BOARD OF CONTRACT AND SUPPLY
CITY OF PROVIDENCE, RHODE ISLAND

REQUEST FOR PROPOSALS

Item Description: 444 IT Server Room

Date to be opened: February 27, 2023

Issuing Department: Public Property

QUESTIONS

- Please direct questions relative to the bidding process, how to fill out forms, and how to submit a bid (Pages 1-8) to Purchasing Agent Chevell Burgess.
    - Phone: (401) 680-5264
    - Email: cburgess@providenceri.gov
        - Please use the subject line "**RFP Question**"
- Please direct questions relative to the Minority and Women's Business Enterprise Program and the corresponding forms (Pages 9-13) to the MBE/WBE Outreach Director for the City of Providence, Grace Diaz
    - Phone: (401) 680-5766
    - Email: gdiaz@providenceri.gov
        - Please use subject line "**MBE WBE Forms**"
- Please direct questions relative to the specifications outlined (beginning on page 14) to the issuing department's subject matter expert:
    - Ben Lobaugh, Capital Improvement Project Manager
    - blobaugh@providenceri.gov

Pre-bid Conference

A non-mandatory pre-bid conference will be held on **February 15, 2023** at **1:30 pm** at **444 Westminster St, Providence, RI 02903**. Participants will meet in the main lobby.

BOARD OF CONTRACT AND SUPPLY
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INSTRUCTIONS FOR SUBMISSION

Bids may be submitted up to **2:15 P.M.** on the above meeting date at the **Department of the City Clerk. Room 311, City Hall. 25 Dorrance Street, Providence.** At 2:15 P.M. all bids will be publicly opened and read at the Board of Contract Meeting in the City Council Chambers, on the 3rd floor of City Hall.

- Bidders must submit **2 copies** of their bid in sealed envelopes or packages labeled with the captioned **Item Description** and the **City Department to which the RFP and bid are related and must include the company name and address on the envelope as well**. (On page 1).
- If required by the Department, please keep the original bid bond and check in only one of the envelopes.
- Communications to the Board of Contract and Supply that are not competitive sealed bids (i.e. product information/samples) should have "**NOT A BID**" written on the envelope or wrapper.
- Only use form versions and templates included in this RFP. If you have an old version of a form do not recycle it for use in this bid.
- The bid envelope and information relative to the bid must be addressed to:

Board of Contract and Supply
Department of the City Clerk – City Hall, Room 311
25 Dorrance Street
Providence, RI 02903

****PLEASE NOTE: This bid may include details regarding information that you will need to provide (such as proof of licenses) to the issuing department before the formalization of an award.**

This information is NOT requested to be provided in your initial bid by design.

All bids submitted to the City Clerk become public record. Failure to follow instructions could result in information considered private being posted to the city's Open Meetings Portal and made available as a public record. The City has made a conscious effort to avoid the posting of sensitive information on the City's Open Meetings Portal, by requesting that such sensitive information be submitted to the issuing department only at their request.

BID PACKAGE CHECKLIST

Digital forms are available in the City of Providence Purchasing Department Office or online at **http://www.providenceri.gov/purchasing/how-to-submit-a-bid/**

The bid package **MUST** include the following, in this order:

- Bid Form 1: Bidder's Blank as the cover page/ 1st page (*see page **6** of this document*)
- Bid Form 2: Certification of Bidder as 2nd page (*see page **7** of this document*)
- Bid Form 3: Certificate Regarding Public Records (*see page **8** of this document)*
- Forms from the Minority and Women Business Enterprise Program: Based on Bidder Category. *See forms and instructions enclosed (pages **9-13**) or on: https://www.providenceri.gov/purchasing/minority-women-owned-business-mbewbe-procurement-program/*

***Please note: MBE/WBE forms must be completed for EVERY bid submitted and must be inclusive of ALL required signatures. Forms without all required signatures will be considered incomplete.**

- Bidder's Proposal/Packet: Formal response to the specifications outlined in this RFP, including pricing information and details related to the good(s) or service(s) being provided. Please be mindful of formatting responses as requested to ensure clarity.
- Financial Assurance, *if requested* (as *indicated on page 5 of this document under "Bid Terms")*

All of the above listed documents are REQUIRED. (With the exception of financial assurances, which are only required if specified on page 5.)

******Failure to meet specified deadlines, follow specific submission instructions, or enclose all required documents with all applicable signatures will result in disqualification, or in an inability to appropriately evaluate bids.***

BOARD OF CONTRACT AND SUPPLY
CITY OF PROVIDENCE, RHODE ISLAND

NOTICE TO VENDORS

1. The Board of Contract and Supply will make the award to the lowest qualified and responsible bidder.
2. In determining the lowest responsible bidder, cash discounts based on preferable payment terms will not be considered.
3. Where prices are the same, the Board of Contract and Supply reserves the right to award to one bidder, or to split the award.
4. No proposal will be accepted if the bid is made in collusion with any other bidder.
5. Bids may be submitted on an "equal in quality" basis. The City reserves the right to decide equality. Bidders must indicate brand or the make being offered and submit detailed specifications if other than brand requested.
6. A bidder who is an out-of-state corporation shall qualify or register to transact business in this State, in accordance with the Rhode Island Business Corporation Act, RIGL Sec. 7-1.2-1401, et seq.
7. The Board of Contract and Supply reserves the right to reject any and all bids.
8. Competing bids may be viewed in person at the Department of the City Clerk, City Hall, Providence, immediately upon the conclusion of the formal Board of Contract and Supply meeting during which the bids were unsealed/opened. Bids may also be accessed electronically on the internet via the City's Open Meetings Portal.
9. As the City of Providence is exempt from the payment of Federal Excise Taxes and Rhode Island Sales Tax, prices quoted are not to include these taxes.
10. In case of error in the extension of prices quoted, the unit price will govern.
11. The contractor will **NOT** be permitted to: a) assign or underlet the contract, or b) assign either legally or equitably any monies or any claim thereto without the previous written consent of the City Purchasing Director.
12. Delivery dates must be shown in the bid. If no delivery date is specified, it will be assumed that an immediate delivery from stock will be made.
13. A certificate of insurance will normally be required of a successful vendor.
14. For many contracts involving construction, alteration and/or repair work, State law provisions concerning payment of prevailing wage rates apply (RIGL Sec. 37-13-1 et seq.)
15. No goods should be delivered, or work started without a Purchase Order.
16. **Submit 2 copies of the bid to the City Clerk, unless the specification section of this document indicates otherwise.**
17. Bidder must certify that it does not unlawfully discriminate on the basis of race, color, national origin, gender, gender identity or expression, sexual orientation and/or religion in its business and hiring practices and that all of its employees are lawfully employed under all applicable federal, state and local laws, rules and regulations. (See Bid Form 2.)

BOARD OF CONTRACT AND SUPPLY
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BID TERMS

1. Financial assurances may be required in order to be a successful bidder for Commodity or Construction and Service contracts. If either of the first two checkboxes below is checked, the specified assurance **must accompany** a bid, or the bid will not be considered by the Board of Contract and Supply. The third checkbox indicates the lowest responsible bidder will be contacted and required to post a bond to be awarded the contract.

   a) ☐ A certified check for **$**_____ must be deposited with the City Clerk as a guarantee that the Contract will be signed and delivered by the bidder.

   b) ☒ A bid bond in the amount of **5** per centum (%) of the proposed total price, must be deposited with the City Clerk as a guarantee that the contract will be signed and delivered by the bidder; and the amount of such bid bond shall be retained for the use of the City as liquidated damages in case of default.

   c) ☒ A performance and payment bond with a satisfactory surety company will be posted by the bidder in a sum equal to one hundred per centum (100%) of the awarded contract.

   d) ☐ No financial assurance is necessary for this item.

2. Awards will be made within **sixty (60) days of bid opening**. All bid prices will be considered firm, unless qualified otherwise. Requests for price increases will not be honored.
3. Failure to deliver within the time quoted or failure to meet specifications may result in default in accordance with the general specifications. It is agreed that deliveries and/or completion are subject to strikes, lockouts, accidents and Acts of God.

The following entry applies only for COMMODITY BID TERMS:

4. Payment for partial delivery will not be allowed except when provided for in blanket or term contracts.

The following entries apply only for CONSTRUCTION AND SERVICE BID TERMS:

5. Only one shipping charge will be applied in the event of partial deliveries for blanket or term contracts.
6. Prior to commencing performance under the contract, the successful bidder shall attest to compliance with the provisions of the Rhode Island Worker's Compensation Act, RIGL 28-29-1, et seq. If exempt from compliance, the successful bidder shall submit a sworn Affidavit by a corporate officer to that effect, which shall accompany the signed contract.
7. Prior to commencing performance under the contract, the successful bidder shall, submit a certificate of insurance, in a form and in an amount satisfactory to the City.

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BID FORM 1: Bidders Blank

1. Bids must meet the attached specifications. Any exceptions or modifications must be noted and fully explained.
2. Bidder's responses must be in ink or typewritten, and all blanks on the bid form should be completed.
3. The price or prices proposed should be stated both in **WRITING** and in **FIGURES**, and any proposal not so stated may be rejected. **Contracts exceeding twelve months must specify annual costs for each year.**
4. Bids **SHOULD BE TOTALED** so that the final cost is clearly stated (unless submitting a unit price bid), however **each item should be priced individually**. Do not group items. Awards may be made on the basis of ***total*** bid or by ***individual items***.
5. All bids **MUST BE SIGNED IN INK.**

Name of Bidder (Firm or Individual): _____

Contact Name: _____

Business Address: _____

Business Phone #: _____

Contact Email Address: _____

Agrees to bid on (Write the "Item Description" here): _____

If the bidder's company is based in a state *other than Rhode Island*, list name and contact information for a local agent for service of process that ***is located within Rhode Island*** _____

Delivery Date (if applicable): _____

Name of Surety Company (if applicable): _____

Total Amount in Writing*: _____

Total Amount in Figures*: _____

**** If you are submitting a unit price bid, please insert "Unit Price Bid"***

Use additional pages if necessary for additional bidding details.

_____

Signature of Representation

_____

Title

BOARD OF CONTRACT AND SUPPLY
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BID FORM 2: Certification of Bidder
(Non-Discrimination/Hiring)

Upon behalf of_____ (Firm or Individual Bidding),

I,_____(Name of Person Making Certification),

being its_____(Title or "Self"), hereby certify that:

1. Bidder does not unlawfully discriminate on the basis of race, color, national origin, gender, sexual orientation and/or religion in its business and hiring practices.
2. All of Bidder's employees have been hired in compliance with all applicable federal, state and local laws, rules and regulations.

I affirm by signing below that I am duly authorized on behalf of Bidder, on this_____day of_____20____.

_____
Signature of Representation

_____
Printed Name

BID FORM 3: Certificate Regarding Public Records

Upon behalf of_____ (Firm or Individual Bidding),

I,_____(Name of Person Making Certification),

being its_____(Title or "Self"), hereby certify an

understanding that:

1. All bids submitted in response to Requests for Proposals (RFP's) and Requests for Qualification (RFQ's), documents contained within, and the details outlined on those documents become public record upon receipt by the City Clerk's office and opening at the corresponding Board of Contract and Supply (BOCS) meeting.
2. The Purchasing Department and the issuing department for this RFP/RFQ have made a conscious effort to request that sensitive/personal information be submitted directly to the issuing department and only at request if verification of specific details is critical the evaluation of a vendor's bid.
3. The requested supplemental information may be crucial to evaluating bids. Failure to provide such details may result in disqualification, or an inability to appropriately evaluate bids.
4. If sensitive information that has not been requested is enclosed or if a bidder opts to enclose the defined supplemental information prior to the issuing department's request in the bidding packet submitted to the City Clerk, the City of Providence has no obligation to redact those details and bears no liability associated with the information becoming public record.
5. The City of Providence observes a public and transparent bidding process. Information required in the bidding packet may not be submitted directly to the issuing department at the discretion of the bidder in order to protect other information, such as pricing terms, from becoming public. Bidders who make such an attempt will be disqualified.

I affirm by signing below that I am duly authorized on behalf of Bidder, on

this_____day of_____20____.

_____

Signature of Representation

_____

Printed Name

WBE/MBE Form Instructions

The City of Providence actively seeks Minority and Women business enterprises to participate in bids to meet the City's procurement needs. Pursuant to the City of Providence Code of Ordinances, Chapter 21, Article II, Sec. 21-52 (Minority and Women's Business Enterprise) and Rhode Island General Laws (as amended), Chapter 31-14, et seq. (Minority Business Enterprise), Minority Business Enterprise (MBE) and Women's Business Enterprise (WBE) participation goals apply to contracts.

The goal for Minority Business Enterprise (MBE) participation is **10%** of the total bid value.
The goal for Women's Business Enterprise (WBE) participation is **10%** of the total bid value.
The goal for combined MBE/WBE participation is **20%** of the total bid value.

Only businesses certified with the State of Rhode Island as minority and/or women business enterprises are counted towards the City's goals. Eligible minority or women-owned businesses are encouraged to seek certification from the State of Rhode Island Minority Business Enterprise Compliance Office at: http://odeo.ri.gov/offices/mbeco/

Note: MBE certification with the State of Rhode Island on the basis of Portuguese heritage is not currently recognized by the City of Providence's MBE program.

Bid Requirements:

All Bidders: All bidders **must complete and submit the *MBE/WBE Participation Affidavit*** indicating whether or not they are a state-certified MBE/WBE and acknowledging the City's participation goals. Submission of this form is **required with every bid**. **Your bid will not be accepted without an affidavit**.

Bidders who will be subcontracting: In addition to the MBE/WBE Participation Affidavit, Bidders who will be subcontracting must submit the ***Subcontractor Disclosure Form*** as part of their bid submission. All subcontractors, regardless of MBE/WBE status, must be listed on this form. Business NAICS codes can be found at https://www.naics.com/search/. Awarded bidders are required to submit

Subcontractor Utilization and Payment Reports with each invoice.

Waiver Requests:

a) If the percentage of the total amount of the bid being awarded to MBE or WBE vendors is less than 20% (Box F on the Subcontractor Disclosure Form) and the prime contractor is not a Rhode Island State-certified MBE or WBE, the Bidder must complete the *MBE/WBE Waiver Request Form* for review.

b) If the prime contractor company has the capacity to perform the whole project, the City of Providence requires the contractor to meet the city's goal of a combined 20% of MBE and WBE participation.

c) If the contractor is a nonprofit organization, the City of Providence requires the nonprofit organization to provide the *MBE/WBE Participation Affidavit Form* and proof of its nonprofit status.

d) If the contractor has researched the RI Certified minority list (http://odeo.ri.gov/offices/mbeco/mbe-wbe.php) and the state does not have any companies in the desired trade, the City of Providence requires the contractor to provide the *MBE/WBE Participation Affidavit Form*.

e) Waivers will be considered for approval on a case-by-case basis.

Verifying MBE/WBE Certification

It is the responsibility of the bidder to confirm that every MBE or WBE named in a proposal and included on a contract is certified by the Rhode Island Minority Business Enterprise Compliance Office. The current MBE/WBE directory is available at the State of RI MBE Office, One Capitol Hill, 2nd Floor, Providence, RI, or online at http://odeo.ri.gov/offices/mbeco/mbe-wbe.php. You can also call (401) 574-8670 to verify certification, expiration dates, and services that the MBE/WBE is certified to provide. Note: MBE certification with the State of Rhode Island on the basis of Portuguese heritage is not currently recognized by the City of Providence's MBE program.

Form Instructions:

Access all bid forms from http://www.providenceri.gov/oeo/ or http://www.providenceri.gov/purchasing/minority-women-owned-business-mbewbe-procurement-program/. Download the forms as blank PDFs. Once saved on your computer, fill them out using the Adobe program. The fillable PDFs must be completed in Adobe in order to be saved property. Google Chrome and similar platforms do not allow for the forms to be saved as filled PDFs. Therefore, please download the blank forms to your computer, then fill them out and save.

Assistance with Form Requirements

Examples of completed forms can be found on the City of Providence website at http://www.providenceri.gov/oeo/ or http://www.providenceri.gov/purchasing/minority-women-owned-business-mbewbe-procurement-program/.

Contract Requirements:

Prime contractors engaging subcontractors must submit the ***Subcontractor Utilization and Payment Report*** to the City Department's Fiscal Agent with every invoice and request for final payment. A copy of all forms should be sent to the MBE/WBE Outreach Director Office, Grace Diaz at gdiaz@providenceri.gov. This form is not submitted as a part of the initial bid package.

For contracts with durations of less than 3 months, this form must be submitted along with the contractor's request for final payment. The form must include all subcontractors utilized on the contract, both MBE/WBE and non- MBE/WBE, the total amount paid to each subcontractor for the given period and to date, A copy of all forms should be sent to the MBE/WBE Outreach Director Office, Grace Diaz at gdiaz@providenceri.gov. During the term of the contract, any unjustified failure to comply with the MBE/WBE participation requirements is a material breach of contract.

Questions?

For more information or for assistance with MBE/WBE Forms, contact the City of Providence MBE/WBE Outreach Director, Grace Diaz, at gdiaz@providenceri.gov or (401) 680-5766.

BOARD OF CONTRACT AND SUPPLY
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MBE/WBE PARTICIPATION AFFIDAVIT

Project /Item Description (as seen on RFP):

_____

_____

_____

Prime Bidder: _____Contact Email and Phone_____

Company Name, Address and Trade: _____

_____

_____

Which one of the following describes your business' status in terms of Minority and/or Woman-Owned Business Enterprise certification with the State of Rhode Island? _____MBE _____WBE _____Neither MBE nor WBE

By initialing the following sections and signing the bottom of this document in my capacity as the contractor or an authorized representative of contractor, I make this Affidavit:

It is the policy of the City of Providence that minority business enterprises (MBEs) and women business enterprises (WBEs) should have the maximum opportunity to participate in procurements and projects as prime contractors and vendors. Pursuant to Sec. 21-52 of the Providence Code of Ordinances and Chapter 31-14 *et seq*. of the Rhode Island General Laws (as amended), MBE and WBE participation goals apply to contracts.

The goal for Minority Business Enterprise (MBE) participation is 10% of the total bid value.
The goal for Women's Business Enterprise (WBE) participation is 10% of the total bid value.
The goal for combined MBE/WBE participation is 20% of the total bid value.

I acknowledge the City of Providence's goals of supporting MBE/WBE certified businesses. Initial _____

If awarded the contract, I understand that my company must submit to the Minority and Women's Business Coordinator at the City of Providence (MBE/WBE Office), copies of all executed agreements with the subcontractor(s) being utilized to achieve the participation goals and other requirements of the RI General Laws. **I understand that these documents must be submitted prior to the issuance of a notice to proceed**. Initial _____

I understand that, if awarded the contract, my firm must submit to the MBE/WBE Office canceled checks and reports required by the MBE/WBE Office on a quarterly basis verifying payments to the subcontractors(s) utilized on the contract. Initial _____

If I am awarded this contract and find that I am unable to utilize the subcontractor(s) identified in my Statement of Intent, I understand that I must substitute another certified MBE and WBE firm(s) to meet the participation goals. **I understand that I may not make a substitution until I have obtained the written approval of the MBE/WBE Office**.
Initial _____

If awarded this contract, I understand that authorized representatives of the City of Providence may examine the books, records and files of my firm from time to time, to the extent that such material is relevant to a determination of whether my firm is complying with the City's MBE/WBE participation requirements.
Initial _____

I do solemnly declare and affirm under the penalty of perjury that the contents of the foregoing Affidavit are true and correct to the best of my knowledge, information, and belief.

_____ _____
Signature of Bidder Printed Name

_____ _____
Company Name Date

BOARD OF CONTRACT AND SUPPLY
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SUBCONTRACTOR DISCLOSURE FORM

Fill out this form only if you WILL SUBCONTRACT with other parties. If you will not subcontract any portion of the proposed bid, do not fill out this form.

Prime Bidder: _____ Primary NAICS_____
Code:_____

Item Description (as seen on RFP): _____

_____

Please list all Subcontractors below. Include the total dollar value that you propose to share with each subcontractor and the dollar amount to be subcontracted. Please check off MBE and WBE where applicable. The directory of all state-certified MBE/WBE firms is located at www.mbe.ri.gov. Business NAICS codes can be found at https://www.naics.com/search/

Proposed Subcontractor	MBE	WBE	Primary NAICS Code	Date of Mobilization	$ Value of Subcontract
					$
					$
					$
					$
					$
					$
A. MBE SUBCONTRACTED AMOUNT:					$
B. WBE SUBCONTRACTED AMOUNT:					$
C. NON-MBE WBE SUBCONTRACTED AMOUNT:					$
D. DOLLAR AMOUNT OF WORK DONE BY THE PRIME CONTRACTOR:					$
E. TOTAL AMOUNT OF BID (SUM OF A, B, C, & D):					$
F. PERCENTAGE OF BID SUBCONTRACTED TO MBEs AND WBEs. (Divide the sum of A and B by E and multiply result by 100).					%

Please read and initial the following statement acknowledging you understand. If the percentage of the total amount of the bid being awarded to MBE or WBE vendors is less than 20% (Box (F) and the prime contractor is NOT a Rhode Island State-certified MBE or WBE, **you must fill out the MBE/WBE WAIVER REQUEST FORM for consideration by City of Providence MBE/WBE Outreach Director**. Initial _____ Required

_____ _____
Signature of Bidder Printed Name

BOARD OF CONTRACT AND SUPPLY
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MBE/WBE Waiver Request Form

Fill out this form only if you did not meet the 20% MBE/WBE participation goal.
State-certified MBE or WBE Prime Bidders are NOT REQUIRED to fill out this form.

Submit this form to the City of Providence MBE/WBE Outreach Director, Grace Diaz, at mbe-wbe@providenceri.gov, for review **prior to bid submission.** This waiver applies only to the current bid which you are submitting to the City of Providence and does not apply to other bids your company may submit in the future. **In case a waiver is need it City Department Directors should not** recommend a bidder for award if this form is not included, absent or is not signed by the city of Providence MBE/WBE director**.**

Prime Bidder: _____ Contact Email and Phone_____
Company Name, Address: _____ Trade _____
Project /Item Description (as seen on RFP):
_____
_____

To receive a waiver, you must list the certified MBE and/or WBE companies you contacted, the name of the primary individual with whom you interacted, and the reason the MBE/WBE company could not participate on this project.

MBE/WBE Company Name	Individual's Name	Company Name	Why did you choose not to work with this company?

I acknowledge the City of Providence's goal of a combined MBE/WBE participation is 20% of the total bid value. I am requesting a waiver of _____ % MBE/WBE (20% minus the value of **Box F** on the Subcontractor Disclosure Form). If an opportunity is identified to subcontract any task associated with the fulfillment of this contract, a good faith effort will be made to select MBE/WBE certified businesses as partners.

_____ _____ _____
Signature of Prime Contractor / or Duly Authorized Representative Printed Name
Date Signed

_____ _____ _____
Signature of City of Providence (or Designee (Only) Printed Name of City of Providence Date Signed
MBE/WBE Outreach Director MBE/WBE Outreach Director

BOARD OF CONTRACT AND SUPPLY
CITY OF PROVIDENCE, RHODE ISLAND

Supplemental Bid Form

To whom it may concern:

1. The undersigned, having familiarized (himself) (herself) (themselves) (itself) with the **444 IT SERVER ROOM** bid affecting the cost of work, and with the Contract Documents (which includes the Invitation for Bids, Instructions to Bidders, Form of Bid Bond, Form of Agreements, form of Non-Collusive Affidavit, Addenda (if any), Drawings, Technical Specification, Form of Surety Bond(s); as prepared by the Department of Public Property, and on file in the office of the City Clerk 3rd Floor, City Hall, Providence, RI 02903, hereby proposes to furnish all supervision, technical personnel, labor, materials, machinery, tools, equipment and services including utility and transportation services, and to perform such other required work for the **444 IT SERVER ROOM** and such other required and incidental work, complete, all in accordance with the above listed documents and for the unit prices for work in-place for the following items and quantities.

2. In submitting this Bid, the bidder understands that the right is reserved by the Department of Public Property to reject any and all Bids, If written notice of acceptance of this Bid is mailed, telegraphed or delivered to the undersigned within (90) days after the opening thereof, or at any time thereafter before this Bid is withdrawn, the undersigned agrees to execute and deliver an Agreement in the prescribed form and furnish the required bond within (10) days after the Agreement is presented to him/her for signature.

Herewith in accordance with the instructions to Bidders.

3. Attached hereto is an affidavit in proof that the undersigned has not colluded with any person in respect to this. Bid or any bids for the Contractor for which this Bid is submitted. Also attached is a Statement of Bidder's Qualifications.

4. Application unit prices are contained in the Agreement (established as the result of either a Unit Price Bid or a Supplemental Schedule of Unit Prices), the City of Providence may order the Contractor to proceed with desired changes in the work, the value of such changes to be determined by the measured quantities involved and the application unit prices specified in the Contract.

5. The City of Providence reserves the right to determine the lowest responsible Bidder based on past experience with the City and/or recommendations by City and/or state agencies with an interest in this procurement. The City reserves the right to award the project to the appropriate bidder in the best interest of the City of Providence.

CERTIFICATION OF NON-SEGREGATED FACILITIES

The Bidder certifies that he/she does not maintain or provide for his/her employees any segregated facilities at any of his establishments, and that he/she does not permit his/her employees to perform their services at any location, under his/her control, where segregation facilities are maintained. The Bidder agrees that a breach of this certification will be a violation of the Equal Opportunity Clause in any contract resulting from acceptance of this Bid. As used in this certification, term "segregation facilities" means any waiting rooms, work rooms, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation and housing facilities provided for employee which are segregated by explicit directive or are in fact segregated on basis of race, color, religion, or national origin, because of habit, local custom, or otherwise. The Bidder agrees that (except where he/she has obtained identical certification from proposed subcontractors for specific time periods) he/she will obtain identical certification from proposed subcontractor prior to the award of subcontracts exceeding $10,000.00 which are not exempt from provisions of the Equal Opportunity Clause, and that he /she will retain such certifications in his/her files.

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. & 1001.

DATE _____, 20___

Name of Bidder and Official Address:

_____

_____

_____

Name of Authorized Representative (Contact):

_____

By _____
(Signature)

Title _____

E-Mail: _____

Phone: _____

Bidder shall indicate, in space provided,
the earliest possible Project Start-up Date:_____, 20 _____

ADDENDA: The undersigned acknowledges receipt of the following Addenda, if any, and has included the provisions thereof in this Bid (If Any):

Addendum No.	**Date**	**Addendum No.**	**Date**
_____	_____, 20 ____	_____	_____, 20 ____
_____	_____, 20 ____	_____	_____, 20 ____

Sub-Contractors (If Any):

Name: _____ **Scope of Work:** _____ **MBE / WBE**

Name: _____ **Scope of Work:** _____ **MBE / WBE**

Name: _____ **Scope of Work:** _____ **MBE / WBE**

BASE BID BREAKDOWN: 444 IT SERVER ROOM

See Bid Set Drawings and Project Manual dated 1/18/23 for full project scope.

Fill out the following form for a breakdown of Base Bid costs. Overhead and profit, bonds, and similar fees may be included under 01 General Requirements. Add any additional rows of breakouts as needed. This breakdown is not binding, and a finalized Schedule of Values for billing will be established following bid award and contract execution.

Division	Lump Sum Cost
01 General Requirements	$
02 Existing Conditions	$
03 Concrete	$
05 Metals	$
06 Wood, Plastics, & Composites	$
08 Openings	$
09 Finishes	$
10 Specialties	$
22 Plumbing	$
23 HVAC	$
26 Electrical	$
28 Electronic Safety & Security	$
TOTAL BASE BID	**$**

ALTERNATES

DEDUCT ALTERNATE #1 (Sheet A1.0)
Provide the cost savings to install wall type 1 as shown in plan detail 2/A1.2 such that the existing electrical equipment can remain in place as a deduct alternate for the Owner's consideration.

Deduct Alternate #1	**$**

UNIT PRICES

Unit Price #1: The demolition of the existing ACT (tile/grid/accessories) in the main storage area, not currently called out for removal.	**$** **per Square Foot**
Unit Price #2: The installation of new ACT (tile/grid/accessories) in the main storage area, not currently called out for new ACT.	**$** **per Square Foot**

BIDDER: _____

ADDITIONAL INFORMATION REQUIRED WITH BID:

- Qualifications to Perform Work – See Form Below for Information Required
- Minority Participation Forms – 10% MBE / 10 % WBE Goal on this Project
- Addenda (If Any) - Must Be Acknowledged on Bid Form
- Product Information for Items Submitted as 'Or Equal' to Specified Materials

PROVISIONS OF THIS PROJECT:

- Upon the Issuance of the Award from the Board of Contract – the City shall issue a Contract to be executed by the City and the vendor incorporating the bid specifications. All Provisions of the Specifications are binding.
- Any Permits Required by the City of Providence and/or State of Rhode Island Shall be Obtained by the Vendor – Permit Fees by the City of Providence Shall be Waived – the State ADA Fee Must be Paid
- The Davis Bacon Act Applies– Prevailing Wages Must Be Paid for On Site Hours – On-Site Interviews will be Conducted During the Project – Employees Shall be Advised of the Prevailing Wage Rates Prior to Mobilization on Site.
- Weekly Certified payrolls must be Submitted with Pay Requests Including Monthly Utilization Form
- An Insurance Certificate Shall be Submitted to the City Within 10 Days of Award
- A Copy of the Vendors Contractor's License Must be Submitted within 10 Days of Award
- All On-Site Personnel Shall be Licensed (If Required) and Shall have Proof of All Licenses Required by the State of Rhode Island to Perform the Work Required
- Pay Requests Must be Submitted on Approved AIA Billing Documents (City will Provide if Needed)
- All Subcontractors Shall be Listed on the Bid Form – All Insurance & Payroll Requirements Apply
    - General Contractor Shall be the Insurance Certificate Holder and the City Shall be Named as 'Additionally Insured' with Respect to Liability Insurance
- A Submittal Log Must be Submitted within 10 Days of Award

CLOSE OUT DOCUMENTS:

- Prior to Final Payment the Vendor Shall Provide the Following:
    - Copies of Permits Signed off and Approved (If Any)
    - Operating Manuals and Warranties Shall Be Transferred and/or Delivered
    - Full and Completed As-Built Drawings Shall be Submitted for Approval
    - Training Shall be Provided to City Personnel (If Required)
    - Certification by Manufactures Representative (If Required)

QUALIFICATIONS:

Qualifications will be evaluated on the basis of similar project experience for:

a. Completion of at least three similar projects within the last five years.
b. Size and dollar value of similar completed projects.
c. Contractor's performance with similar projects. (references will be checked)
d. Relevant experience of individuals assigned to the project.

Questions regarding this bid package shall be submitted via e-mail to **Chevell Burgess** at cburgess@providenceri.gov and **Ben Lobaugh, Capital Improvement Project Manager** at blobaugh@providenceri.gov , no later than five (5) working days before the bid opening date.

Ben Lobaugh is the project contact and can be reached at 401-680-5548.

SUPPLEMENTAL INFORMATION

If the issuing department for this RFP determines that your firm's bid is best suited to accommodate their need, you will be asked to provide proof of the following prior to formalizing an award.

An inability to provide the outlined items at the request of the department may lead to the disqualification of your bid.

This information is <u>NOT</u> requested to be provided in your initial bid that you will submit to the City Clerk's office by the "date to be opened" noted on page 1. This list only serves as a list of items that your firm should be ready to provide on request.

<u>All bids submitted to the City Clerk become public record</u>. Failure to follow instructions could result in information considered private being posted to the city's Open Meetings Portal and made available as a public record.

You must be able to provide:

- Business Tax ID will be requested after an award is approved by the Board of Contract and Supply.
- Proof of Insurance
- Contractor Licenses
- Bid Bond and Performance and Payment Bonds

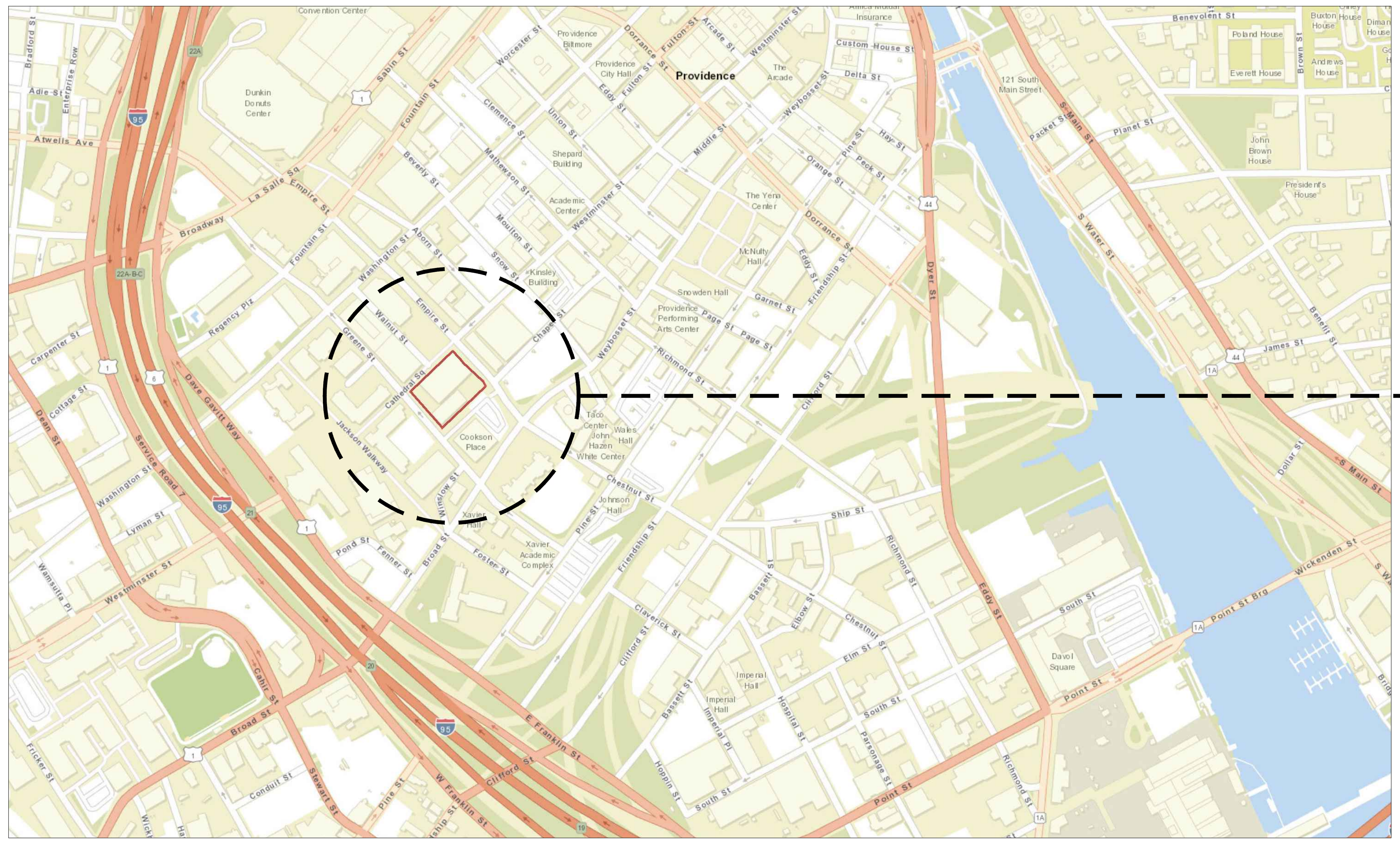
BOARD OF CONTRACT AND SUPPLY
CITY OF PROVIDENCE, RHODE ISLAND

CITY OF PROVIDENCE STANDARD TERMS & CONDITIONS

1. The terms "you" and "your" contained herein refer to the person or entity that is a party to the agreement with the City of Providence ("the City") and to such person's or entity's employees, officers, and agents.
2. The Request For Proposals ("RFP") and these Standard Terms and Conditions together constitute the entire agreement of the parties ("the Agreement") with regard to any and all matters. By your submission of a bid proposal or response to the City's RFP, you accept these Standard Terms & Conditions and agree that they supersede any conflicting provisions provided by bid or in any terms and conditions contained or linked within a bid and/or response. Changes in the terms and conditions of the Agreement, or the scope of work thereunder, may only be made by a writing signed by the parties.
3. You are an independent contractor and in no way does this Agreement render you an employee or agent of the City or entitle you to fringe benefits, workers' compensation, pension obligations, retirement or any other employment benefits. The City shall not deduct federal or state income taxes, social security or Medicare withholdings, or any other taxes required to be deducted by an employer, and this is your responsibility to yourself and your employees and agents.
4. You shall not assign your rights and obligations under this Agreement without the prior written consent of the City. Any assignment without prior written consent of the City shall be voidable at the election of the City. The City retains the right to refuse any and all assignments in the City's sole and absolute discretion.
5. Invoices submitted to the City shall be payable sixty (60) days from the time of receipt by the City. Invoices shall include support documentation necessary to evidence completion of the work being invoiced. The City may request any other reasonable documentation in support of an invoice. The time for payment shall not commence, and invoices shall not be processed for payment, until you provide reasonably sufficient support documentation. In no circumstances shall the City be obligated to pay or shall you be entitled to receive interest on any overdue invoice or payment. In no circumstances shall the City be obligated to pay any costs associated with your collection of an outstanding invoice.
6. For contracts involving construction, alteration, and/or repair work, the provisions of applicable state labor law concerning payment of prevailing wage rates (R.I. Gen. Laws §§ 37-13-1 et seq., as amended) and the City's First Source Ordinance (Providence Code of Ordinances §§ 21-91 et seq., as amended) apply.
7. With regard to any issues, claims, or controversies that may arise under this Agreement, the City shall not be required to submit to dispute resolution or mandatory/binding arbitration. Nothing prevents the parties from mutually agreeing to settle any disputes using mediation or non-binding arbitration.
8. To the fullest extent permitted by law, you shall indemnify, defend, and hold harmless the City, its employees, officers, agents, and assigns from and against any and all claims, damages, losses, allegations, demands, actions, causes of action, suits, obligations, fines, penalties, judgments, liabilities, costs and expenses, including but not limited to attorneys' fees, of any nature whatsoever arising out of, in connection with, or resulting from the performance of the work provided in the Agreement.
9. You shall maintain throughout the term of this Agreement the insurance coverage that is required by the RFP or, if none is required in the RFP, insurance coverage that is considered in your industry to be commercially reasonable, and you agree to name the City as an additional insured on your general liability policy and on any umbrella policy you carry.
10. The City shall not subject itself to any contractual limitations on liability. The City shall have the time permitted within the applicable statute of limitations, and no less, to bring or assert any and all causes of action, suits, claims or demands the City may have arising out of, in connection with, or resulting from the performance of the work provided in the Agreement, and in no event does the City agree to limit your liability to the price of the Agreement or any other monetary limit.
11. The City may terminate this Agreement upon five (5) days' written notice to you if you fail to observe any of the terms and conditions of this Agreement, or if the City believes your ability to perform the

terms and conditions of this Agreement has been materially impaired in any way, including but in no way limited to loss of insurance coverage, lapsing of a surety bond, if required, declaration of bankruptcy, or appointment of a receiver. In the event of termination by the City, you shall be entitled to just and equitable compensation for any satisfactory work completed and expenses incurred up to the date of termination.

12. Written notice hereunder shall be deemed to have been duly served if delivered in person to the individual or member of the firm or entity or to an officer of the entity for whom it was intended, or if delivered at or sent by registered or certified mail to the last business address known by the party providing notice.
13. In no event shall the Agreement automatically renew or be extended without a writing signed by the parties.
14. You agree that products produced or resulting from the performance of the Agreement are the sole property of the City and may not be used by you without the express written permission of the City.
15. For any Agreement involving the sharing or exchange of data involving potentially confidential and/or personal information, you shall comply with any and all state and/or federal laws or regulations applicable to confidential and/or personal information you receive from the City, including but not limited to the Rhode Island Identity Theft Protection Act, R.I. Gen. Laws § 11-49.3-1, during the term of the Agreement. You shall implement and maintain appropriate physical, technical, and administrative security measures for the protection of, and to prevent access to, use, or disclosure of, confidential and/or personal information. In the event of a breach of such information, you shall notify the City of such breach immediately, but in no event later than twenty-four (24) hours after discovery of such breach.
16. The Agreement is governed by the laws of the State of Rhode Island. You expressly submit yourself to and agree that any and all actions arising out of, in connection with, or resulting from the performance of the Agreement or relationship between the parties shall occur solely in the venue and jurisdiction of the State of Rhode Island or the federal court located in Rhode Island.
17. The failure of the City to require performance of any provision shall not affect the City's right to require performance at any time thereafter, nor shall a waiver of any breach or default of this Agreement constitute a waiver of any subsequent breach or default or a waiver of the provision itself.
18. If any term or provision of this Agreement, or the application thereof to any person or circumstance shall, in any extent, be invalid or unenforceable, the remainder of this Agreement shall not be affected thereby, and each term and provision shall be valid and enforceable to the fullest extent permitted by law.



LOCUS MAP

N

BUILDING SITE

444 WESTMINSTER ST
PROVIDENCE, RI 02903
PLAT 24 / LOT 617

PROJECT TITLE:

IT ROOM RENOVATION

PROJECT NUMBER:

2224

ISSUED FOR:

BID SET

01/18/2023

STAMP:

ARCHITECT
Eric Army, Project Architect

SignalWorks

Signal Works
11 Aleppo Street
Providence, RI 02909
p 401 . 400 . 2724

MEP ENGINEERS

Engineering Design Services
141 Industrial Highway
Slatersville, RI 02876
p 401 . 765 . 7659

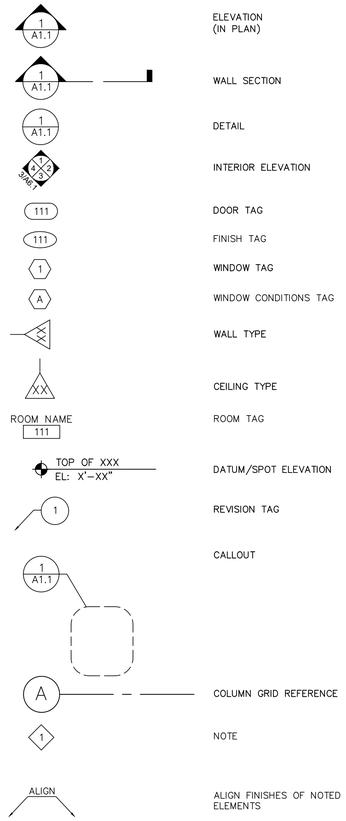
OWNER
BEN LOBAUGH
CAPITAL IMPROVEMENT
PROJECT MANAGER

DEPARTMENT OF PUBLIC
PROPERTY
PROVIDENCE CITY HALL
25 DORRANCE STREET
PROVIDENCE, RI 02903
(401) 680-5548

ABBREVIATIONS

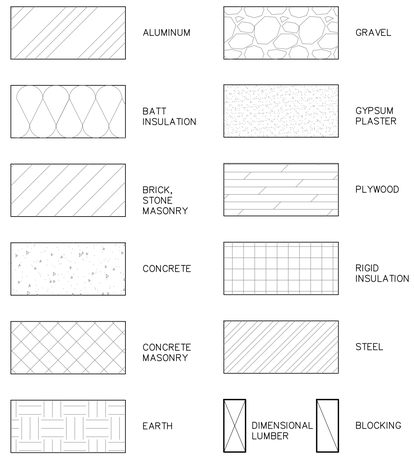
&	AND
L	ANGLE
@	AT
CL	CENTERLINE
Ø	DIAMETER
#	NUMBER
ACOUS	ACOUSTICAL
ACT	ACOUSTICAL CEILING TILE
ADDEN	ADDENDUM
ADD'L	ADDITIONAL
ADJ	ADJUSTMENTS
AFF	ABOVE FINISHED FLOOR
AGGR	AGGREGATE
AHU	AIR HANDLER UNIT
AL	ALUMINUM
APPX	APPENDIX
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL
ASPH	ASPHALT
AWT	ACOUSTICAL WALL TREATMENT
BITUM	BITUMINOUS
BLDG	BUILDING
BLK	BLOCK
BM	BEAM
B.O.	BOTTOM OF
BOD	BOTTOM OF ROOF DECK
BOT	BOTTOM
BRD	BOARD
BYND	BEYOND
CAB	CABINET
CB	CATCH BASIN
CEM	CEMENT
CER	CERAMIC
CJ	CONTROL JOING
CLAD	CLADDING
CLG	CEILING
CLO	CLOSET
CLP	CLAP BOARD
CLR	CLEAR
CNTR	COUNTER
CO	CASED OPENING
COL	COLUMN
COMP	COMPRESSIBLE
CONC	CONCRETE
CONN	CONNECTION
CONSTR	CONSTRUCTION
CONT	CONTINUOUS
CORR	CORRIDOR
CPT	CARPET
CT	CERAMIC TILE
CTR	CENTER
CTSK	COUNTERSUNK
DBL	DOUBLE
DEPT	DEPARTMENT
DF	DRINKING FOUNTAIN
DET	DETAIL
DIA	DIAMETER
DIM	DIMENSION
DISP	DISPENSER
DN	DOWN
DO	DOOR OPENING
DR	DOOR
DWR	DRAWER
DS	DOWNSPOUT
DSP	DRY STANDPIPE
DWG	DRAWING
E	EAST
EA	EACH
EJ	EXPANSION JOIN
ELEC	ELECTRICAL
ELEV	ELEVATION
EMER	EMERGENCY
ENCL	ENCLOSURE
EP	ELECTRICAL PANELBOARD
EPS	EXTRUDED POLYSTYRENE
EQ	EQUAL
EQPT	EQUIPMENT
EVTR	ELEVATOR
EWC	ELECTRIC WATER COOLER
EXIST	EXISTING
ETR	EXISTING TO REMAIN
EXPO	EXPOSED
EXP	EXPANSION
EXT	EXTERIOR
FA	FIRE ALARM
FAP	FIRE ALARM PANEL
FBO/IBC	FURNISHED BY OWNER/ INSTALLED BY CONTRACTOR
FBO/IBO	FURNISHED BY OWNER/ INSTALLED BY OWNER
FC	FLOOR CLEAN OUT
FD	FLOOR DRAIN
FDC	FIRE DEPARTMENT CONNECT
FDN	FOUNDATION
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FHC	FIRE HOSE CABINET
FF	FINISH FLOOR
FIN	FINISH
FL	FLOOR
FLASH	FLASHING
FLUOR	FLUORESCENT
FM	FLOOR MAT
FOC	FACE OF CONCRETE
FOF	FACE OF FINISH
FOS	FACE OF STUD
FOW	FACE OF WALL
FP	FIRE PROTECTION
FRPF	FIREPROOF
FR	FIRE RATED
FRP	FIBERGLASS REINFORCED PLASTIC
FRT	FIRE RETARDANT TREATED
FS	FULL SIZE
FT	FOOT OF FEET
FTG	FOOTING
FURR	FURRING
FUT	FUTURE
GC	GENERAL CONTRACTOR
GA	GAUGE
GALV	GALVANIZED
GB	GRAB BAR
GL	GLASS
GL BLK	GLASS BLOCK
GND	GROUND
GR	GRADE
GWB	GYPSUM WALL BOARD
GYP	GYPSUM
HDCP	HANDICAP
HB	HOSE BIB
HC	HOLLOW CORE
HDWD	HARDWOOD
HDWE	HARDWARE
HM	HOLLOW METAL
HORIZ	HORIZONTAL
HP	HIGH POINT
HR	HOUR
HGT	HEIGHT
ID	INSIDE DIMENSION
INSUL	INSULATION
INT	INTERIOR
INTERM	INTERMEDIATE
JA	JANITOR
JT	JOINT
KIT	KITCHEN
LOD	LIMIT OF DISTURBANCE
LAB	LABORATORY
LAM	LAMINATE
LAV	LAVATORY
LCC	LEAD COATED COPPER
LH	LEFT HAND
LKR	LOCKER
LP	LOW POINT
LT	LIGHT
MATL	MATERIAL
MAX	MAXIMUM
M.O.E.	MEANS OF EGRESS
MECH	MECHANICAL
MEMB	MEMBRANE
MEP	MECHANICAL, ELECTRICAL, PLUMBING
MTL	METAL
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MO	MASONRY OPENING
MR	MOISTURE RESISTANT
MTD	MOUNTED
MUL	MULLION
N	NORTH
NIC	NOT IN CONTRACT
NO	NUMBER
NOM	NOMINAL
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OFF	OFFICE
OPNG	OPENING
OVHD	OVERHEAD
PART	PARTITION
PC	PRECAST
PCT	PORCELAIN CERAMIC TILE
PERF	PERFORATED
PL	PLASTIC
PLAM	PLASTIC LAMINATE
PLAS	PLASTER
PLUMB	PLUMBING
PLYWD	PLYWOOD
PNL	PANEL
POL	POLISHED
POLY	POLYETHYLENE
PR	PAIR
PS	PULL STATION
PT	PAINT
R	RISER
RAD	RADIUS
RB	RESILIENT BASE
RCP	REFLECTED CEILING PLAN
RD	ROOF DRAIN
REF	REFERENCE
REINF	REINFORCED
REM	REMOVE
REQ'D	REQUIRED
REQ'MTS	REQUIREMENTS
RESI	RESISTANT
REV	REVISION
RM	ROOM
RO	ROUGH OPENING
ROW	RIGHT OF WAY
S	SOUTH
SC	SOLID CORE
SCHED	SCHEDULE
SECT	SECTION
SF	SEAMLESS FLOORING
SH	SHELF
SHWR	SHOWER
SHT	SHEET
SIM	SIMILAR
SPEC	SPECIFICATION
SQ	SQUARE
SS	STAINLESS STEEL
STD	STAINED
STL	STEEL
STOR	STORAGE
STRUCT	STRUCTURE
SUSP	SUSPENDED
SYM	SYMMETRICAL
SYS	SYSTEM
T&G	TONGUE AND GROOVE
TBD	TO BE DETERMINED
THK	THICK
TOC	TOP OF CURB
TOP	TOP OF PARAPET
TOS	TOP OF SLAB
TOW	TOP OF WALL
TYP	TYPICAL
UNF	UNFINISHED
UNO	UNLESS NOTED OTHERWISE
UON	UNLESS OTHERWISE NOTED
VEN	VENEER
VB	VAPOR BARRIER
VERT	VERTICAL
VEST	VESTIBULE
VIF	VERIFY IN FIELD
W	WEST
W/	WITH
WB	WOOD BASE
WC	WATER CLOSET
WD	WOOD
W/O	WITHOUT
WP	WATERPROOF
WT	WEIGHT
WWF	WELDED WIRE FABRIC

SYMBOLS



1 TITLE OF DRAWING — TITLE MARK
A1.1 SCALE:

MATERIALS



Signal Works

11 Aleppo Street
Providence RI 02909
401.400.2724
SignalWorksArchitecture.com

CONSULTANT:

PROJECT TITLE:
IT ROOM RENOVATION
444 WESTMINSTER ST
PROVIDENCE, RI 02903

ISSUED FOR:
BID SET
01/18/2023

REVISIONS:
~ 01/18/23 BID SET

STAMP:

SHEET TITLE:
SYMBOLS & ABBREVIATIONS

PROJECT NORTH:
N

PROJECT ARCHITECT: BB
DRAWN: JG

PROJECT NUMBER:
#2224

SHEET NUMBER:
A0.1

REV:
~

GENERAL CONDITIONS NOTES:

1. THE CONTRACTOR SHALL VISIT THE SITE AND BE FULLY COGNIZANT OF ALL EXISTING CONDITIONS PRIOR TO SUBMITTING ANY PROPOSITIONS OR BIDS. IF ANY ASBESTOS, KNOWN MATERIALS CONTAINING ASBESTOS OR ANY MATERIALS CLASSIFIED BY THE EPA AS HAZARDOUS MATERIALS ARE DISCOVERED, THEN THE CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE WITH THE OWNER, AS REQUIRED, FOR THE REMOVAL OF THESE CONDITIONS, PRIOR TO THE BEGINNING OF THIS PROJECT. IF THE CONTRACTOR PARTICIPATES IN ANY PORTION OF THE REMOVAL PROCESS IN HIS COORDINATION WITH THE OWNER, THEN THE CONTRACTOR SHALL PROVIDE THE OWNER WITH A WRITTEN STATEMENT RELEASING THE OWNER OF ANY FUTURE LIABILITY FROM THE CONTRACTOR, HIS EMPLOYEES AND ANY SUBCONTRACTORS HIRED BY THE CONTRACTOR RELATED TO THIS WORK. THESE DRAWINGS AND SPECIFICATIONS DO NOT REPRESENT AN ASSESSMENT OF THE PRESENCE OR AN ASSESSMENT OF THE ABSENCE OF ANY TOXIC OR HAZARDOUS MATERIALS ON THIS PROJECT SITE. THE OWNERS ARE SOLELY RESPONSIBLE FOR SUCH AN ASSESSMENT AND SHOULD BE CONSULTED FOR ANY QUESTIONS THEREIN. IF THE CONTRACTOR DISCOVERS ANY TOXIC OR HAZARDOUS MATERIALS, AS DEFINED BY THE APPROPRIATE GOVERNING AUTHORITIES, IN THE COURSE OF HIS WORK, HE MUST NOTIFY THE OWNERS IN WRITING, AS PER THE GUIDELINES BY ALL GOVERNING AUTHORITIES. THE CONTRACTOR SHALL RESOLVE THE APPLICABLE REGULATIONS AND PROCEDURES WITH THE OWNER AT THE TIME OF DISCOVERY.

2. ALL WORK IS TO BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE CODES, LAWS, ORDINANCES AND LOCAL MUNICIPAL REGULATIONS AND AMENDMENTS RELATED TO THIS PROJECT. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE OWNER AT ONCE UPON DISCOVERY OF ANY CONFLICTS OR DISCREPANCIES BETWEEN THE AFOREMENTIONED AND THE WORK CONTRACTED FOR THIS PROJECT OR A CHANGE OF AN APPLICABLE CODE OR STATUE BY LOCAL AUTHORITIES.

3. THE CONTRACTOR SHALL COORDINATE AND BE RESPONSIBLE FOR ALL WORK BY HIS SUBCONTRACTORS AND THEIR COMPLIANCE WITH ALL THESE GENERAL NOTES. THE CONTRACTOR SHALL IDENTIFY ANY CONFLICTS BETWEEN THE WORKS OF THE SUBCONTRACTORS, AS DIRECTED BY THESE DRAWINGS, DURING THE LAYOUT OF THE AFFECTED TRADES. THE CONTRACTOR SHALL REVIEW THESE CONDITIONS WITH THE ARCHITECTURAL DESIGNER FOR DESIGN CONFORMANCE BEFORE BEGINNING ANY INSTALLATION.

4. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING AND PROPOSED DIMENSIONS AND CONDITIONS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE OWNER AT ONCE UPON THE DISCOVERY OF ANY CONFLICTS OR DISCREPANCIES BETWEEN THE AFOREMENTIONED AND THE DRAWINGS AND SPECIFICATIONS OF THIS PROJECT. THE CONTRACTOR SHOULD FOLLOW DIMENSIONS AND SHOULD NOT SCALE THESE DRAWINGS. IF DIMENSIONS ARE REQUIRED BUT NOT SHOWN, THEN THE CONTRACTOR SHALL REQUEST THE DIMENSIONS FROM THE OWNER BEFORE BUILDING ANY PART OF THE PROJECT, WHICH REQUIRES THE MISSING DIMENSIONS.

5. ANY CHANGES, ALTERNATIVES OR MODIFICATIONS TO THESE DRAWINGS AND SPECIFICATIONS MUST BE APPROVED IN WRITING BY THE OWNER, AND ONLY WHEN SUCH WRITTEN APPROVAL CLEARLY STATES THE AGREED COST OR CREDIT OF THE CHANGE, ALTERNATIVE OR MODIFICATION TO THIS PROJECT. FOR INFORMATION, DRAWINGS OR OTHER DOCUMENTS, NOT SHOWN OR INCLUDED IN THE PERMIT OR CONSTRUCTION DRAWINGS OR SPECIFICATIONS, THE CONTRACTOR SHALL REQUEST THE MISSING INFORMATION, DRAWINGS OR DOCUMENTS FROM THE OWNER BEFORE STARTING OR PROCEEDING WITH THE CONSTRUCTION AFFECTED BY THE MISSING INFORMATION, DRAWINGS OR DOCUMENTS.

6. THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS IS TO PROVIDE THE DESIGN GUIDANCE FOR THE CONTRACTOR TO REASONABLY PLAN FOR ALL ITEMS NECESSARY FOR A COMPLETE JOB. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE ALL MATERIALS, LABOR AND EXPERTISE NECESSARY TO ACHIEVE A COMPLETE JOB AS INTENDED IN THESE DRAWINGS AND SPECIFICATIONS. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, FINAL DIMENSIONS AND PROCEDURES FOR THE WORK SHOWN ON THESE DRAWINGS AND SPECIFICATIONS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENACT THE AFOREMENTIONED IN COMPLIANCE WITH GENERALLY ACCEPTED STANDARDS OF PRACTICE FOR THE CONSTRUCTION INDUSTRY FOR THE TYPE OF WORK SHOWN ON THESE DRAWINGS AND SPECIFICATIONS. THE OWNER RESERVES THE RIGHT OF REVIEW FOR ALL MATERIALS AND PRODUCTS FOR WHICH NO SPECIFIC BRAND NAME OR MANUFACTURER IS IDENTIFIED IN THESE DRAWINGS AND SPECIFICATIONS. (7?) THE CONTRACTOR SHALL VERIFY WITH THE OWNER THE NEED FOR SHOP DRAWINGS OR SAMPLES OF MATERIALS OR PRODUCTS, WHICH WERE NOT IDENTIFIED IN THESE DRAWINGS OR SPECIFICATIONS, AS WELL AS ANY MATERIAL, PRODUCT OR EQUIPMENT SUBSTITUTIONS PROPOSED IN PLACE OF THOSE ITEMS IDENTIFIED IN THESE DRAWINGS AND SPECIFICATIONS.

7. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY AND COORDINATE ALL UTILITY CONNECTIONS, UTILITY COMPANIES' REQUIREMENTS AND INCLUDE ANY RELATED COSTS ASSOCIATED WITH THIS RESPONSIBILITY IN THE PROPOSAL OR BID. THE CONTRACTOR IS ALSO RESPONSIBLE FOR WRITING LETTERS OF CONFORMATION REGARDING OPERATIVE AGREEMENTS FOR THIS PROJECT BETWEEN THE CONTRACTOR AND THE LOCAL FIRE DEPARTMENT; THE LOCAL WATER AGENCY; THE LOCAL NATURAL OR PROPANE GAS PROVIDER; THE LOCAL ELECTRICITY PROVIDER; THE LOCAL TELEPHONE SERVICE PROVIDERS; THE LOCAL CABLE TV PROVIDER; THE OWNER'S SECURITY SERVICE PROVIDER AND ANY UNNAMED UTILITY TYPE SERVICE PROVIDER. THE CONTRACTOR SHALL PROVIDE COPIES OF ANY SUCH AGREEMENTS TO THE OWNER, IF REQUIRED OR REQUESTED.

8. THE CONTRACTOR IS FULLY RESPONSIBLE TO ENACT THE APPROPRIATE SAFETY PRECAUTIONS REQUIRED TO MAINTAIN A SAFE WORKING ENVIRONMENT. THE CONTRACTOR SHALL ALSO INDEMNIFY AND HOLD HARMLESS THE OWNER, THEIR CONSULTANTS AND EMPLOYEES FROM ANY PROBLEMS, WHICH RESULT FROM THE CONTRACTOR'S PERFORMANCE OF THE WORK RELATED TO THE SAFETY OF THE CONSTRUCTION SITE.

9. THE CONTRACTOR SHALL CARRY THE APPROPRIATE WORKMAN'S COMPENSATION AND LIABILITY INSURANCE, AS REQUIRED BY THE LOCAL GOVERNMENT AGENCY HAVING JURISDICTION FOR THIS ISSUE, AS WELL AS COMPLY WITH THE GENERALLY ACCEPTED INDUSTRY STANDARDS OF PRACTICE FOR A PROJECT OF THIS SCOPE. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY WITH THE OWNER, IF HE WILL BE REQUIRED TO CARRY FIRE INSURANCE OR OTHER TYPES OF INSURANCE, AS WELL AS, MAKING THE OWNER ADDITIONALLY INSURED OH THEIR POLICIES FOR THE DURATION OF THE PROJECT. HE SHOULD ALSO ASSIST THE OWNER IN IDENTIFYING THE AMOUNT OF COVERAGE REQUIRED FOR THEIR CO-INSURANCE NEEDS.

10. THE CONTRACTOR SHALL MAINTAIN A CLEAN AND ORDERLY JOB SITE ON A DAILY BASIS. THE CONTRACTOR SHALL NOT UNREASONABLY ENCUMBER THE SITE WITH MATERIALS OR EQUIPMENT. THE CONTRACTOR SHALL NOT ENDANGER EXISTING STRUCTURES AND ANY NEWLY CONSTRUCTED STRUCTURE BY OVERLOADING THE AFOREMENTIONED WITH MATERIALS OR EQUIPMENT. THE CONTRACTOR SHALL PROTECT ALL EXISTING CONSTRUCTION TO REMAIN AND NEW CONSTRUCTION AFTER IT IS INSTALLED. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE TEMPORARY ENCLOSURES OR PROTECTION, AS NEEDED, TO PROTECT THE EXISTING STRUCTURE AND ANY NEWLY CONSTRUCTED STRUCTURES FROM THE ILL EFFECTS OF WEATHER FOR THE DURATION OF THE ENTIRE CONSTRUCTION PROCESS.

11. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGE INCURRED BY HIM OR HIS SUBCONTRACTORS TO ANY EXISTING STRUCTURE OR WORK, ANY STRUCTURE OR WORK IN PROGRESS; UNUSED MATERIAL INTENDED FOR USE IN THE PROJECT; OR ANY EXISTING SITE CONDITION WITHIN THE SCOPE OF WORK INTENDED BY THESE DRAWINGS AND SPECIFICATIONS. THIS RESPONSIBILITY WILL INCLUDE ANY MATERIALS AND LABOR REQUIRED TO CORRECT SUCH DAMAGE TO THE OWNER'S SATISFACTION AT NO COST TO THE OWNER UNLESS AGREED TO BY THE OWNER IN WRITING.

12. THE CONTRACTOR SHALL WARRANTY ACCORDING TO STATE CONSTRUCTION LAW ALL WORK DONE BY HIM, HIS EMPLOYEES AND HIS SUBCONTRACTORS AGAINST ALL VISIBLE DEFECTS OR ERRORS THAT BECOME APPARENT WITHIN THE FIRST YEAR AFTER THE COMPLETION OF THE PROJECT, AS ACCEPTED BY THE OWNER. THE CONTRACTOR SHALL, ADDITIONALLY, WARRANTY ALL DEFECTS AND ERRORS NOT VISIBLE, BUT CONTAINED WITHIN CONSTRUCTED WORK, FOR A PERIOD OF TEN YEARS FROM THE COMPLETION OF THE PROJECT, ALSO ACCORDING TO STATE CONSTRUCTION LAW. ANY AND ALL DEFECTS AND ERRORS THAT DO BECOME APPARENT SHALL BE PROMPTLY REPAIRED BY THE CONTRACTOR TO THE OWNER'S SATISFACTION AT NO COST TO THE OWNER FOR MATERIALS OR LABOR. ALTERATIONS OR CHANGES TO THIS WARRANTY MUST BE MUTUALLY AGREED TO IN WRITING BY BOTH THE CONTRACTOR AND THE OWNER.

13. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE APPROPRIATENESS OF THE APPLICATION OF ALL THE PRODUCT SELECTIONS SHOWN OR INTENDED IN THESE DRAWINGS AND SPECIFICATIONS. THE INTENDED MEANING OF "APPROPRIATENESS" IS THE PROPER SYSTEM, MODEL AND SPECIFIC SELECTION REQUIRED FOR THE INTENDED USE AS SHOWN ON THESE DRAWINGS AND SPECIFICATIONS. THE CONTRACTOR IS RESPONSIBLE TO VERIFY THE MOST CURRENT MODEL NAME OR NUMBER FROM THE SELECTED MANUFACTURER. THE CONTRACTOR IS RESPONSIBLE TO VERIFY THAT ANY INSTALLERS, WHICH HE SELECTS FOR THE VARIOUS PRODUCTS WILL FOLLOW ALL THAT PRODUCT MANUFACTURER'S REQUIRED AND RECOMMENDED METHODS AND PROCEDURES TO ACHIEVE THE DESIRED RESULTS CLAIMED BY SUCH MANUFACTURERS FOR THEIR PRODUCTS. IN ADDITION, THESE DRAWINGS AND SPECIFICATIONS IDENTIFY SOME REQUIRED SYSTEMS AND PRODUCTS IN GENERIC TERMS. THE CONTRACTOR IS RESPONSIBLE TO MAKE SPECIFIC SELECTIONS FOR THESE SYSTEMS AND PRODUCTS THAT SATISFY THE SAME CONDITIONS OUTLINED ABOUT THE IDENTIFIED MANUFACTURED ITEMS.

14. IF THE CONTRACTOR FINDS FAULT WITH, DISAGREES WITH, OBJECTS TO, OR WOULD LIKE TO CHANGE THE SCOPE OF THESE GENERAL NOTES OR HIS STATED RESPONSIBILITIES, AS OUTLINED IN THESE GENERAL NOTES, THEN THE CONTRACTOR MUST RESOLVE SUCH CHANGES WITH THE OWNER IN WRITING BEFORE SIGNING A CONTRACT. FAILURE TO DO SO SHALL CONSTITUTE AN UNDERSTANDING OF THESE GENERAL NOTES AND THEIR ACCEPTANCE BY THE CONTRACTOR.

15. THE CONTRACTOR SHALL IDENTIFY IN HIS PROPOSAL OR BID, WHICH PERMITS HE EXPECTS TO OBTAIN AND WHICH PERMITS AND APPLICATION FEES HE EXPECTS THE OWNER TO PROVIDE.

16. THE CONTRACTOR IS RESPONSIBLE TO IDENTIFY ANY CONFLICTS BETWEEN HIS CONTRACT WITH THE OWNER AND THESE DRAWINGS. THE ARCHITECTURAL DESIGNER, THE CONTRACTOR AND THE OWNER SHALL REVIEW THESE CONFLICTS IN ORDER TO AMEND ONE OF THESE DOCUMENTS BEFORE THE START OF THE CONSTRUCTION. IF A CONFLICT IS DISCOVERED WITHOUT THIS PRIOR RESOLUTION, THEN THESE DRAWINGS SHALL TAKE PRECEDENCE OVER ANY OTHER DOCUMENTS IN RESOLVING A CONFLICT.

17. THE CONTRACTOR SHALL ASSUME THAT SITE MEETINGS WITH THE OWNER, THE ARCHITECTURAL DESIGNER AND THE CONTRACTOR PRESENT SHALL BE HELD ONCE EVERY WEEK, UNLESS THEY ARE MUTUALLY CHANGED OR CANCELED. THE CONTRACTOR SHALL KEEP WRITTEN NOTES OF ALL RELEVANT INFORMATION DISCUSSED AT THESE MEETINGS AND PROVIDE COPIES TO THE OWNER AND THE ARCHITECTURAL DESIGNER, UNLESS DIFFERING ARRANGEMENTS ARE RESOLVED WITH THE ARCHITECTURAL DESIGNER AND THE OWNER. THE ARCHITECTURAL DESIGNER SHALL PROVIDE ANY REQUESTED SKETCHES OR ANY REQUESTED INFORMATION THAT IS REQUIRED AND REQUESTED DURING THESE MEETINGS. THE OWNER AND THE CONTRACTOR SHALL ALSO PROVIDE ANY REQUESTED INFORMATION THAT IS REQUIRED DURING THESE MEETINGS.

18. THE ARCHITECTURAL DESIGNER OR THE OWNER CAN WRITE AND ISSUE FIELD ORDERS FOR CHANGES TO THE DRAWINGS AND SPECIFICATIONS, AS REQUESTED BY OWNER OR THE CONTRACTOR. IF ADDITIONAL (OR DELETION OF) COST TO THE PROJECT IS REQUIRED, THEN THESE FIELD ORDERS SHALL BECOME THE BASIS OF A CHANGE ORDER.

19. THE CONTRACTOR SHALL WRITE AND ISSUE ALL CHANGE ORDERS, WHICH SHALL INCLUDE A COST BREAKDOWN FOR ALL THE WORK DESCRIBED IN SUCH A CHANGE ORDER. ANY CHANGE ORDER WILL NOT BE BINDING TO THE OWNER UNTIL BOTH THE CONTRACTOR AND THE OWNER HAVE SIGNED IT.

20. UPON SUBSTANTIAL COMPLETION THE CONTRACTOR SHALL NOTIFY THE ARCHITECTURAL DESIGNER, WHO SHALL COORDINATE A WALK-THROUGH OF THE PROJECT WITH THE OWNER AND THE CONTRACTOR AND THEN PROVIDE A PUNCH LIST OF ITEMS TO COMPLETE. ARRANGEMENTS FOR FINAL PAYMENT WILL BE MADE AT THAT TIME.

CODE REFERENCES

RI FIRE CODE (450-RICR-00-00-7) INCORPORATES THE FIRE CODE OF THE NATIONAL FIRE PROTECTION ASSOCIATION, INC., (NFPA 1), 2018 EDITION, BY REFERENCE.

RI LIFE SAFETY CODE (450-RICR-00-00-8) INCORPORATES THE LIFE SAFETY CODE OF THE NATIONAL FIRE PROTECTION ASSOCIATION, INC., (NFPA 101), 2018 EDITION, BY REFERENCE.

RISBC-1 RHODE ISLAND BUILDING CODE (510-RICR-00-00-1) INCORPORATES THE INTERNATIONAL BUILDING CODE, 2018 EDITION, BY REFERENCE.

RISBC-3 RHODE ISLAND PLUMBING CODE (510-RICR-00-00-3) INCORPORATES THE INTERNATIONAL PLUMBING CODE, 2018 EDITION, BY REFERENCE.

RISBC-4 RHODE ISLAND MECHANICAL CODE (510-RICR-00-00-4) INCORPORATES THE INTERNATIONAL MECHANICAL CODE, 2018 EDITION, BY REFERENCE.

RISBC-5 RHODE ISLAND ELECTRICAL CODE (510-RICR-00-00-5) INCORPORATES THE NATIONAL ELECTRICAL CODE, 2020 EDITION, BY REFERENCE.

DEMOLITION GENERAL NOTES:

1. THE DEMOLITION WORK SHOWN ON THESE DRAWINGS MAY NOT BE THE COMPLETE DEMOLITION REQUIRED TO ACCOMMODATE THE NEW WORK, WHICH IS SHOWN ELSEWHERE. THE INTENT OF THESE DRAWINGS IS TO GENERALLY SHOW THE DEMOLITION SCOPE OF WORK EXPECTED OF THE CONTRACTOR. THE CONTRACTOR WILL BE RESPONSIBLE TO COORDINATE ANY ADDITIONAL DEMOLITION WORK AND VERIFY THE EXTENT OF DEMOLITION REQUIRED IN ORDER TO ACCOMMODATE ANY NEW WORK.

2. ALL THE DIMENSIONS SHOWN, OR NOT SHOWN BUT REQUIRED, MUST BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION. THE INFORMATION SHOWN ON THESE DRAWINGS WAS DERIVED BY THE ARCHITECTURAL DESIGNER WITHOUT ANY SURVEYING OR ENGINEERING EQUIPMENT AND IS INTENDED TO BE HELPFUL, BUT NOT NECESSARILY ACCURATE.

3. ALL BIDS OR PROPOSALS MUST CLEARLY IDENTIFY WHAT WORK WILL BE PERFORMED AND WHAT WORK WILL NOT BE PERFORMED. THE CONTRACTOR WILL ALSO IDENTIFY ANY ALLOWANCES FOR WORK TOO UNCERTAIN TO BID FROM THE INFORMATION SHOWN ON THESE DRAWINGS.

4. THE CONTRACTOR WILL COORDINATE THE CAPPING AND PATCHING OF ALL EXISTING PLUMBING FIXTURES, SPRINKLER SYSTEMS AND RELATED EQUIPMENT SHOWN TO BE REMOVED WITH THE EXISTING ROUGH-IN SYSTEM TO REMAIN. THE CONTRACTOR WILL VERIFY THE WORK REQUIRED FOR INSTALLING AND CONNECTING NEW PLUMBING FIXTURES AND RELATED EQUIPMENT, AS SHOWN ON THE NEW WORK PLANS, TO THE REMAINING EXISTING SYSTEM. THE CONTRACTOR WILL REVIEW WITH THE ARCHITECTURAL DESIGNER IN THE FIELD ANY CONDITIONS THAT WILL CONFLICT WITH THIS INTENT.

5. THE CONTRACTOR WILL COORDINATE THE CAPPING AND PATCHING OF THE MECHANICAL SYSTEM AND RELATED DEVICES SHOWN TO BE REMOVED WITH THE EXISTING SYSTEM TO REMAIN. THE CONTRACTOR WILL VERIFY THE WORK REQUIRED FOR INSTALLING ANY NEW MECHANICAL SYSTEM AND RELATED EQUIPMENT, AS SHOWN ON THE NEW WORK PLANS, TO THE REMAINING EXISTING SYSTEM OR EQUIPMENT. THE CONTRACTOR WILL REVIEW WITH THE ARCHITECTURAL DESIGNER IN THE FIELD ANY CONDITIONS THAT WILL CONFLICT WITH THIS INTENT.

6. THE CONTRACTOR WILL COORDINATE THE CAPPING AND PATCHING OF ALL EXISTING ELECTRICAL FIXTURES AND RELATED EQUIPMENT SHOWN TO BE REMOVED WITH THE EXISTING SYSTEM TO REMAIN. THE CONTRACTOR WILL VERIFY THE WORK REQUIRED FOR INSTALLING AND CONNECTING NEW ELECTRICAL FIXTURES AND RELATED EQUIPMENT, AS SHOWN ON THE NEW WORK PLANS, TO THE REMAINING EXISTING SYSTEM. THE CONTRACTOR WILL REVIEW WITH THE ARCHITECTURAL DESIGNER IN THE FIELD ANY CONDITIONS THAT WILL CONFLICT WITH THIS INTENT.

7. THE CONTRACTOR WILL PROTECT EXISTING MATERIALS TO REMAIN, AS REQUIRED. DAMAGE TO EXISTING MATERIALS TO REMAIN, BECAUSE OF INADEQUATE PROTECTION SHALL BE FIXED, REPAIRED OR REPLACED, AS REQUIRED BY THE ARCHITECTURAL DESIGNER, AT THE SOLE EXPENSE OF THE CONTRACTOR INCLUDING BUT NOT NECESSARILY LIMITED TO LABOR AND MATERIALS.

8. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR OBTAINING ANY ADDITIONAL PERMITS, ENGINEERING, SHORING AND ANY CONSTRUCTION DOCUMENTS BY OTHERS RELATED TO THIS WORK, WHETHER OR NOT THEY ARE REQUIRED, FROM THE LOCAL AUTHORITIES.

9. THE CONTRACTOR IS RESPONSIBLE TO PROPERLY STORE AND PROTECT ANY MATERIAL DESIGNATED ON THE DRAWINGS TO BE SALVAGED AND RE-INSTALLED AS PART OF THE NEW WORK INTENT.

CONSTRUCTION GENERAL NOTES:

1. THE CONTRACTOR WILL BE RESPONSIBLE TO MAINTAIN THE SECURITY OF THE JOB SITE DURING THE CONSTRUCTION PROCESS UNTIL FINAL ACCEPTANCE BY THE OWNER OR UNTIL AN ALTERNATE DATE, AS MUTUALLY AGREED BETWEEN THE OWNER AND THE CONTRACTOR.

2. THE CONTRACTOR WILL VERIFY THE ROUGH-IN DIMENSIONS AND REQUIREMENTS FROM THE APPROPRIATE MANUFACTURER OR FABRICATOR FOR DOORS, WINDOWS, EQUIPMENT, CABINETRY, PLUMBING FIXTURES, ELECTRICAL FIXTURES, APPLIANCES AND ANY OTHER DEVICES BEFORE PROCEEDING TO LAY OUT AREAS WHERE SUCH ITEMS ARE LOCATED.

3. ALL CONNECTIONS AND FASTENERS ARE INTENDED TO BE CONCEALED, UNLESS OTHERWISE NOTED. WHERE SUCH DEVICES CAN NOT BE CONCEALED AS INTENDED NOTIFY THE ARCHITECTURAL DESIGNER FOR REVIEW OF DESIGN CONFORMANCE.

4. FIREBLOCKING SHALL BE PROVIDED IN ALL LOCATIONS IDENTIFIED BY LOCAL / STATE BUILDING CODE AND IN ANY ADDITIONAL LOCATIONS IDENTIFIED BY THE LOCAL AUTHORITIES OR LOCAL ORDINANCES

5. THE CONTRACTOR WILL VERIFY ALL ROOF AND FRAMING SPACES REQUIRED TO BE VENTILATED WITH THE LOCAL FIELD INSPECTOR OR LOCAL CODE AND PROVIDE THE APPROPRIATE NET FREE VENTILATION AREA, BUT IN NO CASE SHALL IT BE LESS THAN 1/50TH OF THE AREA OF THE SPACE TO BE VENTILATED. WHEN THE MEANS OF THE VENTILATION IS VISIBLE FROM A COMMONLY USED SPACE, PASSAGEWAY, YARD OR PUBLIC RIGHT OF WAY, THE CONTRACTOR SHALL REVIEW THIS SITUATION WITH THE ARCHITECTURAL DESIGNER FOR DESIGN CONFORMANCE BEFORE INSTALLING SUCH DEVICES, EQUIPMENT OR MATERIALS.

6. THE CONTRACTOR WILL VERIFY AND PROVIDE THE REQUIRED BLOCKING AND BACKING FOR ALL CABINETRY, WALL-MOUNTED ACCESSORIES, BUILT-IN EQUIPMENT, LIGHT FIXTURES OR OTHER DEVICES REQUIRING BLOCKING OR BACKING.

7. THE CONTRACTOR WILL VERIFY AND PROVIDE ALL CODE REQUIRED FIREPROOFING AT ALL PENETRATIONS INTO AND THROUGH A FIRE RATED FLOOR, WALL, CEILING OR ROOF ASSEMBLY.

8. ALL CHANGES OR OFFSETS IN FLOOR FINISH MATERIAL WILL OCCUR UNDER A THRESHOLD, WHEN PROVIDED, OR AT THE CENTERLINE OF A DOOR TRANSITION UNLESS OTHERWISE INDICATED ON THE DRAWINGS. OTHER LOCATIONS OF THESE CONDITIONS SHALL BE VERIFIED WITH THE ARCHITECTURAL DESIGNER IN THE FIELD FOR DESIGN CONFORMANCE BEFORE INSTALLING ANY MATERIAL.

9. THE SEALANT, CAULKING AND FLASHING LOCATIONS SHOWN ON THESE DRAWINGS ARE NOT INTENDED TO COVER ALL CONDITIONS REQUIRING THESE PRODUCTS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO IDENTIFY ALL CONDITIONS REQUIRING THESE PRODUCTS, SIMILAR PRODUCTS AND REVIEW THESE CONDITIONS NOT IDENTIFIED IN THE DRAWINGS WITH THE ARCHITECTURAL DESIGNER FOR DESIGN CONFORMANCE.

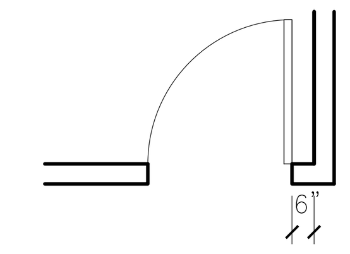
10. COMPLETE ALL WORK REQUIRED TO MEET LOCAL / STATE ENERGY CONSERVATION REQUIREMENTS INCLUDING BUT NOT LIMITED TO ALL MANDATORY AND SPECIAL FEATURES, AS WELL AS ANY LOCAL ORDINANCES AND ANY NEW REQUIREMENTS IDENTIFIED BY THE LOCAL BUILDING FIELD INSPECTOR.

11. THE CONTRACTOR SHALL IDENTIFY IN HIS PROPOSAL WHICH UTILITY TYPE (WATER, ELECTRICITY, TELEPHONE, INTERNET, ETC.) CONNECTIONS, USE AND RELATED COSTS WILL BE INCLUDED IN HIS OVERHEAD AND WHICH COSTS HE EXPECTS THE OWNER TO PROVIDE. ANY UTILITY TYPE COST WHICH IS NOT IDENTIFIED, AS AN OWNER PROVIDED ITEM, WILL BE ASSUMED TO BE INCLUDED IN THE CONTRACTOR'S OVERHEAD COST.

12. THE CONTRACTOR SHALL IDENTIFY AND PROVIDE THE REQUIRED SIDEWALK AND PUBLIC PASSAGE ENCLOSURE PROTECTION AT ANY AFFECTED RIGHT-OF-WAY AREAS OR PUBLIC ACCESS LOCATIONS. THE CONTRACTOR WILL REVIEW ALL INTENDED SIGNAGE WITH THE ARCHITECTURAL DESIGNER FOR DESIGN CONFORMANCE.

13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL MEANS AND METHODS OF CONSTRUCTION AND ANY DIRECTION FROM THE OWNER OR THE ARCHITECTURAL DESIGNER SHALL NOT BE CONSTRUED TO OVERRIDE THIS RESPONSIBILITY UNLESS MUTUALLY AGREED TO IN A WRITTEN DOCUMENT IDENTIFYING A SPECIFIC AREA OF WORK FOR WHICH THE CONTRACTOR WILL NOT BE RESPONSIBLE

ARCHITECTURAL GENERAL NOTES:



DOORS TO BE PLACED 6" FROM FACE OF WALL, U.N.O.

2. ALL THE DIMENSIONS OF EXISTING CONDITIONS SHOWN, OR NOT SHOWN BUT REQUIRED, MUST BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION. LABELED DIMENSIONS CONTROL THE DESIGN INTENT, DO NOT SCALE DRAWINGS. DIMENSIONS FOR PROPOSED WORK ARE NOT ADJUSTABLE WITHOUT APPROVAL FROM THE ARCHITECT.

3. PROVIDE ALL TEMPORARY FRAMING AND SHORING REQ'D TO SUPPORT EXISTING STRUCTURE DURING DEMOLITION AND ALTERATION OF ANY LOAD BEARING BUILDING COMPONENTS.

4. PROVIDE TEMPORARY, SECURE / WEATHER-PROOF ENCLOSURE @ ALL NEW AND ALTERED OPENINGS TO EXTERIOR DURING DEMOLITION AND CONSTRUCTION.

5. PROVIDE TEMPORARY DUST-PROOF BARRIERS BETWEEN AREA OF WORK AND EXISTING INTERIOR SPACES TO REMAIN.

6. PRIOR TO BEGINNING DEMOLITION, IDENTIFY WITH OWNER ANY APPLIANCES, CABINETS, FIXTURES OR OTHER ITEMS TO BE SELECTIVELY REMOVED AND STORED ONSITE FOR FUTURE REUSE.

7. DEMOLISH FIXTURES AND EQUIPMENT AS SHOWN, REMOVE ALL ASSOCIATED PLUMBING & WIRING NOT TO BE REUSED IN NEW WORK.

8. OWNER TO DETERMINE IN FIELD WITH CONTRACTOR EXTENT TO WHICH EXISTING FLOORING DISTURBED BY CONSTRUCTION WILL BE REMOVED AND REPLACED. CONTRACTOR SHALL SUGGEST APPROPRIATE STEPS TO ADEQUATELY REFINISH FLOORING AS NEEDED.

9. IN NO CASE SHALL DIMENSIONS BE SCALED FROM DRAWINGS. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS IN THE FIELD BEFORE PROCEEDING WITH SUBSEQUENT WORK.

10. ALL DIMENSIONS ARE TO CENTER LINE (℄) OF NEW WALLS AND FACE OF FINISH TO EXISTING WALLS UNLESS OTHERWISE NOTED.

11. DIMENSIONS MARKED "MIN." INDICATE A MINIMUM CLEARANCE THAT MUST BE MAINTAINED.

12. REFER TO SHEET A0.1 FOR SYMBOLS AND ABBREVIATIONS.

13. ALL FINISH WALL SURFACES TO BE FLUSH UNLESS NOTED OTHERWISE. PROVIDE FURRING AS REQUIRED.

14. ALL GYP. BD. WALLS TO BE TAPED, SANDED AND PRIMED TO LEVEL 5 FINISH ("IMPERIAL" PLASTER SKIMCOAT, PRIMED AND PAINTED) UNLESS NOTED OTHERWISE.

15. ALL WORK SHALL COMPLY WITH CURRENTLY ADOPTED STATE BUILDING CODE AND ASSOCIATED CODES ADOPTED VIA INCORPORATION.

16. IF THE ARCHITECT HAS NOT BEEN RETAINED FOR CONSTRUCTION ADMINISTRATION, THEN THE ARCHITECT IS NOT RESPONSIBLE FOR SEEING THAT THE CONTRACTOR ADHERES TO THE CONSTRUCTION DRAWINGS.

MECHANICAL GENERAL NOTES:

1. IT IS THE INTENTION OF THE DESIGNER, THAT ALL MECHANICAL DUCTS, WIRING, EQUIPMENT AND OTHER MECHANICAL WORK WILL BE CONCEALED WITHIN THE WALL, FLOOR, CEILING OR ROOF STRUCTURE OF THE BUILDING, EXCEPT IN THE GARAGE AND STORAGE ON THE LOWER LEVEL. THE CONTRACTOR WILL REVIEW WITH THE DESIGNER ANY CONFLICTS WITH THIS INTENTION BEFORE FRAMING IS ENCLOSED OR ANY DEVICE IS INSTALLED.

2. THE CONTRACTOR WILL REVIEW ALL MECHANICAL-RELATED REQUIREMENTS OF RHODE ISLAND REGULATIONS / BUILDING CODE AND COMPLY WITH THE PROVISIONS SPECIFIED. IF ANY CONFLICTS RESULT WITH THE DESIGN INTENT, THE CONTRACTOR WILL REVIEW SUCH SITUATIONS WITH THE DESIGNER FOR DESIGN CONFORMANCE BEFORE INSTALLING.

3. THE CONTRACTOR WILL VERIFY AND IDENTIFY ANY REQUIRED BLOCKING IN THE FRAMING NECESSARY FOR MECHANICAL DEVICE SUPPORT OR ENCLOSURE.

PLUMBING GENERAL NOTES:

1. THE CONTRACTOR WILL VERIFY AND IDENTIFY ALL REQUIRED BLOCKING IN THE FRAMING NECESSARY FOR PLUMBING FIXTURE SUPPORT OR ENCLOSURE.

2. THE CONTRACTOR WILL VERIFY THE ROUTE AND TERMINATION AT THE ROOF FOR ALL VENT STACKS. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, IT IS THE INTENTION OF THE DESIGNER, THAT ALL SUCH TERMINATIONS OCCUR AT LOCATIONS NOT VISIBLE FROM THE STREET.

3. THE CONTRACTOR WILL REVIEW ALL PLUMBING RELATED REQUIREMENTS OF THE LOCAL BUILDING AND ENERGY CODES AND VERIFY THAT ALL NEW WORK WILL COMPLY WITH ALL THE PROVISIONS REQUIRED OF THIS PROJECT. IF ANY CONFLICTS EXIST WITH THE DESIGN INTENT, THE CONTRACTOR WILL REVIEW SUCH SITUATIONS WITH THE DESIGNER FOR DESIGN CONFORMANCE BEFORE INSTALLING.

4. IN ALL EXPOSED CEILING AREAS, THE CONTRACTOR SHALL REVIEW WITH THE DESIGNER ANY POTENTIAL VISIBLE PLUMBING LINES, DRAINS, FIXTURE SUPPORTS, CUTOUTS OR ANY OTHER PLUMBING RELATED WORK FOR DESIGN CONFORMANCE. THIS REVIEW WILL OCCUR IN THE FIELD PRIOR TO COMMENCING ANY WORK THAT WOULD AFFECT THE VISUALLY QUALITY OF THE EXPOSED CEILING AREA.

5. THE CONTRACTOR WILL PROVIDE ACCESS PANELS AS NECESSARY TO SERVICE CONCEALED PLUMBING EQUIPMENT.

6. THE CONTRACTOR WILL BE RESPONSIBLE FOR COORDINATING THE WARRANTY INFORMATION AND RESPONSIBILITY WITH THE OWNER FOR ALL EQUIPMENT. IF SPECIAL ARRANGEMENTS ARE NOT COORDINATED, THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL FIXTURES AND EQUIPMENT HE INSTALLS FOR A PERIOD OF TWO YEARS. ANY REPAIRS REQUIRED AND PERFORMED BY THE CONTRACTOR OR HIS DESIGNATED SUBCONTRACTOR WILL BE AT NO COST TO THE OWNER, INCLUDING PARTS AND LABOR COSTS.

7. THE FIXTURES AND EQUIPMENT LISTED IS PROVIDED FOR THE CONTRACTOR'S BENEFIT TO COORDINATE THE INSTALLATION OF THE SAME. THE CONTRACTOR CAN PROPOSE SUBSTITUTES FOR ALL FIXTURES AND EQUIPMENT LISTED, IF HE CAN DEMONSTRATE AN EQUAL QUALITY ALTERNATIVE AND IT IS APPROVED BY THE OWNER.

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ISSUED FOR:
BID SET
01/18/2023

REVISIONS:
~ 01/18/23 BID SET

STAMP:

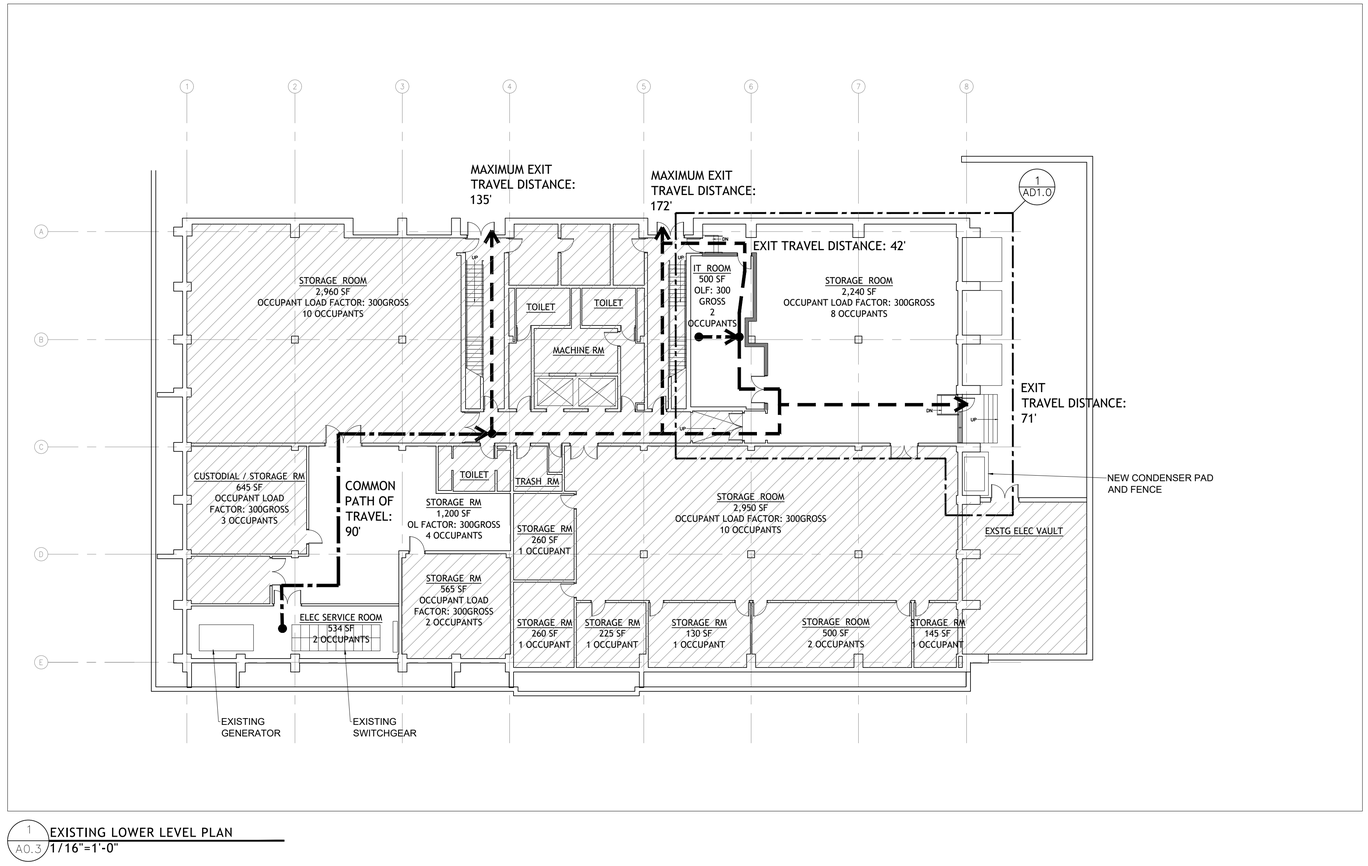
SHEET TITLE:
GENERAL NOTES

PROJECT NORTH:
N

PROJECT ARCHITECT: BB
DRAWN: JG

PROJECT NUMBER:
#2224

SHEET NUMBER: A0.2
REV: ~



1 EXISTING LOWER LEVEL PLAN
A0.3 1/16"=1'-0"

CODE REFERENCES

RI FIRE CODE (450-RICR-00-00-7) INCORPORATES THE FIRE CODE OF THE NATIONAL FIRE PROTECTION ASSOCIATION, INC., (NFPA 1), 2018 EDITION, BY REFERENCE.
RI LIFE SAFETY CODE (450-RICR-00-00-8) INCORPORATES THE LIFE SAFETY CODE OF THE NATIONAL FIRE PROTECTION ASSOCIATION, INC., (NFPA 101), 2018 EDITION, BY REFERENCE.

RISBC-1 RHODE ISLAND BUILDING CODE (510-RICR-00-00-1) INCORPORATES THE INTERNATIONAL BUILDING CODE, 2018 EDITION, BY REFERENCE.

RISBC-3 RHODE ISLAND PLUMBING CODE (510-RICR-00-00-3) INCORPORATES THE INTERNATIONAL PLUMBING CODE, 2018 EDITION, BY REFERENCE.

RISBC-4 RHODE ISLAND MECHANICAL CODE (510-RICR-00-00-4) INCORPORATES THE INTERNATIONAL MECHANICAL CODE, 2018 EDITION, BY REFERENCE.

RISBC-5 RHODE ISLAND ELECTRICAL CODE (510-RICR-00-00-5) INCORPORATES THE NATIONAL ELECTRICAL CODE, 2020 EDITION, BY REFERENCE.

LEGENDS

- DEMO WALL / ITEM TO BE REMOVED
- NEW GWB WALL
- EXISTING WALL TO REMAIN
- LIMIT OF DISTURBANCE LINE
- NO WORK IN THIS AREA

EGRESS PLAN

KEY

- COMMON PATH (MAX 100'")
- TRAVEL DISTANCE NEAREST EXIT
- DEAD END CORRIDOR
- (FE) 2A/10 BC FIRE EXITINGUISHER

FIRE EXTINGUISHER PROVISION

75FT MAX TRAVEL DISTANCE
REQUIREMENT: 1A PER 1500SF
2A REQUIRED FOR TOTAL AREA 2433SF
2(2A) PROVIDED

EGRESS

PER TABLE 1006.2.1 - MAX COMMON PATH OF TRAVEL FOR BUILDING WITH BUSINESS (B) OCCUPANCY WITHOUT SPRINKLER SYSTEM AND AN OCCUPANT LOAD OF 30 OR LESS = 100'

PER TABLE 1017.2 - MAX EXIT TRAVEL DISTANCE FOR BUILDING WITH BUSINESS (B) OCCUPANCY WITHOUT SPRINKLER SYSTEM = 200'

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REVISIONS:
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STAMP:

SHEET TITLE:
GENERAL NOTES

PROJECT NORTH:
N

PROJECT ARCHITECT: BB
DRAWN: JG
PROJECT NUMBER:
#2224

SHEET NUMBER:
A0.3

REV:
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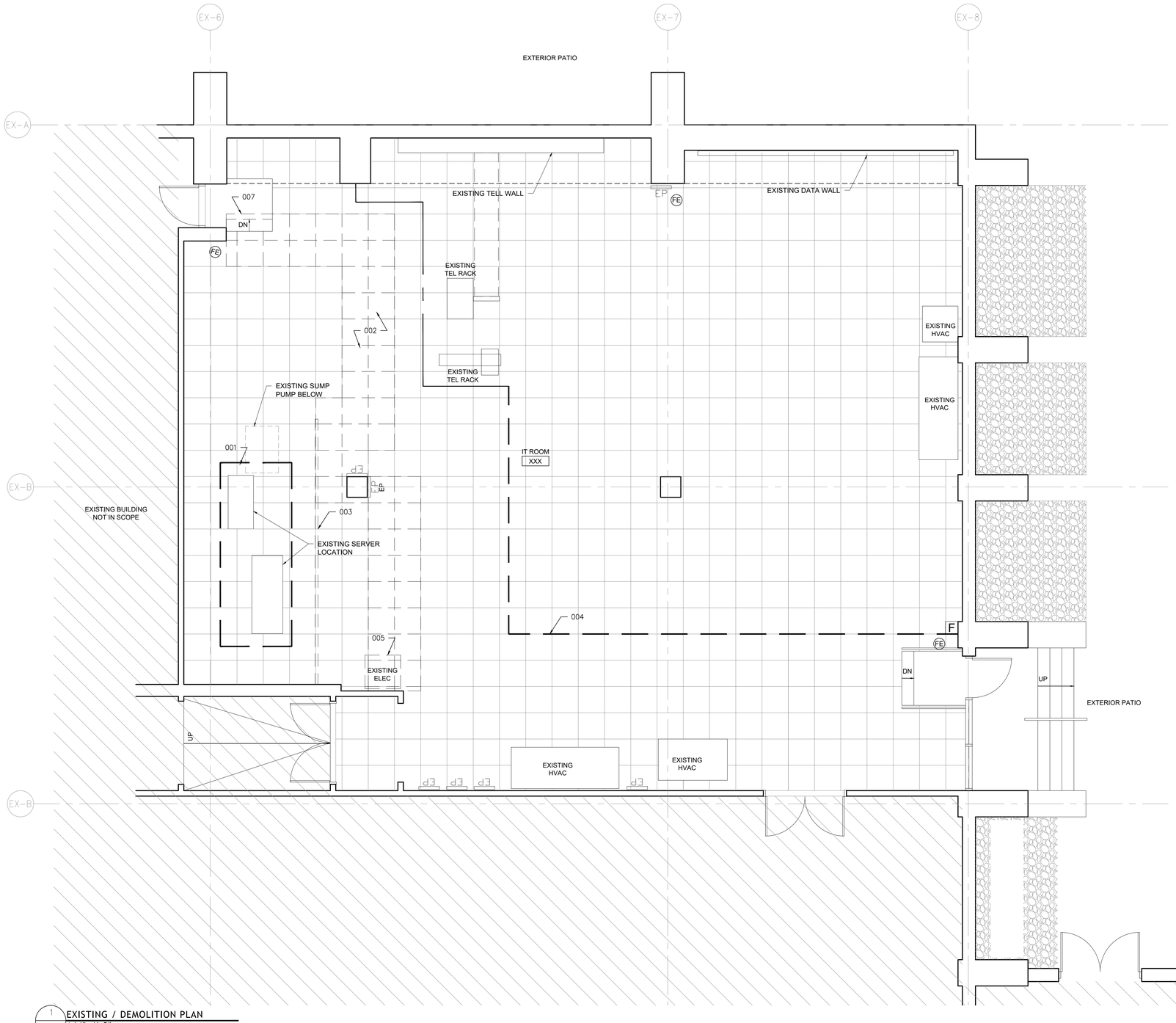

1 AD1.0 EXISTING / DEMOLITION PLAN
1/4"=1'-0"

GENERAL NOTES

1. COORDINATE SCOPE OF DEMOLITION WORK IN CONJUNCTION WITH THE NEW WORK PLANS.

LEGENDS

DEMO WALL / ITEM TO BE REMOVED

EXISTING WALL TO REMAIN

DEMOLITION KEYNOTES

001: RELOCATE EXISTING SERVERS OR PROVIDE TEMP DUST PROTECTION EQUAL TO "ZIP WALL DUST BARRIER" OR EQUAL. CONTRACTOR TO COORDINATE WITH OWNER TO ENSURE CONTINUOUS OPERATION OF SERVER DURING CONSTRUCTION.

002: REMOVE, STORE, & MODIFY EXISTING PLATFORM FLOOR PANELS AS REQUIRED TO ACCOMMODATE PROPOSED CONSTRUCTION.

003: REMOVE & DISPOSE OF EXISTING SERVER CAGE

004: PROVIDE TEMP DUST PROTECTION EQUAL TO "ZIP WALL DUST BARRIER OR EQUAL PROTECTION OWNERS STORAGE ITEMS TO REMAIN DURING CONSTRUCTION

005: RELOCATE EXISTING ELECTRICAL EQUIPMENT

006: REMOVE & DISPOSE OF EXISTING ACT GRID & TILES IN THEIR ENTIRETY, INCLUDING ALL FRAMES & HANGERS

007: REMOVE & DISPOSE OF EXISTING STAIR

008: REMOVE AND REINSTALL EXISTING ACT & CLG GRID TO ACCOMMODATE THE PROPOSED NEW MECHANICAL UNITS AND DUCTWORK. PROVIDE UNIT COST TO REPLACE ANY CEILING TILES DAMAGED DURING CONSTRUCTION OR ARE DEEMED NOT SUITABLE FOR REUSE.

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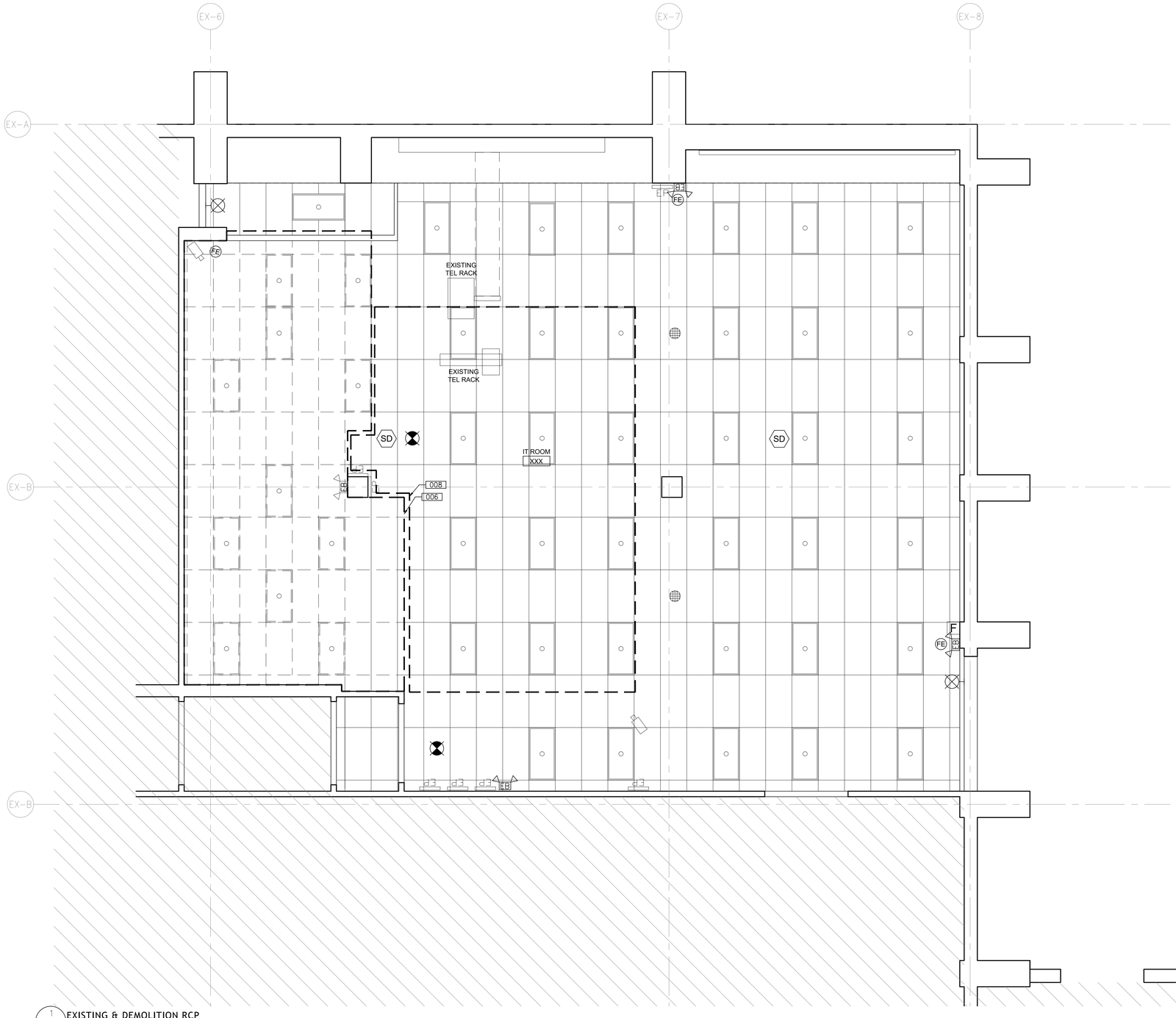
SHEET TITLE:
LOWER LEVEL DEMOLITION PLAN

PROJECT NORTH:
N

PROJECT ARCHITECT: BB
DRAWN: JG

PROJECT NUMBER:
#2224

SHEET NUMBER: AD1.0
REV: ~



1 AD1.2 EXISTING & DEMOLITION RCP
1/4"=1'-0"

GENERAL NOTES

1. COORDINATE SCOPE OF DEMOLITION WORK IN CONJUNCTION WITH THE NEW WORK PLANS.

LEGENDS

DEMO WALL / ITEM TO BE REMOVED

EXISTING WALL TO REMAIN

DEMOLITION KEYNOTES

001: RELOCATE EXISTING SERVERS OR PROVIDE TEMP DUST PROTECTION EQUAL TO "ZIP WALL DUST BARRIER" OR EQUAL. CONTRACTOR TO COORDINATE WITH OWNER TO ENSURE CONTINUOUS OPERATION OF SERVER DURING CONSTRUCTION.

002: REMOVE, STORE, & MODIFY EXISTING PLATFORM FLOOR PANELS AS REQUIRED TO ACCOMMODATE PROPOSED CONSTRUCTION.

003: REMOVE & DISPOSE OF EXISTING SERVER CAGE

004: PROVIDE TEMP DUST PROTECTION EQUAL TO "ZIP WALL DUST BARRIER OR EQUAL PROTECTION OWNERS STORAGE ITEMS TO REMAIN DURING CONSTRUCTION

005: RELOCATE EXISTING ELECTRICAL EQUIPMENT

006: REMOVE & DISPOSE OF EXISTING ACT GRID & TILES IN THEIR ENTIRETY, INCLUDING ALL FRAMES & HANGERS

007: REMOVE & DISPOSE OF EXISTING STAIR

008: REMOVE AND REINSTALL EXISTING ACT & CLG GRID TO ACCOMMODATE THE PROPOSED NEW MECHANICAL UNITS AND DUCTWORK. PROVIDE UNIT COST TO REPLACE ANY CEILING TILES DAMAGED DURING CONSTRUCTION OR ARE DEEMED NOT SUITABLE FOR REUSE.

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CONSULTANT:

PROJECT TITLE:
IT ROOM RENOVATION
444 WESTMINSTER ST
PROVIDENCE, RI 02903

ISSUED FOR:
BID SET
01/18/2023
REVISIONS:
~ 01/18/23 BID SET

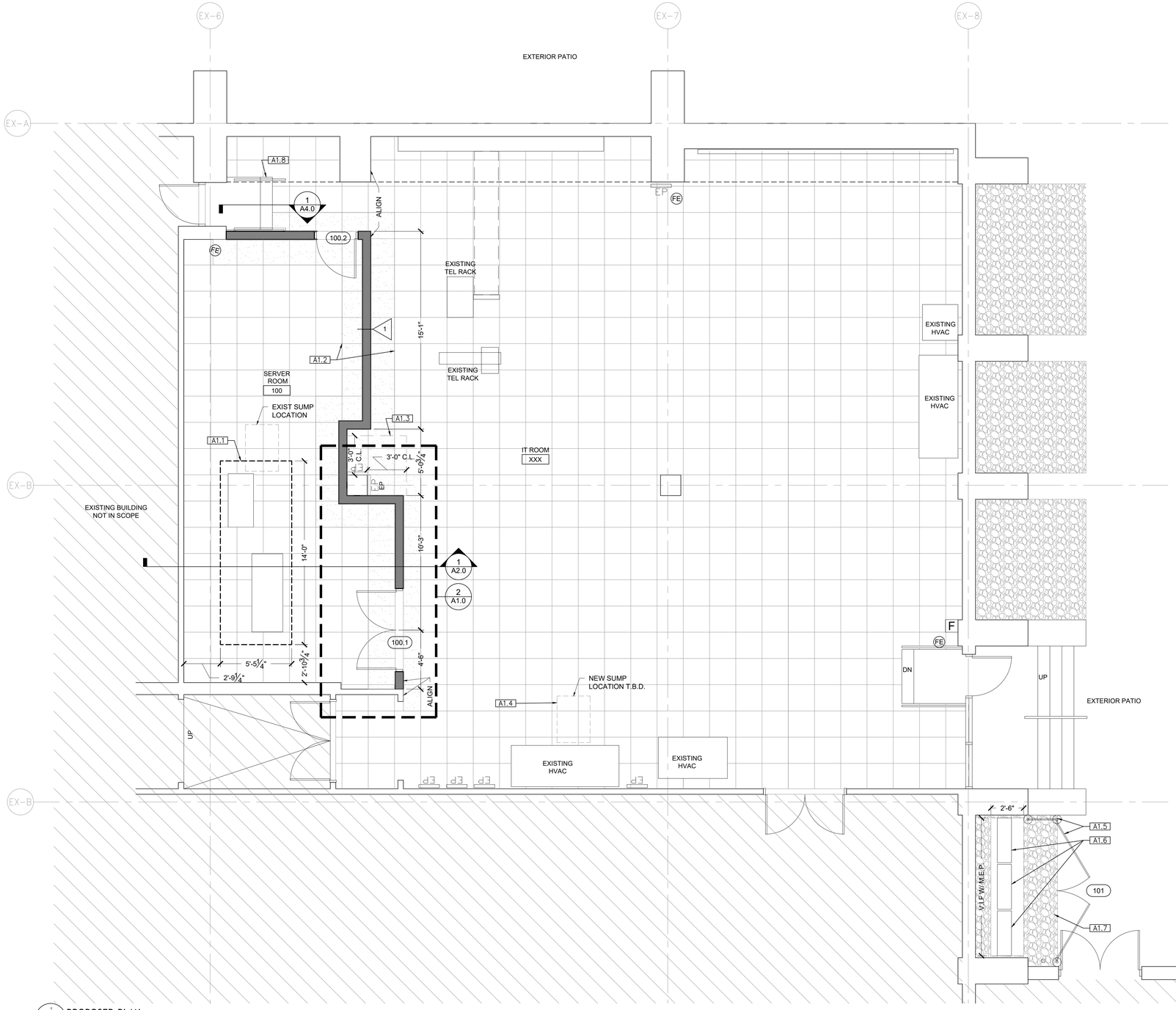
STAMP:

SHEET TITLE:
LOWER LEVEL DEMOLITION
REFLECTED CEILING PLAN

PROJECT NORTH:
N

PROJECT ARCHITECT: BB
DRAWN: JG
PROJECT NUMBER:
#2224

SHEET NUMBER: AD1.1
REV: ~



1 A1.0 PROPOSED PLAN
1/4"=1'-0"

GENERAL NOTES

1. COORDINATE SCOPE OF NEW WORK IN CONJUNCTION WITH THE DEMOLITION DRAWINGS

LEGENDS

NEW INTERIOR GWB WALL

EXISTING WALL TO REMAIN

MODIFY AND REPLACE FLOOR PANELS AS REQUIRED

KEYNOTES

A1.1: NEW MULTI WALL POLYCARBONATE CANOPY, SEE DETAILS SHEET A2.0

A1.2: MODIFY AND REPLACE FLOOR PANELS AS REQUIRED TO ACCOMMODATE NEW WALL.

A1.3: PROVIDE 3'-0" CLEARANCE IN FRONT OF EXISTING ELECTRICAL PANELS

A1.4: PROVIDE NEW STAINLESS STEEL SUMP BASIN SIMILAR TO "SUPCO 15qt. CONDENSATE PAN ASSEMBLY" AND RELOCATE EXISTING CONDENSATE DRAIN LINES AS SHOWN IN MECHANICAL DRAWINGS. CONTRACTOR TO EXPOSE EXISTING CONDITIONS UNDER PLATFORM FLOORING AND RECOMMEND THE IDEAL LOCATION FOR THE NEW BASIN AND COORDINATE WITH MECHANICAL ENGINEER AND OWNER AS REQUIRED.

A1.5: NEW BLACK VINYL COATED CHAIN LINK FENCE AND GATE WITH PRIVACY SCREEN. SEE DETAILS ON SHEET A4.0

A1.6: NEW HVAC CONDENSER - SEE MECHANICAL DRAWINGS FOR MORE INFORMATION. CONTRACTOR TO FIELD VERIFY AVAILABLE SPACE BETWEEN BRICK PIERS AND CONFIRM CLEARANCE REQUIREMENTS OF PROPOSED UNITS.

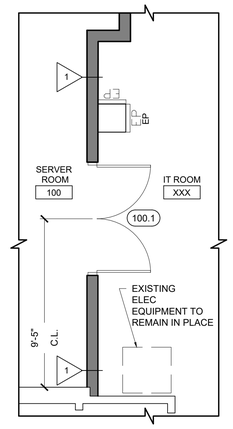
A1.7: NEW 6" THICK CONCRETE EQUIPMENT PAD, SEE DETAILS SHEET A4.0

A1.8: NEW STAIR AND HANDRAIL TO EXIT DOOR. MODIFY AND ALTER PLATFORM FLOOR SYSTEM AS NEEDED. PROVIDE FINISHES TO MATCH EXISTING.

A1.9 NEW CEILING TILE TO BE EQUAL TO THE FOLLOWING BASIS OF DESIGN: ARMSTRONG-TECHZONE SQUARE TEGULAR PANELS WITH PRELUDE XL SUSPENSION SYSTEM WITH BLIZZARD WHITE FINISH.

DEDUCT ALTERNATE #1

PROVIDE THE COST SAVINGS TO INSTALL WALL TYPE 1 AS SHOWN IN PLAN DETAIL 2/A1.2 SUCH THAT THE EXISTING ELECTRICAL EQUIPMENT CAN REMAIN IN PLACE AS A DEDUCT ALTERNATE FOR THE OWNER'S CONSIDERATION.



2 A1.2 DEDUCT ALTERNATE: PLAN LAYOUT
1/4"=1'-0"

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DRAWN: JG

PROJECT NUMBER:
#2224

SHEET NUMBER:
A1.0

REV:
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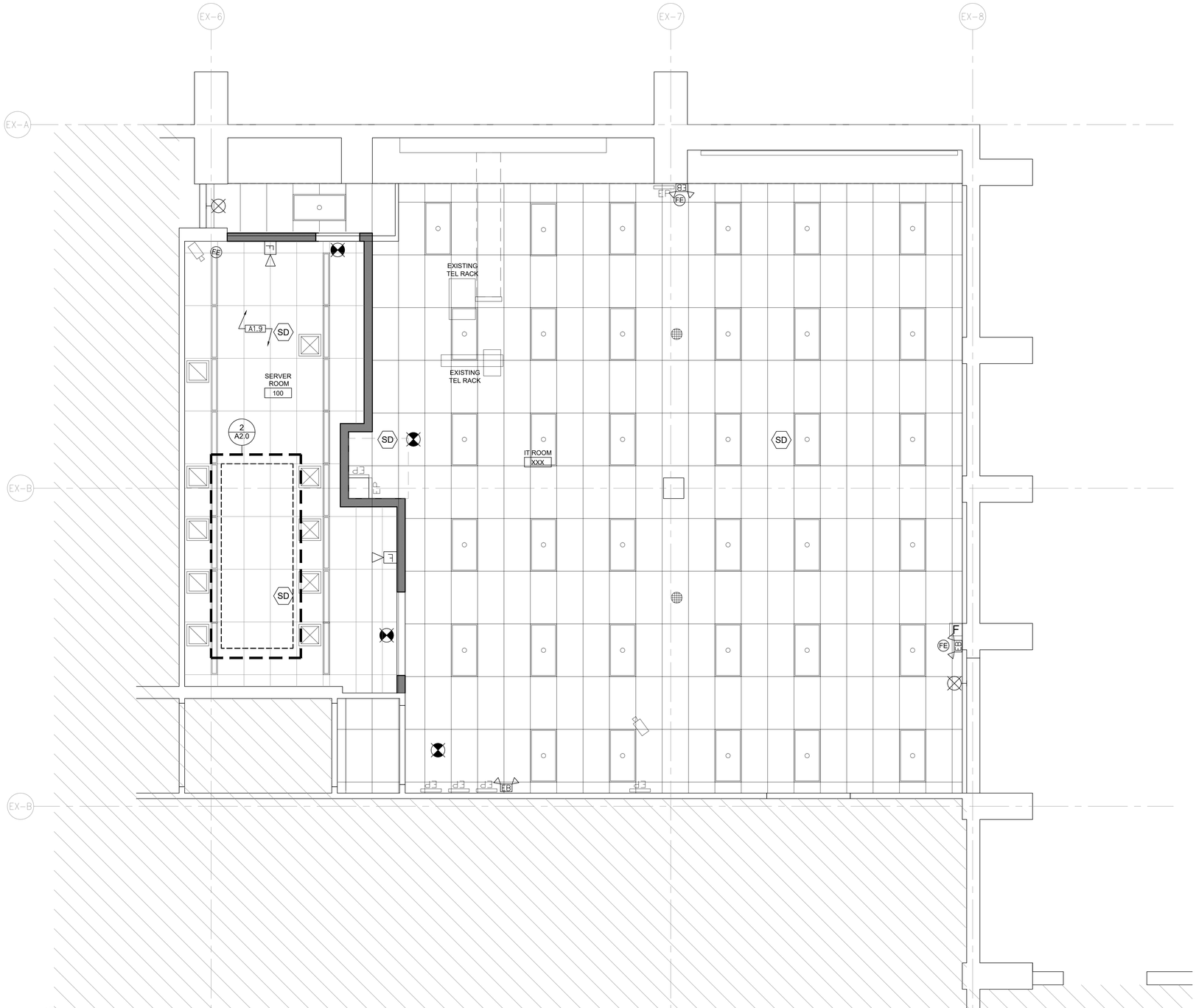

1 A1.2 PROPOSED RCP
1/4"=1'-0"

GENERAL NOTES

1. COORDINATE SCOPE OF NEW WORK IN CONJUNCTION WITH THE DEMOLITION DRAWINGS

LEGENDS

NEW INTERIOR GWB WALL

EXISTING WALL TO REMAIN

MODIFY AND REPLACE FLOOR PANELS AS REQUIRED

KEYNOTES

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A1.9 NEW CEILING TILE TO BE EQUAL TO THE FOLLOWING BASIS OF DESIGN: ARMSTRONG-TECHZONE SQUARE TEGULAR PANELS WITH PRELUDE XL SUSPENSION SYSTEM WITH BLIZZARD WHITE FINISH.

LEGEND

RECESSED 6" WIDE LINEAR LED FIXTURE COMPATIBLE WITH ARMSTRONG - TECH ZONE CEILING SYSTEM

EXISTING 2'X4' FLUORESCENT LIGHT

NEW SUPPLY/RETURN DIFFUSERS

NEW SUPPLY/RETURN DIFFUSERS

FIRE ALARM EQUIPMENT

=EXIT SIGN - WALL MOUNT

=EXIT SIGN - CEILING MOUNT

=EMERGENCY LIGHTING

=HORN STROBE

=FIRE ALARM PULL STATION

=FIRE EXTINGUISHER

=SMOKE DETECTOR

=CEILING SPEAKER PANEL

=SURFACE ELECTRIC PANEL

=SECURITY CAMERA

=CEILING COVER

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#2224

SHEET NUMBER:
A1.2

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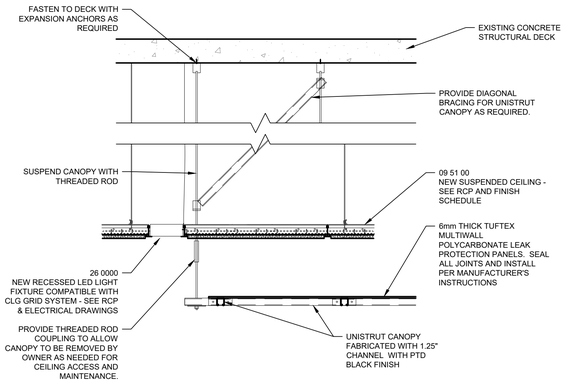
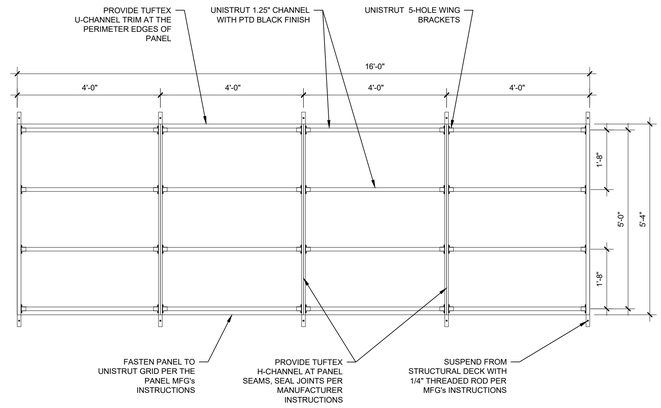
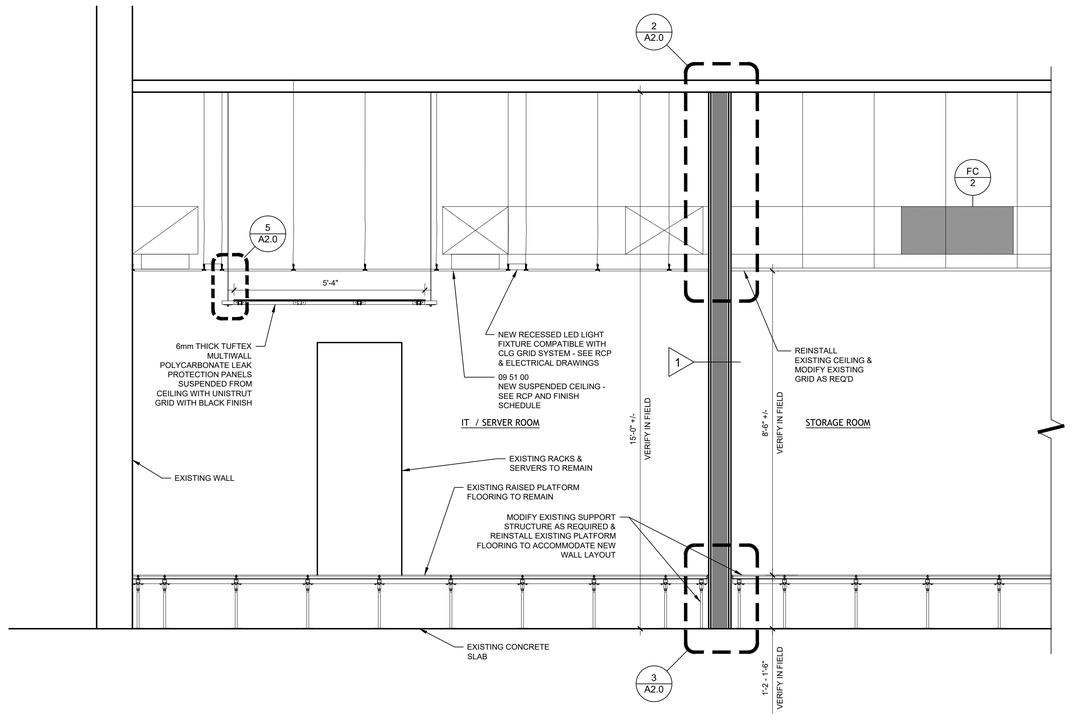


5 A2.0 MOUNTING LEAK PROTECTION DETAIL
1"=1'-0"



4 A2.0 LEAK PROTECTION PANEL DETAIL
1 1/2"=1'-0"



1 A2.0 PROPOSED SECTION
1/2"=1'-0"

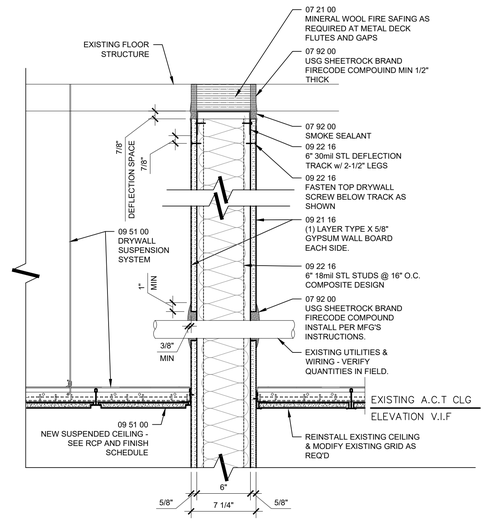
GENERAL NOTES

1. COORDINATE SCOPE OF NEW WORK IN CONJUNCTION WITH THE DEMOLITION DRAWINGS

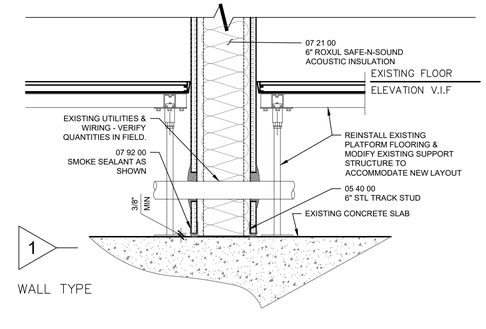
LEGENDS

NEW INTERIOR GWB WALL

EXISTING WALL TO REMAIN



2 A2.0 WALL ASSEMBLY @ CLG - UL DESIGN 419
1 1/2"=1'-0"



3 A2.0 WALL ASSEMBLY @ FLOOR- UL DESIGN 419
1 1/2"=1'-0"

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#2224

SHEET NUMBER: A2.0
REV: ~

DOOR SCHEDULE

ROOM	DOOR NO	TYPE	MATL	GLAZING	WIDTH	HEIGHT	FTYPE	FMATL	RATING	REMARKS	LOCATION	LOCKSET
SERVER ROOM	100.1	A1	HM	–	6'–0"	7'–0"	1	MT	–	1,3,5	BASEMENT STAIR EGRESS–EXISTING	DOUBLE DOOR
SERVER ROOM	100.2	A1	HM	–	3'–0"	7'–0"	1	MT	–	1,3,5	BASEMENT FIRE PUMP ROOM	SINGLE DOOR

NOTE: FOR SIDE LIGHTS AT NON–FIRE RATED DOORS, USE TEMPERED GLASS.

ABBREVIATIONS

ALUM	ALUMINUM
DBL	DOUBLE
FB	FLUSH BOLTS
FBG	FIBERGLASS
FTYPE	FRAME TYPE
FMATL	FRAME MATERIAL
HM	HOLLOW METAL
MT	METAL DOOR, INSULATED W/ THERMAL BREAK
EX	EXISTING DOOR
IG	INSULATING GLASS, SPECIFIED
NO	NUMBER
P/P	PUSH/PULLS
TG	TEMPERED GLASS, SPECIFIED
W/	WITH
WD	WOOD
WG	WIRE GLASS, AS SPECIFIED
SDS	SLIDING DOOR SYSTEM
MFG	MANUFACTURER

Manufacturer's Abbreviations:
1. MK – McKinney
2. OT – Other
3. PE – Pemko
4. MR – Markar
5. RO – Rockwood
6. SA – SARGENT
7. SU – Securitron
8. MC – Medeco
9. RF – Rixson
10. NO – Norton

TYPICAL NOTES

1. PROVIDE ADA COMPLIANT DOOR HARDWARE.
2. PROVIDE SMOKE CONTROL per UL 1784/NFPA 105 – (3.0 cuft/min OF DOOR OPENING .10" WATER).
3. PROVIDE AUTOMATIC CLOSER.
4. PROVIDE MAGNETIC HOLD–OPEN WITH AUTOMATIC CLOSING AT LOSS OF POWER OR DETECTION OF SMOKE.
5. THE CONTRACTOR SHALL PROVIDE A CYLINDRICAL PREPPED AND CORED DOOR FOR THE OWNER'S DOOR SECURITY VENDOR (ISI) AND THE VENDOR SUPPLIED HARDWARE. CONTRATOR SHALL PROVIDE ELECTRIFIED DOOR HARDWARE AS SPECIFIED; ISI SHALL PROVIDE ALL FINAL LOCKING HARDWARE, ELECTRIFIED HINGE AND ALL ACCESS CONTROL WIRE/CONTROLLERS NEEDED FOR THIS PROJECT PER THE CITY'S REQUIREMENTS.

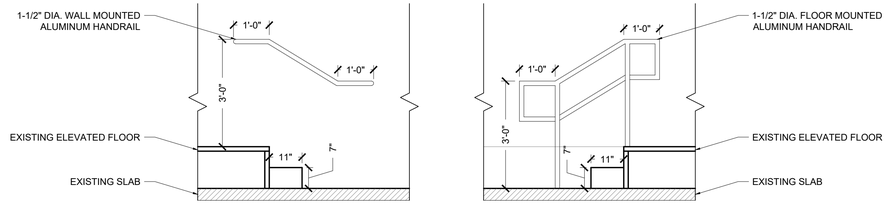
DOOR HARDWARE

Description: IT; – Card Access

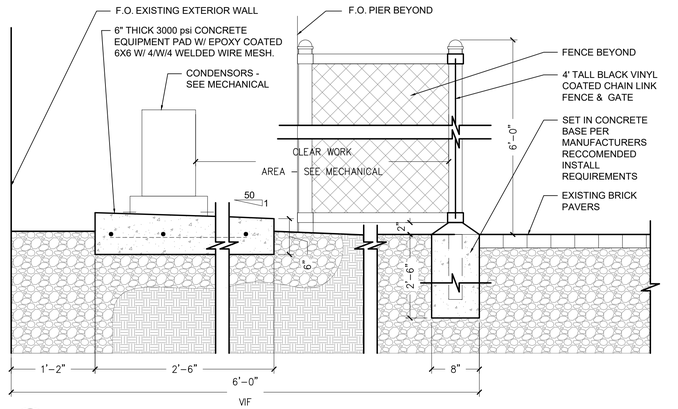
SINGLE DOOR HARDWARE SET	ITEM #	FINISH	MFG
3 Hinge (heavy weight)	T4A3786 (qty, size, nrp per spec)	US26D	MK
1 Fail Secure Lock	RX 72 8271 LNL	US26D	SA
1 Core (SFIC)	X4 (furnished by owner)	26	MC
1 Door Closer	281 O or P10	EN	SA
1 Kick Plate	K1050 10" 4BE CSK	US32D	RO
1 Door Stop	401; 404; 441CU (or per spec)	US26D	RO
1 Head & Jamb Gasketing	S88BL		PE
1 Door Wiring Harness	QC Series (hinge to device)		MK
1 Frame Wiring Harness	QC Series (jamb to J–box)		MK
1 Position Switch	By Security Vendor		SU
1 Power Supply	AQD4–BF8R1 (coord w/ security)		SU
1 Electric Power Transfer	EL–CEPT		SU
1 Card Reader	By Owner's Vendor		OT

DOUBLE DOOR HARDWARE SET			
2 Continuous Hinge (w/ EPT)	(K)CFM–HD1 EL–CEPTx32D Series		PE
1 Key Removable Mullion	L980S	PC	SA
2 Exit Device (rim,FSA,RX)	12 55 72 8875 ETL	US32D	SA
1 KR Mullion Cylinder	72 980C1	US26D	SA
3 Core (SFIC)	X4 (furnished by owner)	26	MC
2 Door Closer	281 O or P10	EN	SA
2 Kick Plate	K1050 10" 4BE CSK	US32D	RO
2 Door Stop	401; 404; 441CU (or per spec)	US26D	RO
1 Head & Jamb Gasketing	S88BL		PE
1 Mullion Gasket	5110BL		PE
1 Astragal (adhesive, edge mount)	S771C		PE
2 Door Wiring Harness	QC Series (hinge to device)		MK
2 Frame Wiring Harness	QC Series (jamb to J–box)		MK
2 Position Switch	By Security Vendor		SU
1 Power Supply	AQD4–BF8R1 (coord w/ security)		SU
1 Card Reader	By Security Vendor		OT

OPERATION NARRATIVE:
DOOR IS NORMALLY CLOSED AND LOCKED. VALID CARD AT READER UNLOCKS OUTSIDE LEVER FOR MOMENTARY MONITORING BY DOOR POSITION SWITCH. DURING A LOSS OF POWER THE DOOR WILL DEFAULT TO SECURE. FREE EGRESS AT ALL TIMES. LOCK STATUS WILL NOT CHANGE WHEN THE FIRE DETECTION/SUPPRESSION SYSTEMS ARE ACTIVATED. ROTATING INSIDE LEVER WILL ACTIVATE REQUEST TO EXIT SWITCH FOR APPROPRIATE MONITOR BY EAC SYSTEMS. OUTSIDE KEY OVERRIDE.



1 A4.0 PROPOSED SECTION
1/2"=1'-0"



2 A4.0 MECHANICAL PAD & CHAIN LINK FENCE DETAIL
1"=1'-0"

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#2224

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A4.0

REV:
~

ABBREVIATIONS

GENERAL ABBREVIATIONS:

AAV	AUTOMATIC AIR VENT	L	LENGTH
ADD'L	ADDITIONAL	LAT	LEAVING AIR TEMPERATURE
AFF	ABOVE FINISHED FLOOR	LB	POUND
AMS	AIR FLOW MEASURING STATION	LF	LINEAR FEET
ALT	ALTITUDE OR ALTERNATE	LD	LINEAR DIFFUSER
AMP	AMPERE	LRA	LOCKED ROTOR AMPS
AP	ACCESS PANEL	LVD	LOUVERED DOOR
APD	AIR PRESSURE DROP	LVG	LEAVING
ARCH	ARCHITECT	LWT	LEAVING WATER TEMPERATURE
ATC	AUTOMATIC TEMP. CONTROL		
ATM	ATMOSPHERE	MAX	MAXIMUM
AVG	AVERAGE	MBH	THOUSAND BTH
		MCA	MINIMUM CIRCUIT AMPS
BDD	BACKDRAFT DAMPER	MD	MOTOR OPERATED DAMPER
BG	BLAST GATE DAMPER	MECH	MECHANICAL
BHP	BRAKE HORSEPOWER	MEZZ	MEZZANINE
BI	BACKWARDS INCLINED	MFR	MANUFACTURER
BLDG	BUILDING	MIN	MINIMUM
BMS	BUILDING MANAGEMENT SYSTEM	MUA	MAKE-UP AIR
BOD	BOTTOM OF DUCT		
BOP	BOTTOM OF PIPE	N/A	NOT APPLICABLE
BSMT	BASEMENT	NC	NORMALLY CLOSED
BTU	BRITISH THERMAL UNIT	NC	NOISE CRITERIA
BTH	BTU PER HOUR	NIC	NOT IN CONTRACT
		NO	NORMALLY OPEN
CA	COMPRESSED AIR	No.	NUMBER
CDW	CONDENSER WATER	NOM	NOMINAL
CENT	CENTRIFUGAL	NTS	NOT TO SCALE
CF	CUBIC FEET		
CFM	CUBIC FEET PER MINUTE	OA	OUTSIDE AIR
CL	CENTERLINE	OD	OUTSIDE DIAMETER
C.L.	COLUMN LINE	ODP	OPEN DRIP PROOF
CND	CONDENSATE	OED	OPEN END DUCT
CLG	CEILING OR COOLING	OV	OUTLET VELOCITY
C.O.	CLEAN-OUT		
CO	CARBON MONOXIDE	PD	PRESSURE DROP
CO2	CARBON DIOXIDE	PH	PHASE
COL	COLUMN	PHC	PREHEAT COIL
CONN	CONNECTION	PBG	PLUMBING
CONTR	CONTRACTOR	POS	PROVIDED BY OTHER SECTION
CV	CONSTANT VOLUME	PSI	POUNDS PER SQUARE INCH
		PSIA	PSI ABSOLUTE
DB	DRY BULB TEMPERATURE	PSID	PSI DIFFERENTIAL
		PSIG	PSI GAUGE
DEG	DEGREE DIRECT	PVC	POLYVINYL CHLORIDE
DDC	DIGITAL CONTROL	PRV	PRESSURE REDUCING VALVE
DIA	DIAMETER		
DIFF	DIFFUSER	QTY	QUANTITY
DIM	DIMENSION		
DN	DOWN	R	RADIUS
DP	DIFFERENTIAL PRESSURE	RA	RETURN AIR
DWDI	DOUBLE WIDTH DOUBLE INLET	REG	REGISTER
DX	DIRECT EXPANSION	RET	RETURN
		REQD	REQUIRED
EA	EACH OR EXHAUST AIR	RH	RELATIVE HUMIDITY
EAT	ENTERING AIR TEMPERATURE	RLA	RUNNING LOAD AMPS
ECH	ELECTRIC CABINET HEATER	RLL	REFRIGERANT LIQUID LINE
EFF	EFFICIENCY	RM	ROOM
ELEC	ELECTRICAL	RPM	REVOLUTIONS PER MINUTE
ELEV	ELEVATION	RSL	REFRIGERANT SUCTION LINE
EMER	EMERGENCY		
EMS	ENERGY MANAGEMENT SYSTEM	SA	SUPPLY AIR
ENT	ENTER	SCH	SCHEDULE
ESP	EXTERNAL STATIC PRESSURE	SD	SMOKE DETECTOR
EWT	ENTERING WATER TEMPERATURE	SEN	SENSIBLE
EXH	EXHAUST	SHC	SENSIBLE HEAT CAPACITY
EXIST.	EXISTING	SP	STATIC PRESSURE
		SPECS	SPECIFICATIONS
F	FAHRENHEIT OR FAN	SQ	SQUARE
FA	FREE AREA	SF	SQUARE FEET
FD	FIRE DAMPER (ACCESS DOOR)	SS	STAINLESS STEEL
FLA	FULL LOAD AMPS	STL	STEEL
FLEX	FLEXIBLE	SUP	SUPPLY
FPM	FEET PER MINUTE	SWSI	SINGLE WITH SINGLE INLET
FPS	FEET PER SECOND		
FRP	FIBERGLASS REINFORCED PLASTIC	T	TEMPERATURE
FS	FLOW SWITCH	TEL	TELEPHONE
FT	FEET	TEFC	TOT. ENCLOSED FAN COOLED
FTR	FINNED TUBE RADIATION	TEMP	TEMPERATURE
		TSTAT	THERMOSTAT
G	GAS	TOD	TOP OF DUCT
GAL	GALLONS	TON	12,000 BTH
GALV	GALVANIZED	TOP	TOP OF PIPE
GC	GENERAL CONTRACTOR	TOT	TOTAL
GPH	GALLONS PER HOUR	TSP	TOTAL STATIC PRESSURE
GPM	GALLONS PER MINUTE	TYP	TYPICAL
GWB	GYPSUM WALL BOARD		
		V	VENT
HB	HOSE BIBB	VB	VACUUM BREAKER
HC	HEATING COIL	VD	VOLUME DAMPER
HEX	HEAT EXCHANGER	V	VOLTS (ELECTRICAL)
HGT	HEIGHT	VEL	VELOCITY
HP	HORSEPOWER		
HR	HOUR	W	WIDTH OR WATT
HTG	HEATING	W/	WITH
HW	HOT WATER	WB	WET BULB TEMPERATURE
HZ	HERTZ	WC	WATER COLUMN
		WG	WATER GAUGE
ID	INSIDE DIAMETER	WMS	WIRE MESH SCREEN
IN	INCHES	W/O	WITHOUT
		WPD	WATER PRESSURE DROP
KW	KILOWATT	WTD	WATER TEMPERATURE DIFF.

CONTROLS ABBREVIATIONS:

ACD	AUTOMATIC CONTROL DAMPER	LSPS	LOW STATIC PRESSURE SWITCH
ACV	AUTOMATIC CONTROL VALVE	LS	LEVEL SENSOR
AMS	AIR FLOW MEASURING STATION		
ALM	ALARM	MD	MOTORIZED DAMPER
ATC	AUTOMATIC TEMPERATURE CONTROL		
ATS	AIR TEMPERATURE SENSOR	NC	NORMALLY CLOSED (POWER LOSS)
		NO	NORMALLY OPEN (POWER LOSS)
BD	BACKDRAFT DAMPER		
BV	BYPASS VALVE	OAH	OUTSIDE AIR HUMIDITY SENSOR
		OAT	OUTSIDE AIR TEMP. SENSOR
CO2	CARBON DIOXIDE SENSOR		
CO	CARBON MONOXIDE SENSOR	RH	RELATIVE HUMIDITY
CT	CURRENT TRANSFORMER		
CV	CONTROL VALVE	S	SWITCH
		SP	STATIC PRESSURE SENSOR
DDC	DIRECT DIGITAL CONTROL	SD	SMOKE DETECTOR
DPS	DIFFERENTIAL PRESSURE SWITCH	SPD	SPEED CONTROL
DPT	DIFFERENTIAL PRESSURE SENSOR	S/S	START/STOP
DPV	DIFF. PRESSURE BYPASS VALVE		
DSD	DUCT MOUNTED SMOKE DETECTOR	T	THERMOSTAT
DWDI	DOUBLE WIDTH DOUBLE INLET	TS	TEMPERATURE SENSOR
ES	END SWITCH	WTS	WATER TEMPERATURE SENSOR
FM	FLOW METER/TRANSMITTER		
FZ	FREEZESTAT		
H	HUMIDISTAT		
HEPA	HIGH EFF. PARTICULATE AIR FILTER		
HGB	HOT GAS BYPASS		
HHL	HIGH HUMIDITY LIMIT SENSOR		
HOA	HANDS-OFF AUTOMATIC SWITCH		
HS	HUMIDITY SENSOR		
HZ	HERTZ		

EQUIPMENT ABBREVIATIONS:

AC	AIR CONDITIONING UNIT	GMS	GLYCOL MAKE-UP SYSTEM
ACU	AC CONDENSING UNIT	GUH	GAS FIRED UNIT HEATER
AHU	AIR HANDLING UNIT		
AS	AIR SEPARATOR	H	HUMIDIFIER
		HP	HEAT PUMP
B	BOILER	HPU	HP CONDENSING UNIT
BB	BASE BOARD	HV	HEATING & VENTILATING UNIT
BC	BRANCH CONTROLLER	HWC	HOT WATER COIL
BP	BOILER PUMP		
BT	BUFFER TANK	LV	LOUVER
CAC	CRITICAL COOLING AC UNIT	KEF	KITCHEN EXHAUST FAN
CC	COOLING COIL		
CCU	CC CONDENSING UNIT	MAU	MAKE-UP AIR UNIT
CEF	CEILING EXHAUST FAN	MCC	MOTOR CONTROL CENTER
CH	CHILLER		
CP	CIRCULATOR PUMP	P	PUMP
CT	COOLING TOWER	PTAC	PACKAGED TERMINAL AC UNIT
CUH	CABINET UNIT HEATER		
CWC	CHILLED WATER COIL	R	RETURN GRILLE
		REF	ROOF EXHAUST FAN
DC	DRY COOLER	RHP	RADIANT HEATING PANEL
DEF	DISHWASHER EXHAUST FAN	RTU	ROOF TOP UNIT
DSF	DESTRATIFICATION FAN		
		S	SUPPLY DIFFUSER
E	EXHAUST GRILLE	SA	SOUND ATTENUATOR
EBB	ELECTRIC BASE BOARD	SAC	SPLIT AC UNIT
ECH	ELECTRIC CABINET HEATER	SHP	SPLIT HEAT PUMP
ECH	ELECTRIC CEILING HEATER	SF	SUPPLY FAN
EF	EXHAUST FAN		
ERV	ENERGY RECOVERY VENTILATOR	T	TRANSFER GRILLE
ET	EXPANSION TANK		
EUH	ELECTRIC UNIT HEATER	UH	UNIT HEATER
		UV	UNIT VENTILATOR
F	FURNACE		
FC	FAN COIL UNIT	VAV	VARIABLE AIR VOLUME BOX
FPB	FAN POWERED VAV	VFD	VARIABLE FREQUENCY DRIVE
FT	FINTUBE		
		WSHP	WATER SOURCE HEAT PUMP

MECHANICAL SYMBOL LEGEND

AIR DEVICES

- 4-WAY SUPPLY DIFFUSER
- 3-WAY SUPPLY DIFFUSER
- 2-WAY SUPPLY DIFFUSER
- 2-WAY CORNER SUPPLY DIFFUSER
- 1-WAY SUPPLY DIFFUSER
- RETURN REGISTER
- EXHAUST REGISTER
- SIDE WALL SUPPLY DIFFUSER
- SIDE WALL RETURN OR EXHAUST GRILLE

DUCTWORK

- STANDARD SIZE REDUCTION
- ASYMMETRICAL TRANSITION
- SQUARE-TO-ROUND TRANSITION
- STANDARD BRANCH TAKE-OFF
- ROUND BRANCH TAKE-OFF
- STANDARD TEE
- STANDARD TEE WITH TURNING VANES
- SLOPED DUCT RISE
- FIRE DAMPER ACCESS DOOR
- GREASE DUCT ACCESS DOOR
- DUCT RISE
- DUCT DROP
- STANDARD SQUARE ELBOW
- SQUARE ELBOW WITH TURNING VANES
- STANDARD RADIUS ELBOW (R=D)
- FIRE WRAPPED DUCTWORK
- ACOUSTICALLY LINED DUCTWORK
- OPEN ENDED DUCT OUTLET
- OPEN ENDED DUCT INTAKE
- OPEN ENDED DUCT OUTLET W/ SCREEN
- OPEN ENDED DUCT INTAKE W/ SCREEN

CONTROLS

- THERMOSTAT
- TS — TEMPERATURE SENSOR
- DSD — DUCT MOUNTED SMOKE DETECTOR

AIR DAMPERS

- MANUALLY ADJUSTABLE VOLUME DAMPER
- FIRE DAMPER
- M — MOTORIZED DAMPER

TAGS

- X / # / CFM — DIFFUSER TAG
- X / # — EQUIPMENT TAG
- # — REVISION
- CONNECT NEW TO EXISTING

LEGEND NOTE:
NOT ALL SYMBOLS ARE NECESSARILY USED. ABSENCE OF A SYMBOL ON THE DRAWINGS DOES NOT NECESSARILY MEAN IT IS NOT REQUIRED. REFER TO DETAILS & SPECIFICATIONS FOR A COMPLETE UNDERSTANDING OF WORK REQUIRED.

GENERAL CONSTRUCTION NOTES:

1. ALL WORK IS TO BE PERFORMED IN STRICT COMPLIANCE WITH LOCAL CODES AND ALL OTHER REGULATIONS GOVERNING WORK OF THIS NATURE.
2. THE CONTRACTOR IS RESPONSIBLE FOR ALL WORK, MATERIALS, AND LABOR TO SATISFY A COMPLETE WORKING SYSTEM WHETHER SPECIFIED OR IMPLIED.
3. THIS CONTRACTOR, PRIOR TO SUBMITTING HIS BID, SHALL VISIT THE PROJECT SITE TO FAMILIARIZE HIMSELF WITH ALL EXISTING CONDITIONS. REQUESTS FOR COMPENSATION FOR EXTRA WORK, WHICH WOULD HAVE BEEN EVIDENT BY COMPLIANCE WITH THE PREVIOUS STATEMENT, WILL NOT BE CONSIDERED. THE CONTRACTOR SHALL CONDUCT A THOROUGH FIELD INVESTIGATION TO VERIFY WORK SHOWN ON THE DRAWINGS. THE DRAWINGS REFLECT THE BEST AVAILABLE INFORMATION FROM EXISTING PLANS AND SITE INVESTIGATIONS.
4. THE MECHANICAL PLANS ARE INTENDED TO BE DIAGRAMMATIC AND ARE BASED ON ONE MANUFACTURER'S EQUIPMENT. THEY ARE NOT INTENDED TO SHOW THE EXACT ROUTING OF SYSTEMS OR LOCATION OF COMPONENTS. THE EXACT LOCATIONS, DIMENSIONS AND ALL OTHER DETAILS OF EQUIPMENT ARE THE RESPONSIBILITY OF THIS CONTRACTOR. THIS CONTRACTOR SHALL VERIFY THE ACTUAL DIMENSIONS OF THE EQUIPMENT PROPOSED TO ENSURE THAT THE EQUIPMENT WILL FIT IN THE AVAILABLE SPACE. PROVIDE ALL DUCT AND PIPE TRANSITIONS REQUIRED FOR CONNECTION TO EQUIPMENT.
5. THIS CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS PRIOR TO PROCEEDING WITH ANY WORK. WHERE DISCREPANCIES OCCUR BETWEEN THESE DOCUMENTS AND EXISTING CONDITIONS, THE DISCREPANCY SHALL BE REPORTED TO THE OWNER AND/OR ENGINEER FOR EXPEDITING AND RESOLVE.
6. ALL WORK SHALL BE PERFORMED IN A CLEAN AND WORKMANLIKE MANNER. CARE SHALL BE EXERCISED TO MINIMIZE ANY INCONVENIENCE OR DISTURBANCE TO OTHER AREAS OF THE BUILDING WHICH ARE TO REMAIN IN OPERATION. ISOLATE WORK AREAS BY MEANS OF TEMPORARY PARTITIONS AND/OR TARPS TO KEEP DUST AND DEBRIS WITHIN THE CONSTRUCTION AREA.
7. CLEAN THE JOB SITE DAILY AND REMOVE FROM THE PREMISES ANY DIRT AND DEBRIS CAUSED BY THE PERFORMANCE OF THE WORK INCLUDED IN THIS CONTRACT.
8. ALL OPENINGS IN WALLS SHALL BE KEPT PROPERLY SEALED AT ALL TIMES, EXCEPT WHEN BEING WORKED ON TO PRECLUDE THE POSSIBILITY OF FLOODING DUE TO STORM OR OTHER CAUSES.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFEKEEPING OF HIS OWN PROPERTY ON THE JOB SITE. OWNER ASSUMES NO RESPONSIBILITY FOR PROTECTION OF PROPERTIES AGAINST FIRE, THEFT, AND ENVIRONMENTAL CONDITIONS.
10. THIS CONTRACTOR SHALL COORDINATE HIS WORK WITH ALL OTHER TRADES PRIOR TO FABRICATION, PURCHASE AND/OR INSTALLATION OF ALL WORK. ALL OFFSETS IN PIPING AND DUCTS TO AVOID OBSTRUCTIONS SHALL BE PROVIDED AT NO COST TO THE OWNER.
11. CONTRACTOR SHALL REFER TO THE COMPLETE SET OF CONTRACT DOCUMENTS INCLUDING SPECIFICATIONS AND OTHER TRADES FOR A FULL UNDERSTANDING OF ALL WORK REQUIRED.
12. WHERE USED THE TERM "PROVIDE" SHALL MEAN "FURNISH AND INSTALL".
13. PROVIDE ALL REQUIRED RIGGING TO ACCOMMODATE THE REMOVAL & INSTALLATION OF ALL EQUIPMENT.
14. PROVIDE ACCESS PANELS FOR ALL CONCEALED DAMPERS, VALVES, AND EQUIPMENT.
15. ALL EQUIPMENT AND MATERIALS SHALL BE AS SPECIFIED OR "APPROVED EQUAL" BY THE ENGINEER OR ARCHITECT.
16. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION OF REGISTERS, DIFFUSERS, AND GRILLES.
17. CONTRACTOR SHALL SPRAY PAINT INSIDE OF DUCT BLACK, BEHIND ALL GRILLES AND REGISTERS.
18. ALL DUCTWORK AND PIPING SHALL BE INSTALLED AS INDICATED ON THE DRAWINGS IN A NEAT AND WORKMANLIKE MANNER AND BE SUPPORTED AS REQUIRED BY CODES. DUCTWORK AND PIPING SHALL BE SET UP AND DOWN AND OFFSET AS REQUIRED TO SUIT FIELD CONDITIONS. DIELECTRIC COUPLINGS SHALL BE USED WHERE DISSIMILAR METALS ARE JOINED.
19. IF A SECTION OF DUCT OR PIPE IS NOT LABELED FOR SIZE, THEN THE LARGER SIZE INDICATED ON THE DRAWINGS SHALL PREVAIL. SIZE OF DUCT RUN-OUTS TO DIFFUSERS SHALL EQUAL DIFFUSER NECK SIZE UNLESS OTHERWISE NOTED.
20. PROVIDE ALL NECESSARY TEMPORARY OR PERMANENT CAPS OR PLUGS FOR PIPING. DO NOT LEAVE PIPING OPEN ENDED.
21. PROVIDE CONDENSATE PUMPS THROUGHOUT CONDENSATE DRAINAGE SYSTEM AS REQUIRED TO PROPERLY REMOVE CONDENSATE. PROVIDE A PER PUMP LINE-ITEM ALLOWANCE.
22. REFRIGERANT PIPE SIZING SHALL BE PER MANUFACTURER'S RECOMMENDATIONS. LENGTH OF PIPE, ELEVATION CHANGE AND EQUIPMENT ORIENTATION SHALL BE TAKEN INTO ACCOUNT.
23. SUCCESSFULLY PRESSURE TEST ALL REROUTED PIPING SYSTEMS. TEST SHALL BE PERFORMED AT TWICE SYSTEM OPERATING PRESSURES. REPAIR AND RETEST AS REQUIRED UNTIL SYSTEMS PROVE TIGHT.
24. ALL ROOF MOUNTED EQUIPMENT SHALL BE INSTALLED A MINIMUM OF 10' FROM THE ROOF EDGE. EQUIPMENT INSTALLED CLOSER THAN 10' SHALL REQUIRE THE INSTALLATION OF GUARD RAILS.
25. ALL CONCEALED ELECTRICAL CONNECTIONS SHALL BE HARD WIRED. PLUGS SHALL NOT BE USED AS A DISCONNECTING MEANS IN CONCEALED LOCATIONS.
26. CONTRACTOR SHALL PROVIDE ALL TEMPERATURE CONTROLS INCLUDING WIRING, TUBING, AND THERMOSTATS (WITH LOCKING COVERS) AND ALL MISCELLANEOUS APPURTENANCES TO MEET THE INTENT OF THESE DOCUMENTS.
27. DUCT SMOKE DETECTORS SHALL BE FURNISHED BY ELECTRICAL CONTRACTOR, INSTALLED IN THE DUCTWORK BY MECHANICAL CONTRACTOR AND WIRED BY THE ELECTRICAL CONTRACTOR.
28. ALL FRESH AIR INTAKES & DIRECT VENTS SHALL TERMINATE AT LEAST 10' HORIZONTALLY FROM ANY GAS METERS.
29. ALL THERMOSTATS, CONTROL SWITCHES, ETC. SHALL BE INSTALLED 48" AFF.

GENERAL RENOVATION NOTES:

1. ALL SHUT DOWNS OF EXISTING SYSTEMS SHALL BE SCHEDULED AND APPROVED BY THE OWNER PRIOR TO COMMENCING WITH WORK.
2. NO DUCTWORK, PIPING, EQUIPMENT, ETC. SHALL BE REMOVED, DISCONNECTED, OR SHUT DOWN WITHOUT PRIOR REVIEW WITH THE OWNER AND/OR ENGINEER TO CONFIRM THAT AREAS TO REMAIN IN OPERATION WILL NOT BE AFFECTED. IF ANY AREAS NOT WITHIN THE SCOPE OF WORK ARE AFFECTED BY ANY SHUTDOWN, REMOVAL, OR DISCONNECTION, 1 WEEK NOTICE MUST BE GIVEN TO THE OWNER INDICATING WHICH AREAS WILL BE AFFECTED, WHEN THE PROPOSED SHUTDOWN WILL OCCUR, AND FOR HOW LONG A PERIOD.
3. USE OF THE OWNER'S ELEVATORS AND BUILDING CORRIDORS FOR HANDLING OF THE OWNER'S AND REMOVED EQUIPMENT AND MATERIALS SHALL BE AT THE DIRECTION OF THE OWNER AND SHALL BE COORDINATED WITH HIS OPERATIONS.
4. ALL ITEMS REMOVED SHALL BECOME PROPERTY OF THE OWNER AND SHALL BE DISPOSED OF AS PER OWNER'S INSTRUCTIONS, UNLESS INDICATED OTHERWISE. ALL ITEMS WHICH ARE NOT TO BE STORED ON SITE BY OWNERS SHALL BE REMOVED FROM THE BUILDING IMMEDIATELY.
5. DISCONNECT AND REMOVE ALL EXISTING EQUIPMENT, PIPING, DUCTWORK, FLUES, REGISTERS, SUPPORTS, HANGERS, AND ALL OTHER MECHANICAL COMPONENTS MADE OBSOLETE BY THIS PROJECT.
6. PRIOR TO RENOVATION, CONTRACTOR TO RECORD ALL SUPPLY & RETURN MAIN AIRFLOWS & SUBMIT A COPY TO THE ENGINEER. ALL READINGS SHALL BE PERFORMED BY A CERTIFIED NEBB CONTRACTOR. COMPARE NEW EQUIPMENT VALUES & ALERT DISCREPANCIES FOR ENGINEER FEEDBACK. AT THE END OF THE PROJECT EXISTING SYSTEMS SHALL BE BALANCED TO PRE-CONSTRUCTION VALUES OR ADJUSTED VALUES BASED ON PRE-CONSTRUCTION TESTING ENGINEERING FEEDBACK.
7. ALL NEW, RELOCATED, OR EXISTING EQUIPMENT AFFECTED BY THIS SCOPE OF WORK SHALL BE REBALANCED BEFORE BEING PLACED IN SERVICE.
8. PROVIDE ALL REQUIRED CUTTING AND PATCHING AS REQUIRED TO COMPLETE THE INSTALLATION OF NEW MECHANICAL SYSTEM. PATCH ALL SURFACES TO MATCH AND MAINTAIN ALL FIRE RATINGS.
9. EXISTING ROOF CUTTING, FLASHING, SEALING, ETC. TO BE ACCOMPLISHED BY A ROOFING CONTRACTOR APPROVED BY THE EXISTING ROOF MANUFACTURER AND INSTALLED IN ACCORDANCE WITH ROOF MANUFACTURER'S RECOMMENDATIONS SO AS NOT TO VOID ROOF WARRANTY.
10. EXISTING MATERIALS THAT ARE REMOVED SHALL NOT BE REUSED IN NEW SYSTEMS, EXCEPT WHERE INDICATED AS SUCH ON THE DRAWINGS. ALL MATERIALS AND EQUIPMENT LISTED AS NEW MUST BE NEW.
11. THE FIRE PROOFING OF THE EXISTING STRUCTURE IS NOT TO BE REMOVED FOR THE INSTALLATION OF HANGERS, SUPPORTS AND DUCTWORK ETC. IF FIRE PROOFING IS DAMAGED, IT SHALL BE REPAIRED AT THE EXPENSE OF THE TRADE.

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PROJECT TITLE:
IT ROOM RENOVATION
444 WESTMINSTER ST
PROVIDENCE, RI 02903

ISSUED FOR:
BID SET
01/18/2023
REVISIONS:

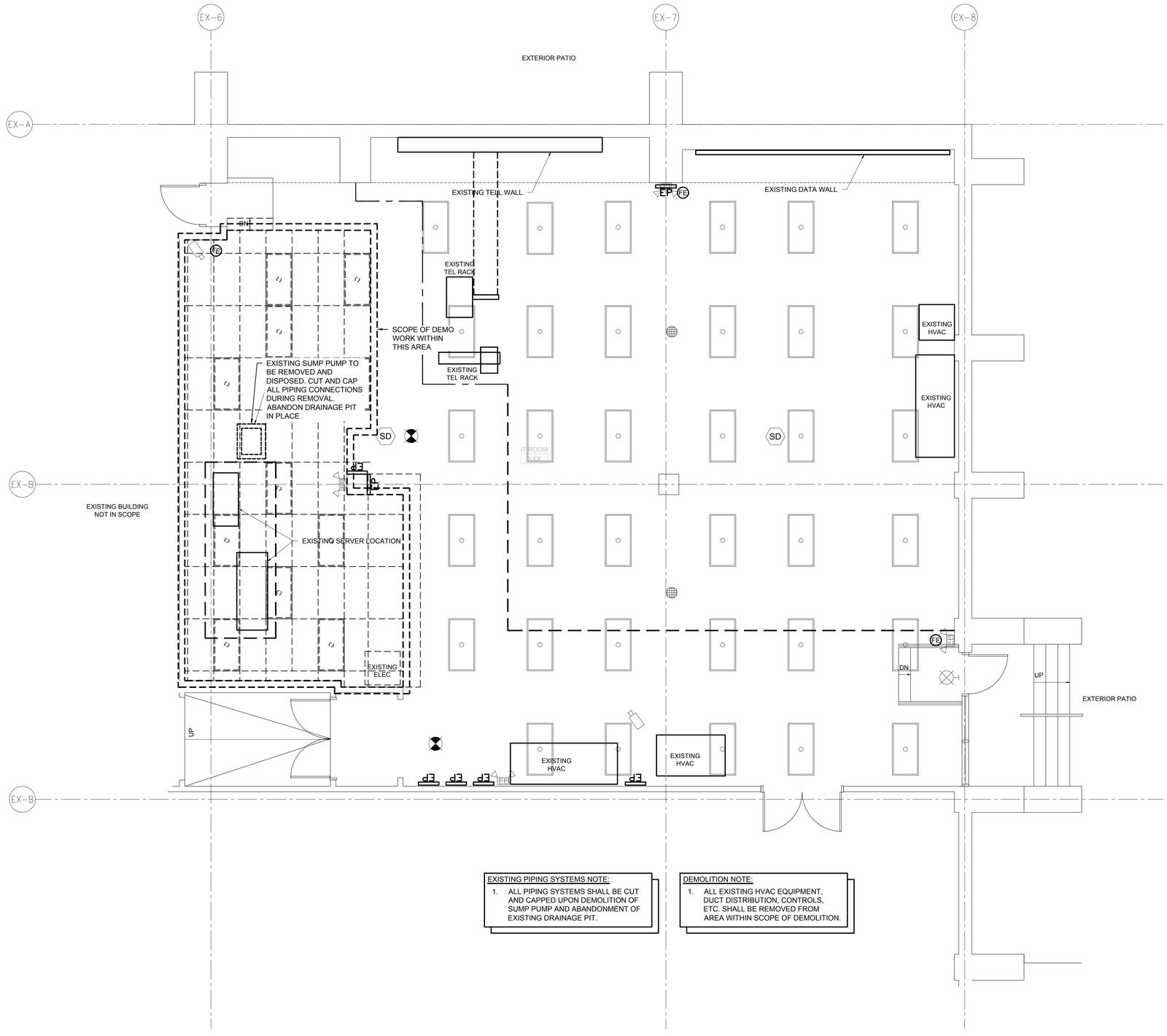
STAMP:

SHEET TITLE:
MECHANICAL - LEGENDS & NOTES

PROJECT NORTH: N

PROJECT ARCHITECT: BB
DRAWN: YYY
PROJECT NUMBER:
#2224

SHEET NUMBER: M0.0
REV:



EXISTING PIPING SYSTEMS NOTE:

1. ALL PIPING SYSTEMS SHALL BE CUT AND CAPPED UPON DEMOLITION OF SUMP PUMP AND ABANDONMENT OF EXISTING DRAINAGE PIT.

DEMOLITION NOTE:

1. ALL EXISTING HVAC EQUIPMENT, DUCT DISTRIBUTION, CONTROLS, ETC. SHALL BE REMOVED FROM AREA WITHIN SCOPE OF DEMOLITION.

1 / MD1.0 — MECHANICAL - DEMOLITION PLAN

1/4" = 1'-0"

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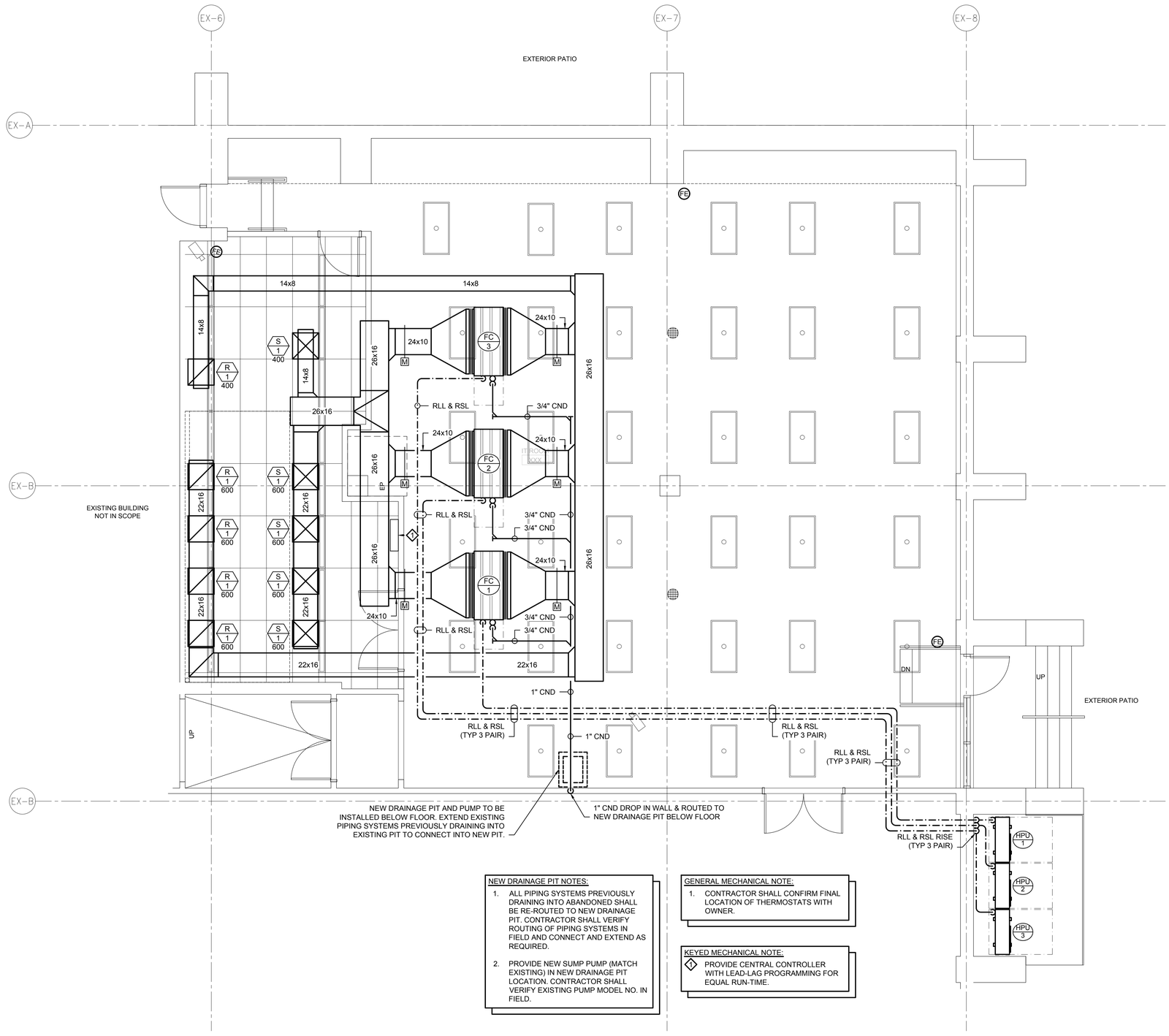

NEW DRAINAGE PIT NOTES:

1. ALL PIPING SYSTEMS PREVIOUSLY DRAINING INTO ABANDONED SHALL BE RE-ROUTED TO NEW DRAINAGE PIT. CONTRACTOR SHALL VERIFY ROUTING OF PIPING SYSTEMS IN FIELD AND CONNECT AND EXTEND AS REQUIRED.
2. PROVIDE NEW SUMP PUMP (MATCH EXISTING) IN NEW DRAINAGE PIT LOCATION. CONTRACTOR SHALL VERIFY EXISTING PUMP MODEL NO. IN FIELD.

GENERAL MECHANICAL NOTE:

1. CONTRACTOR SHALL CONFIRM FINAL LOCATION OF THERMOSTATS WITH OWNER.

KEYED MECHANICAL NOTE:

1. PROVIDE CENTRAL CONTROLLER WITH LEAD-LAG PROGRAMMING FOR EQUAL RUN-TIME.

1 M1.0 MECHANICAL - FLOOR PLAN

1/4" = 1'-0"

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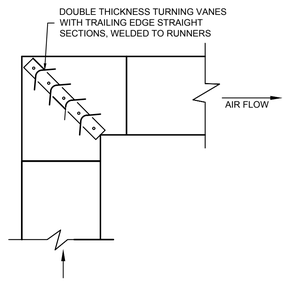
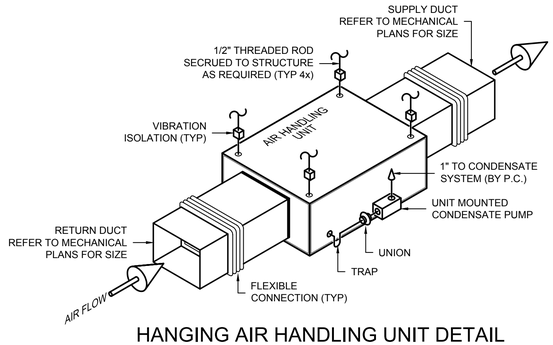


TYPICAL SQUARE ELBOW
NTS



HANGING AIR HANDLING UNIT DETAIL
NO SCALE

SPLIT FAN COIL UNIT SCHEDULE (BASED ON TRANE)

SYMBOL	MODEL	CFM	ESP	COOLING		HEATING	ELECTRICAL DATA			NOTES
				TOTAL MBH	SENSIBLE MBH	MBH	MOCP	MCA	VOLTAGE	
FC-1,2,3	TPEFYP054MA144A	1400	0.6	54.0	38.1	60.0	15	4.4	208/1/60	1,2,3

SYMBOL	MODEL	COMPRESSOR QUANTITY	CORRECTED CAPACITY	NOMINAL MBH	EFFICIENCIES			ELECTRICAL DATA			NOTES
					EER	SEER	HSPF	MCA	MAX. FUSE	VOLTAGE	
HP-1,2,3	NTXMSM60A182AA	1	60.6	60.0	12.2	18.9	11.4	36	40	208/1/60	1,3,4,5

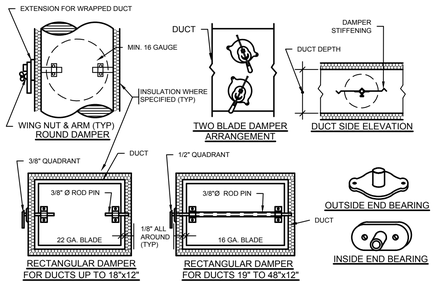
NOTES:
1. PROVIDE WITH DISCONNECT. REFER TO ELECTRICAL PLANS FOR RATINGS & COORDINATE WITH E.C.
2. PROVIDE WITH FACTORY CONDENSATE PUMP AND PROVIDE UNIT WITH MEDIUM ESP OPTION.
3. PROVIDE WITH SPACE-MOUNTED THERMOSTAT.
4. PROVIDE WITH AN 18" SLING STAND.
5. EQUIPMENT PERFORMANCE DATA SELECTED AT AHRI CONDITIONS. UNIT HEAT SHALL NOT BE UTILIZED, COOLING ONLY.

AIR DEVICE SCHEDULE (BASED ON PRICE)

SYMBOL	MODEL	MOUNTING TYPE	CFM	NECK SIZE	NOTES
S-1	PDS	DUCT MOUNT	400-600	12x12	1,2,3,4
R-1	PDDR	DUCT-MOUNT	400-600	14x14	1,2,3,4

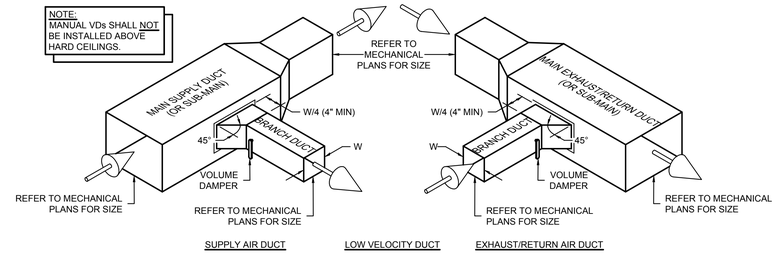
NOTES:
1. PROVIDE ALL NECESSARY MOUNTING HARDWARE. CONTRACTOR TO CONFIRM MOUNTING TYPE.
2. CONTRACTOR TO PROVIDE DUCT TRANSITIONS AS REQUIRED.
3. BASED ON 24x24 FACE SIZE.
4. ARCHITECT TO VERIFY COLOR FINISH.

** - SIZE
*** - CFM



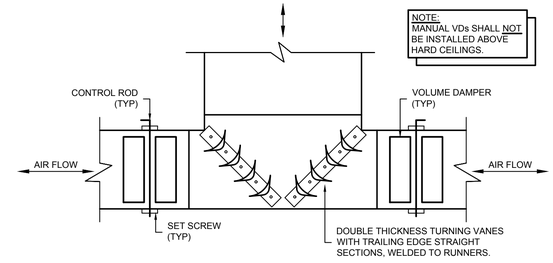
NOTES: ① FOR RECTANGULAR DUCTS OVER 12" HIGH OBD.
② ALL BRANCH DUCTS (SUPPLY, RETURN & EXHAUST) SHALL HAVE VOLUME DAMPERS, INCLUDING RUNOUTS TO DIFFUSERS.
③ ALL QUADRANT OPERATORS SHALL BE EXTENDED TO OUTSIDE OF INSULATION.

VOLUME DAMPER DETAIL
NTS

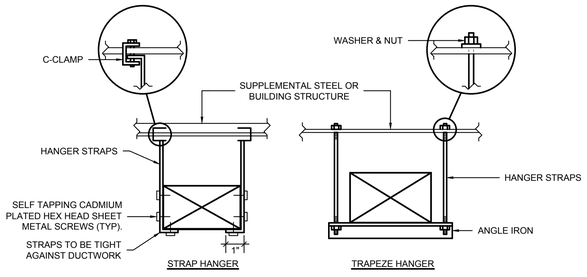


SUPPLY AIR DUCT LOW VELOCITY DUCT EXHAUST/RETURN AIR DUCT

BRANCH DUCT CONNECTIONS
NTS



TYPICAL TEE CONNECTION
NO SCALE



NOTE:
NO POP RIVETS ALLOWED, USE SELF-TAPPING SHEETMETAL SCREWS ONLY.

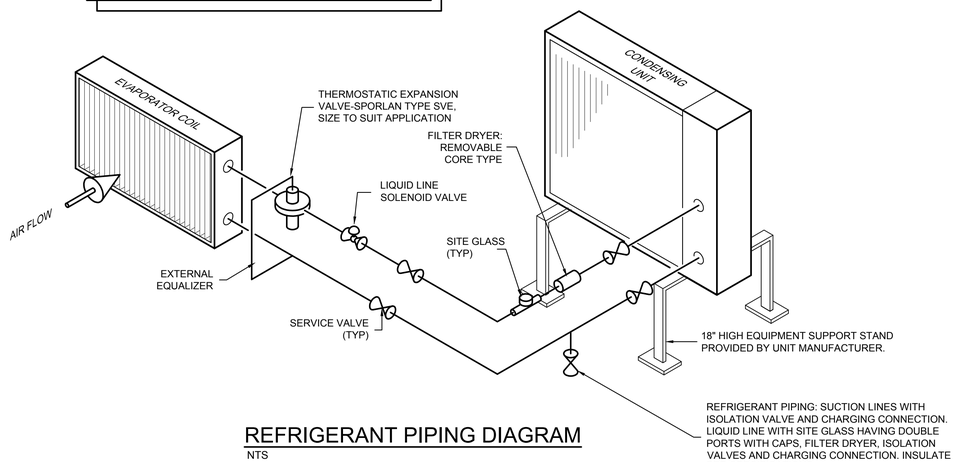
HANGER SIZES*

MAX. SIDE	HANGER	HORIZONTAL SUPPORT ANGLE	MAXIMUM SPACING
30"	1"x18" GAUGE STRAP	NONE REQUIRED	10'-0"
36"	1/4" ROD	1-1/2"x1-1/2"x1/8"	8'-0"
48"	1/4" ROD	2"x2"x1/8"	8'-0"
60"	5/16" ROD	2"x2"x1/8"	8'-0"
84"	3/8" ROD	2"x2"x1/8"	8'-0"

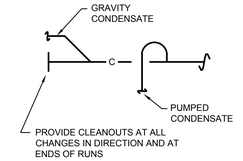
* FOR RECTANGULAR DUCTS

DUCT HANGER DETAIL
NTS

NOTE:
ACTUAL PIPING ACCESSORIES AND ARRANGEMENT MAY VARY ACCORDING TO MANUFACTURER AND SYSTEM TYPE. FINAL CONFIGURATION SHALL BE VERIFIED WITH MANUFACTURER INSTALLATION INSTRUCTIONS PRIOR TO BID AND INSTALLATION.



REFRIGERANT PIPING DIAGRAM
NTS



NOTES:
1. ALL BRANCH CONNECTIONS TO MAINS SHALL BE AT 45 DEGREES.
2. GATHER & RUN ALL CONDENSATE TO TANK ROOM. PROVIDE 120V CONDENSATE PUMPS & ELECTRICAL CIRCUITING AS NEEDED.

CONDENSATE PIPING DETAIL
NO SCALE

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MECHANICAL - SCHEDULES & DETAILS

PROJECT NORTH:
N

PROJECT ARCHITECT: BB
DRAWN: YYY

PROJECT NUMBER:
#2224

SHEET NUMBER: REV:
M2.0

WIRING DEVICE LEGEND

	DUPLEX CONVENIENCE OUTLET; 125 VOLT, 20 AMPERE, U-SLOT GROUNDING TYPE	18" A.F.F.
	DUPLEX CONVENIENCE OUTLET; 125 VOLT, 20 AMPERE, U-SLOT GROUNDING TYPE.	42" A.F.F. OR 6" ABOVE COUNTER
	DUPLEX CONVENIENCE OUTLET; 125 VOLT, 20 AMPERE, U-SLOT GROUNDING TYPE WITH GROUND FAULT PROTECTION.	18" A.F.F.
	DUPLEX CONVENIENCE OUTLET; 125 VOLT, 20 AMPERE, U-SLOT GROUNDING TYPE WITH GROUND FAULT PROTECTION.	42" A.F.F. OR 6" ABOVE COUNTER
	SPECIAL NEMA CONFIGUATION OUTLET; VERIFY NEMA TYPE WITH EQUIPMENT TO BE SERVED.	--
	SINGLE CONVENIENCE OUTLET; 125 VOLT, 20 AMPERE, U-SLOT GROUNDING TYPE.	18" A.F.F.
	DEDICATED DUPLEX CONVENIENCE OUTLET; 125 VOLT, 20 AMPERE, U-SLOT GROUNDING TYPE.	18" A.F.F.
	SWITCHED DUPLEX CONVENIENCE OUTLET; 125 VOLT, 20 AMPERE, U-SLOT GROUNDING TYPE. TOP OUTLET SWITCHED, BOTTOM OUTLET UN-SWITCHED. REFER TO PLANS FOR SWITCH LOCATION(S).	18" A.F.F.
	QUADRUPLEX CONVENIENCE OUTLET; 125 VOLT, 20 AMPERE, U-SLOT GROUNDING TYPE.	18" A.F.F.
J	JUNCTION BOX; SIZE AS REQUIRED PER CODE.	-
R	RELAY; REFER TO PLANS FOR RATINGS.	-
C	CONTACTOR; REFER TO PLANS FOR RATINGS.	-
TC	TIMECLOCK; REFER TO DETAILS ON PLANS.	-
	MOTOR; REFER TO PLANS FOR DETAILS.	-
60/50	FUSED DISCONNECT SWITCH. 60/50 INDICATES FRAME SIZE/FUSE SIZE IN THAT ORDER. STARTERS FOR HVAC EQUIPMENT BY MECHANICAL CONTRACTOR.	-
	SURFACE MOUNTED PANELBOARD; 208Y/120V, 3-PHASE, 4-WIRE. REFER TO DRAWINGS FOR ADDITIONAL INFORMATION.	MOUNT 6'-6" AFF TO TOP BREAKER.
	RECESSED MOUNTED PANELBAORD; 208Y/120V, 3-PHASE, 4-WIRE. REFER TO DRAWINGS FOR ADDITIONAL INFORMATION.	MOUNT 6'-6" AFF TO TOP BREAKER.
	GROUNDING CONDUCTOR / MEANS & METHOD; IN ACCORDANCE WITH THE *"NATIONAL ELECTRIC CODE"*, (NEC). REFER TO PLANS FOR SIZING.	-

NOTES:

1. THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE G.C. FOR WALLS BEING FURRED-OUT WITH SHEETROCK DRYWALL SO OUTLET BOXES & DEVICES CAN BE INSTALLED FLUSH WITHIN THE WALLS. (TYPICAL)
2. ALL RECEPTACLES SHALL BE PROVIDED WITH AN ADHERED, TYPED LABEL INDICATING PANEL NAME AND CIRCUIT NUMBER. HANDWRITTEN LABELS WILL NOT BE ACCEPTED.
3. ALL RECEPTACLES WITH A DEDICATED CIRCUIT SHALL BE LABELED WITH PANEL NAME AND CIRCUIT NUMBER AS INDICATED, AS WELL AS LABELED "DEDICATED".
4. ALL COLORS OF RECEPTACLES AND ASSOCIATED FACEPLATES TO BE CONFIRMED WITH OWNER'S REPRESENTATIVE AND LOCAL (AHJ) PRIOR TO ANY SUBMITTALS, PURCHASE AND/OR INSTALLATION OF EQUIPMENT. THIS REQUIREMENT AS INDICATED, SHALL BE CORRECTED AS REQUIRED.
5. ALL TYPES AND LOCATIONS OF RECEPTACLES TO BE CONFIRMED WITH OWNER'S REPRESENTATIVE AND LOCAL (AHJ) PRIOR TO ANY SUBMITTALS, PURCHASE AND/OR INSTALLATION OF EQUIPMENT. FAILURE OF THIS REQUIREMENT AS INDICATED IN THESE NOTES SHALL BE CORRECTED AS REQUIRED.
6. ANY CONFLICT WITH RECEPTACLE LOCATIONS, TYPES OF RECEPTACLES OR COLORS OF RECEPTACLES WITH OWNER'S REPRESENTATIVE OR WILL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR, AND GENERAL CONTRACTOR TO PROVIDE ALL ADDITIONAL WORK AND EXPENSES TO REPAIR AND CORRECT. NO ADDITIONAL REIMBURSEMENTS OR TIME OF COMPLETION FOR WORK WILL BE ALLOWED.
7. IT SHALL BE THIS CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH LOCAL (AHJ) FOR ALL INSTALLATIONS AND REQUIREMENTS.

LIGHTING CONTROL LEGEND

SYMBOL	DESCRIPTION	MOUNTING
SM	MANUAL MOTOR RATED TOGGLE SWITCH WITH THERMAL OVERLOADS.	48" A.F.F.
Sa	SINGLE POLW SWITCH; "a" INDICATES LIGHTING FIXTURES CONTROLLED.	48" A.F.F.
S3a	THREE-WAY SWITCH; "a" INDICATES LIGHTING FIXTURES CONTROLLED.	48" A.F.F.
WS	WALL SWITCH VACANCY SENSOR (MANUAL "ON" AND AUTOMATIC "OFF") SENSOR SWITCH #WSX-PDT-2P-2SA-XX. INSTALL PER MANUFACTURERS INSTRUCTIONS.	48" A.F.F.
MS	DUAL TECHNOLOGY VACANCY SENSOR EQUAL TO ACUITY NLIGHT CONTROLS #NWV-PDT-16-KIT. PROVIDE ACUITY NLIGHT CONTROLS #NAR40 OUTPUT DEVICE; WIRE TO POWERPACK PER MANUFACTURERS INSTRUCTIONS FOR MANUAL "ON" WITH WALL LOW VOLTAGE SWITCH AND AUTOMATIC "OFF" WITH SENSOR. SET DELAY TIMES FOR 15 MINUTES. SET SENSOR SO THAT ONLY ONE TECHNOLOGY IS NEEDED TO KEEP LIGHTS ON.	CEILING

NOTES:

- E.C. SHALL FURNISH AND INSTALL ALL DEVICES AND ACCESSORIES FOR A COMPLETE LIGHTING CONTROL INSTALLATION.
- COORDINATE EXACT REQUIREMENTS FOR INSTALLATION WITH LIGHTING CONTROL REPRESENTATIVE.
- PROVIDE ALL LOW VOLTAGE CABLING REQUIRED FOR CONTROLS.

LUMINAIRE BRANCH CIRCUIT WIRING SCHEDULE

CONDUCTOR AWG.	MAXIMUM CONDUCTOR LENGTH AT 120V	GROUND CONDUCTOR AWG.
#12	175'-0"	#12
#10	285'-0"	#10
#8	445'-0"	#10
#6	-	#10

RECEPTACLE BRANCH CIRCUIT WIRING SCHEDULE NOTES:

1. BASED ON 20A CIRCUIT LOADED TO 9A USING SINGLE PHASE, 2 WIRE CIRCUITS.
2. THE ABOVE SCHEDULE REPRESENTS MINIMUM CONDUCTOR SIZE BASED FROM PANEL TO CENTER OF LEAD TO OVERCOME VOLTAGE DROP.
3. MAKE PROVISIONS FOR JUNCTION BOX ADJACENT TO OUTLET TO TRANSITION TO #12 WIRE FOR FINAL TERMINATIONS TO DEVICE AS REQUIRED.

RECEPTACLE BRANCH CIRCUIT WIRING SCHEDULE

CONDUCTOR AWG.	MAXIMUM CONDUCTOR LENGTH AT 120V	GROUND CONDUCTOR AWG.
#12	100'-0"	#12
#10	165'-0"	#10
#8	255'-0"	#10
#6	405'-0"	#10

RECEPTACLE BRANCH CIRCUIT WIRING SCHEDULE NOTES:

1. BASED ON 20A CIRCUIT LOADED TO 9A USING SINGLE PHASE, 2 WIRE CIRCUITS.
2. THE ABOVE SCHEDULE REPRESENTS MINIMUM CONDUCTOR SIZE BASED FROM PANEL TO CENTER OF LEAD TO OVERCOME VOLTAGE DROP.
3. MAKE PROVISIONS FOR JUNCTION BOX ADJACENT TO OUTLET TO TRANSITION TO #12 WIRE FOR FINAL TERMINATIONS TO DEVICE AS REQUIRED.

TYPICAL ELECTRICAL NOTES

1. FURNISH LABOR, MATERIALS, EQUIPMENT AND SERVICES NECESSARY FOR THE PROPER AND COMPLETE INSTALLATION OF ALL ELECTRIC WORK SHOWN ON THE DRAWINGS AND HEREIN SPECIFIED.
2. ALL ITEMS NOT SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS, BUT WHICH ARE NECESSARY TO MAKE A COMPLETE ELECTRICAL INSTALLATION, SHALL BE FURNISHED AND INSTALLED AS PART OF THIS PROJECT.
3. ALL ELECTRICAL INSTALLATIONS AND GROUNDING SHALL BE IN STRICT ACCORDANCE WITH THE LATEST REQUIREMENTS OF THE LOCAL, STATE AND NATIONAL CODES.
4. OBTAIN AND PAY FOR ALL REQUIRED PERMITS AND INSPECTIONS.
5. MATERIALS AND WORKMANSHIP SHALL BE THE BEST OF THEIR RESPECTIVE KIND AND IN FULL ACCORDANCE WITH THE MOST MODERN ELECTRICAL CONSTRUCTION STANDARDS. ALL MATERIAL SHALL BE NEW, UNLESS OTHERWISE NOTED AND FREE OF ANY DEFECTS.
6. THE ELECTRICAL CONTRACTOR SHALL CLEAN AT THE END OF EACH DAY ALL AREAS WORKED IN. EMPTY BOXES, RUBBISH, AND OTHER CONSTRUCTION MATERIALS OF NO USE SHALL BE REMOVED FROM THE BUILDING.
7. ALL WORK SEQUENCES SHALL BE COORDINATED WITH THE G.C. AND SHALL BE COORDINATION WITH OTHER BUILDING TRADES AND G.C. BUILDING SCHEDULES.
8. ALL BRANCH CIRCUITS RATED AT 120 VOLTS, 20 AMPERES EXCEEDING 75 FEET SHALL BE MINIMUM #10 AWG.
9. THE ELECTRICAL CONTRACTOR (E.C.) SHALL COORDINATE WITH THE LOCAL UTILITY POWER COMPANY AND PROVIDE ALL MATERIAL & LABOR REQUIRED TO COMPLY WITH THE UTILITY POWER COMPANY'S REQUIREMENTS AND STANDARDS, PRIOR TO ORDERING ANY ELECTRICAL EQUIPMENT, SUCH AS, SWITCHGEAR, PANELS, TRANSFORMERS, DISCONNECT SWITCHES, ETC... E.C. SHALL CONFIRM METERING SEQUENCE (HOT OR COLD) AND MAKE THE APPROPRIATE PROVISIONS FOR THE APPROVED METERING SEQUENCE ARRANGEMENT. A.I.C. RATINGS, GROUNDING, BONDING, RACEWAYS, ETC... SHALL BE IN ACCORDANCE WITH THE UTILITY COMPANY'S STANDARDS.
10. THE ELECTRICAL CONTRACTOR (E.C.) SHALL COORDINATE WITH THE LOCAL TELEPHONE COMPANY AND PROVIDE ALL MATERIAL & LABOR REQUIRED TO COMPLY WITH THE TELEPHONE COMPANY'S REQUIREMENTS AND STANDARDS, PRIOR TO ODERING ANY ELECTRICAL EQUIPMENT, SUCH AS, TERMINAL BOARDS, GROUNDING, RACEWAYS, ETC...
11. ALL RECEPTACLE WITH "WP" DESIGNATION SHALL BE PROVIDED WITH A WEATHER-PROOF WHILE IN-USE ENCLOSURE. (TYPICAL)
12. ELECTRICAL CONTRACTOR TO ALLOW TIME FOR DIRECTIONAL ADJUSTMENT OF ALL LIGHT FIXTURES AS DIRECTED BY OWNER.
13. ALL RECEPTACLES SHALL BE LABELED INDICATING THEIR RESPECTIVE PANEL & CIRCUIT NUMBER.
14. AT EXISTING FLOOR SLABS AND WALLS TO BE CORE-DRILLED OR CUT, THE CONTRACTOR SHALL FIND AND MARK ALL EXISTING REINFORCING, PIPING, CONDUIT & FEEDERS, ETC IN BOTH FACES LOCATED BY MEANS OF X-RAY, PACH-OMETER, OR PROFOMETER. SUBMIT DRAWING SHOWING LOCATIONS OF EXISTING REBAR, PIPING AND/OR CONDUIT AND PROPOSED CORES AND/OR CUTS FOR REVIEW.
15. ALL PENETRATIONS FOR POWER RECEPTACLES, JUNCTION BOXES, TELEPHONE/DATA OUTLETS, SWITCHES, BACKBOXES, ETC.. LOCATED IN EXTERIOR WALLS SHALL BE PROVIDED WITH APPROPRIATE CAULKING AND GASKETS TO SEAL OFF AND PREVENT AIR LEAKAGE. FOLLOW CAULKING AND GASKET MANUFACTURERS INSTALLATION GUIDELINES TO ENSURE CORRECT AND EFFECTIVE INSTALLATION.

SEISMIC RESTRAINT NOTE

A. GENERAL: IT IS THE INTENT OF THIS SEISMIC SPECIFICATION TO KEEP ALL ELECTRIAL BUILDING SYSTEM COMPONENTS IN PLACE DURING A SEISMIC EVENT. ALL ELECTRICAL SYSTEMS MUST BE INSTALLED IN STRICT ACCORDANCE WITH SEISMIC CODES, COMPONENT MANUFACTURER'S AND BUILDING CONSTRUCTION STANDARDS. WHENEVER A CONFLICT OCCURS BETWEEN THE MANUFACTURER'S OR CONSTRUCTION STANDARDS, THE MOST STRINGENT SHALL APPLY.

B. THIS CONTRACTOR SHALL ENGAGE A PROFESSIONAL STRUCTURAL ENGINEER REGISTERED IN THE JURISDICTION OF THIS PROJECT TO REVIEW THE ENTIRE INSTALLATION TO DETERMINE ALL SEISMIC RESTRAINT REQUIREMENTS AND METHODS. CONTRACTOR SHALL SUBMIT A REPORT OUTLINING THE STRUCTURAL ENGINEER'S REVIEW AS WELL AS SEISMIC RESTRAINT SHOP DRAWINGS AND SUPPORTING CALCULATIONS PREPARED BY THE PROFESSIONAL STRUCTURAL ENGINEER FOR REVIEW BY THE ARCHITECT.

C. SEISMIC RESTRAINTS SHALL BE DESIGNED IN ACCORDANCE WITH SEISMIC FORCE LEVELS AS DETAILED IN THE APPLICABLE BUILDING CODE.

1. ALL EQUIPMENT, CONDUIT AND PULL BOXES SHALL BE ADEQUATELY RESTRAINED TO RESIST SEISMIC FORCES. RESTRAINT DEVICES SHALL BE DESIGNED AND SELECTED TO MEET SEISMIC REQUIREMENTS AS DEFINED IN THE LATEST ISSUE OF THE BOCA NATIONAL BUILDING CODE IN ACCORDANCE WITH THE APPLICABLE SEISMIC ZONE.
2. ANCHOR BOLT CALCULATORS, SIGNED AND STAMPED BY A REGISTERED PROFESSIONAL ENGINEER, SHALL BE SUBMITTED SHOWING ADEQUACY OF THE BOLT SIZING AND TYPE. STAMPED CALCULATIONS SHALL ALSO BE FURNISHED FOR ANCHORS ON RESTRAINT DEVICES, CABLES, ISOLATORS AND RIGIDLY MOUNTED EQUIPMENT.

ABBREVIATIONS

A	AMPERES
ADA	AMERICANS WITH DISABILITIES ACT
AMPS	AMPERES
AFF	ABOVE FINISHED FLOOR
A/C	AIR CONDITIONING
AWG	AMERICAN WIRE GAGE
C	CONDUIT
C/B	CIRCUIT BREAKER
CF	COMPACT FLUORESCENT
CLG	CEILING
℄	CENTERLINE
DN	DOWN
DWG	DRAWING
E.C.	ELECTRICAL CONTRACTOR
EQ	EQUAL
ETR	EXISTING TO REMAIN
ER	EXISTING TO BE REMOVED
ERL	EXISTING TO BE RE-LOCATED
F.A.	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
FLR	FLOOR
G.C.	GENERAL CONTRACTOR
GFCI	GROUND FAULT CIRCUIT INTERUPTER.
G	GROUND
GND	GROUND
HVAC	HEATING, VENTILATING, & & AIR CONDITIONING
JB	JUNCTION BOX
KVA	KILOVOLT-AMPERES
KW	KILOWATT
LTG	LIGHTING
MAX	MAXIMUM
M.C.	MECHANICAL CONTRACTOR
MECH	MECHANICAL
MIN	MINIMUM
MTD	MOUNTED
NAC	F.A. NOTIFICATION APPLIANCE CIRCUIT EXPANDER PANEL
NEC	NATIONAL ELECTRICAL CODE
NTS	NOT TO SCALE
P	POLE
P.C.	PLUMBING CONTRACTOR
PNL	PANEL
RE	RE-LOCATED DEVICE OR EQUIPMENT SHOWN IN NEW LOCATION
TYP	TYPICAL
UL	UNDERWRITERS LABATORY
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLTS
W	WATTS
WP	WEATHER-PROOF

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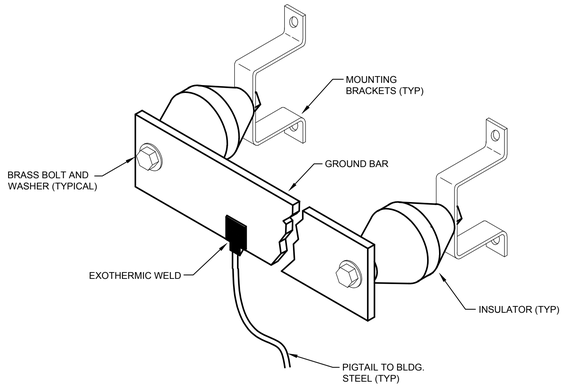


NOTES:

1. PROVIDE GROUND BAR (1/4" X 4" X 12") WITH WALL MOUNTING BRACKETS, INSULATORS AND A 25' EXOTHERMICALLY WELDED PIGTAIL (#6 AWG) IN EACH LAN ROOM & COMMUNICATIONS ROOM.

2. MOUNT GROUND BAR AT THE BOTTOM RIGHT CORNER ON THE PLYWOOD BACKBOARD.

3. GROUND BARS SHALL HAVE CAPACITY FOR NINE (9) GROUNDING LUGS TO BE ATTACHED.

4. CONNECT EXOTHERMICALLY WELDED PIGTAIL TO BUILDING STEEL.

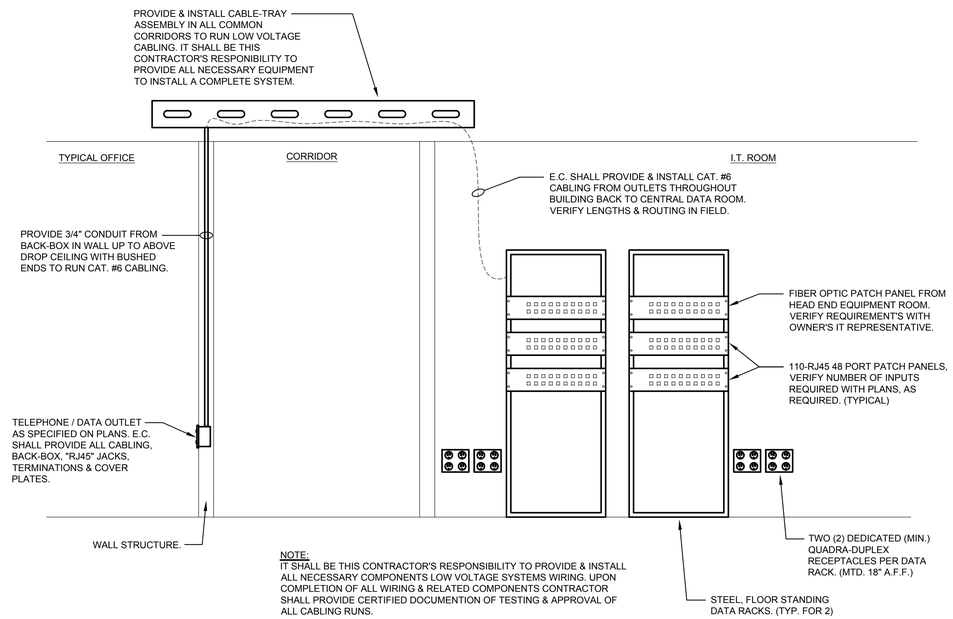
5. GROUND BARS SHALL BE ELECTROLYTIC COPPER AND SHALL BE MOUNTED ON INSULATORS RATED AT 2700 VOLTS.

6. COPPER SURFACES SHALL BE SMOOTH AND WITHOUT MARKS DEEPER THAN 0.010 INCHES.

7. MANUFACTURERS SHALL BE ERICO, HARGER OR APPROVED EQUAL.

TYPICAL GROUND BAR DETAIL

NOT TO SCALE



NOTE:
IT SHALL BE THIS CONTRACTOR'S RESPONSIBILITY TO PROVIDE & INSTALL ALL NECESSARY COMPONENTS LOW VOLTAGE SYSTEMS WIRING. UPON COMPLETION OF ALL WIRING & RELATED COMPONENTS CONTRACTOR SHALL PROVIDE CERTIFIED DOCUMENTION OF TESTING & APPROVAL OF ALL CABLING RUNS.

TYPICAL WIRING DIAGRAM FOR COMMUNICATIONS DISTRIBUTION

NOT TO SCALE

TELEPHONE & DATA RACEWAY NOTES

1. NO SECTION OF CONDUIT SHALL BE LONGER THAN 100-FEET BETWEEN PULL POINTS.
2. NO SECTION OF CONDUIT SHALL CONTAIN MORE THAN TWO 90-DEGREE BENDS, OR EQUIVALENT, BETWEEN PULL POINTS (e.g., OUTLET BOXES, TELECOMMUNICATIONS CLOSETS, OR PULL BOXES). IF THERE IS A REVERSE (U-SHAPED) BEND IN THE SECTION, A PULL BOX SHALL BE INSTALLED.
3. THE INSIDE RADIUS OF A BEND IN CONDUIT SHALL BE AT LEAST 6 TIMES THE INTERNAL DIAMETER. BENDS IN THE CONDUIT SHALL NOT CONTAIN ANY KINKS OR OTHER DISCONTINUITIES THAT MAY HAVE A DETRIMENTAL EFFECT ON THE CABLE SHEATH DURING CABLE PULLING OPERATIONS.
4. ANY SINGLE CONDUIT RUN EXTENDING FROM A TELECOMMUNICATIONS CLOSET SHALL NOT SERVE MORE THAN THREE OUTLET BOXES.
5. CONDUITS PROTRUDING / PENETRATING THROUGH THE FLOOR IN THE TELECOMMUNICATIONS CLOSETS SHALL BE TERMINATED 3-INCHES ABOVE THE FLOOR ADJACENT WALLS. PROTRUSIONS / PENETRATIONS SHALL BE LOCATED TO AVOID CREATING A TRIPPING HAZARD WITHIN THE CLOSETS. FIRESTOP ALL PROTRUSIONS / PENETRATIONS.
6. A MINIMUM 3/4-INCH CONDUIT SHALL BE PROVIDED FROM THE TELECOMMUNICATIONS CLOSET TO SERVE EACH WALL-MOUNTED PUBLIC TELEPHONE. IN DISCUSSION WITH THE TELEPHONE PROVIDER, AND WHERE IT IS DESIRABLE TO CONCEAL THE OUTLET BOX DIRECTLY BEHIND THE TELEPHONE, THE CENTER OF THE OUTLET BOX SHALL BE LOCATED 48-INCHES ABOVE THE FINISHED FLOOR. FOR RECESSED APPLICATIONS, THE CONDUIT AND BOX SHALL BE INSTALLED TO SUIT THE SPECIFIC TYPE OF MOUNTING. REFER TO APPLICABLE CODES, ADA GUIDELINES, UNIFORM FEDERAL ACCESSIBILITY STANDARDS, MANUFACTURES SPECIFICATIONS AND ANSI STANDARDS FOR ADDITIONAL REQUIREMENTS.
7. WHERE A TELECOMMUNICATIONS CONDUIT IS TO BE INSTALLED TO A DEVICE EXPOSED TO THE WEATHER, CARE SHALL BE TAKEN TO PREVENT THE INGRESS OF MOISTURE. CARE SHALL ALSO BE TAKEN TO ENSURE THAT MOISTURE WILL NOT COLLECT IN LOW POINTS, FREEZE AND DAMAGE THE CABLE. NONMETALLIC CONDUIT SHALL BE UV RESISTANT AND MARKED ACCORDINGLY.
8. CONDUITS SHALL BE REAMED TO ELIMINATE SHARP EDGES. METALLIC CONDUIT SHALL BE TERMINATED WITH AN INSULATED BUSHING.
9. REFER TO ANSI/TIA/EIA-606 FOR ADMINISTRATION OF THE CONDUIT SYSTEM IDENTIFICATION.
10. ALL CONDUITS SHALL BE PROVIDED WITH PULL STRINGS.
11. OUTLET BOXES SHALL BE NO SMALLER THAN 2-INCHES WIDE, 3-INCHES HIGH AND 2.5-INCHES DEEP. THIS WILL ACCOMODATE ONE OR TWO 3/4-INCH CONDUITS. WHERE A LARGER CONDUIT IS REQUIRED, THE BOX SHALL BE INCREASED ACCORDINGLY. A MAXIMUM 1-1/4-INCH CONDUIT WILL REQUIRE A 4-11/16-INCH x 4-11/16-INCH x 2-1/2-INCH BOX.
12. CONDUIT TYPES SHALL BE ELECTRICAL METALLIC TUBING (EMT) OR RIGID METAL CONDUIT. LOCATIONS SUBJECT TO MOISTURE SHALL BE RIGID PVC. FLEXIBLE CONDUIT SHALL NOT BE USED FOR TELE/DATA RACEWAYS.
13. CONDUIT REQUIREMENTS FOR SUPPORT, END PROTECTION AND CONTINUITY SHALL COMPLY WITH APPROPRIATE ELECTRICAL CODES.
14. CONDUIT AND BOXES FOR TELE/DATA WIRING SHALL BE DEDICATED TO THOSE SYSTEMS. POWER WIRING SHALL BE KEPT OUT OF CONDUIT AND BOXES DEDICATED TO TELE/DATA WIRING.
15. CONDUIT SIZE FOR MAXIMUM NUMBER OF CABLES (SEE TABLE BELOW):

Conduit Trade Size	Maximum number of cables based upon allowable fill									
	Cable Outside Diameter in Inches									
	0.13	0.18	0.22	0.24	0.29	0.31	0.37	0.53	0.62	0.70
1/2"	1	1	0	0	0	0	0	0	0	0
3/4"	6	5	4	3	2	2	1	0	0	0
1"	8	8	7	6	3	3	2	1	0	0
1-1/4"	16	14	12	10	6	4	3	1	1	1
1-1/2"	20	18	16	15	7	6	4	2	1	1
2"	30	26	22	20	14	12	7	4	3	2
2-1/2"	45	40	36	30	17	14	12	6	3	3
3"	70	60	50	40	20	20	17	7	6	6
3-1/2"	-	-	-	-	-	-	22	12	7	6
4"	-	-	-	-	-	-	30	14	12	7

COMMUNICATIONS SYMBOL LEGEND

SYMBOL	DESCRIPTION	MOUNTING
▽	TEL./DATA OUTLET; PROVIDE BACK BOX, DUAL RJ45 JACKS, COVER PLATES AND CABLING (CAT. #6, 2-RUNS) AS INDICATED IN DETAILS ON THIS DRAWING. CABLE TO BE RUN FROM BACKBOX UP WALL IN 3/4" CONDUIT TO ABOVE DROP CEILING AND ONTO CABLE TRAY SYSTEM IN COMMON CORRIDOR AND ONTO DATA RACKS. ALL EQUIPMENT COLORS TO TO BE SELECTED BY ARCHITECT.	18" A.F.F.
▼	DATA OUTLET; PROVIDE BACK BOX, RJ45 JACK, COVER PLATES AND CABLING (CAT. #6) AS INDICATED IN DETAILS ON THIS DRAWING. CABLE TO BE RUN FROM BACKBOX UP WALL IN 3/4" CONDUIT TO ABOVE DROP CEILING AND ONTO CABLE TRAY SYSTEM IN COMMON CORRIDOR AND ONTO DATA RACKS. ALL EQUIPMENT COLORS TO TO BE SELECTED BY ARCHITECT.	18" A.F.F.
▽	TELEPHONE OUTLET; PROVIDE BACK BOX, RJ45 JACK, COVER PLATES AND CABLING (CAT. #6) AS INDICATED IN DETAILS ON THIS DRAWING. CABLE TO BE RUN FROM BACKBOX UP WALL IN 3/4" CONDUIT TO ABOVE DROP CEILING AND ONTO CABLE TRAY SYSTEM IN COMMON CORRIDOR AND ONTO DATA RACKS. ALL EQUIPMENT COLORS TO TO BE SELECTED BY ARCHITECT.	18" A.F.F.
TV	TELEVISION OUTLET; PROVIDE BACK BOX,COAX JACK, COVER PLATES AND CABLING (COAX CABLE) AS INDICATED IN DETAILS ON THIS DRAWING. CABLE TO BE RUN FROM BACKBOX UP WALL IN 3/4" CONDUIT TO ABOVE DROP CEILING AND ONTO CABLE TRAY SYSTEM IN COMMON CORRIDOR AND ONTO CABLE TELEVISION SERVICE EQUIPMENT. ALL EQUIPMENT COLORS TO TO BE SELECTED BY ARCHITECT.	FLUSH IN WALL, VERFIY HGT. WITH ARCH.
	PENDANT HUNG CABLE TRAY SYSTEM AS MANUFACTURED BY "CABLOFIL" (OR) APPROVED EQUAL. CONTRACTOR SHALL PROVIDE ALL REQUIRED COMPONENTS TO INSTALL A COMPLETE WIRE MANAGEMENT SYSTEM. CABLE TRAY SYSTEM TO BE A MINIMUM OF 12" WIDE BY 2" TALL, CONSTRUCTED OF STEEL / MESH TYPE.	VERIFY
- - - - -	PLENUM RATED, CAT #6 WIRING. MFG. TELEDATA EXPRESS, CATALOG #101360 (OR) APPROVED EQUAL.	

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FIRE ALARM LEGEND

NFPA SYMBOL	TYPICAL INDUSTRY SYMBOL	DESCRIPTION / REMARKS
	S	FIRE ALARM SYSTEM, SMOKE DETECTOR.
P	(S)	FIRE ALARM SYSTEM, DUCT SMOKE DETECTOR LOCATED IN THE SUPPLY & RETURN DUCTWORK OF HVAC UNITS WITH 2000 CFM (OR) GREATER.
RTS	RTS	FIRE ALARM SYSTEM, REMOTE TEST STATION WITH SIGNAL / INDICATOR FOR DUCT SMOKE DETECTOR.
R	135° R/R (H)	FIRE ALARM SYSTEM, RATE-OF-RISE TEMPERATURE HEAT DETECTOR, SUB-SCRIPT INDICATES TEMPERATURE RATING. (SUITABLE FOR 50'-0" "ON CENTER" MOUNTING)
AC F	AC FT (H)	FIRE ALARM SYSTEM, FIXED TEMPERATURE HEAT DETECTOR INSTALLED ABOVE DROP CEILING, SUB-SCRIPT INDICATES TEMPERATURE RATING. (SUITABLE FOR 50'-0" "ON CENTER" MOUNTING)
	F	FIRE ALARM SYSTEM, HORN / STROBE DEVICE, SUB-SCRIPT INDICATES CANDELA RATING.
P	F	FIRE ALARM SYSTEM, PULL STATION, PROVIDE WITH STOPPER II PROTECTIVE COVER AND MOUNTED SO THAT THE OPERABLE PART OF THIS DEVICE IS 48" ABOVE FINISHED FLOOR.
R	R	FIRE ALARM SYSTEM, RELAY.
AIM	MM	FIRE ALARM MONITOR MODULE.
AOM	CM	FIRE ALARM CONTROL MODULE.

FIRE ALARM NOTES

1. E.C. SHALL PROVIDE CIRCUIT BREAKER LOCK-ON DEVICES FOR FACP AND NAC POWER EXTENDER CIRCUITS.
2. E.C. SHALL FURNISH & INSTALL REMOTE INDICATING LIGHTS/TEST SWITCHES FOR DUCT SMOKE DETECTORS AS WELL AS SMOKE DETECTOR LOCATED AT THE TOP OF THE ELEV. SHAFTS.
3. REFER TO FLOOR PLANS FOR EXACT NUMBER OF DEVICES & CANDELA RATINGS.
4. COLOR CODE PER NFPA, (LATEST EDITION).
5. ALL SPLICES SHALL BE MADE ON SCREW TYPE TERMINAL BLOCKS. NO WIRENUTS WILL BE ALLOWED.
6. RED PAINTED TERMINAL CABINETS & BOXES WITH LOCKABLE COVERS SHALL BE PROVIDED AT ALL JUNCTION POINTS.
7. AFC FIRE ALARM / CONTROL CABLE TYPE MC (UL LISTED) MAY BE USED ABOVE CEILINGS AND IN CONCEALED AREAS WHERE ACCEPTABLE TO THE LOCAL AUTHORITY HAVING JURISDICTION, OTHERWISE WIRING SHALL BE INSTALLED IN EMT CONDUIT. WIRING IN EXPOSED AREAS SHALL BE EMT, E.C. SHALL PROVIDE AN ALTERNATE TO PAINT PER ARCHITECTS DIRECTION.
8. THE CONTRACTOR AT COMPLETION OF THE FIRE ALARM SYSTEM SHALL TEST THE ENTIRE SYSTEM PER THE LOCAL FIRE DEPARTMENTS REQUIREMENTS. THE CONTRACTOR SHALL REPLACES OR FIX ANY PART OF THE SYSTEM NOT PROPERLY WORKING.
9. ALL WIRING SHALL BE PER MANUFACTURER'S RECOMMENDATIONS. E.C. SHALL TAKE INTO ACCOUNT VOLTAGE DROP. (TYPICAL)
10. ALL FIRE ALARM SYSTEM COMPONENTS & MOUNTING HEIGHTS SHALL COMPLY WITH ADA REQUIREMENTS.
11. E.C. SHALL PROVIDE ANY AND ALL AUXILIARY EQUIPMENT IN ORDER TO PROVIDE A COMPLETE, PROPERLY FUNCTIONING SYSTEM. COORDINATE REQUIREMENTS WITH LOCAL MANUFACTURERS REP.
12. ALL FIRE ALARM STROBE SIGNAL DEVICES SHALL BE SYNCHRONIZED TYPE DEVICES AND COMPLY WITH ADA REQUIREMENTS.
13. NO T-TAPPING OF FIRE ALARM WIRING SHALL BE ALLOWED. (TYPICAL)
14. ALL FIRE ALARM WIRING & RACEWAY SHALL BE SUPPORTED BY THE BUILDING STRUCTURE AND SHALL NOT BE LOCATED AS TO BE DAMAGED BY BUILDING USE.
15. FIRE ALARM SYSTEM BATTERIES AND CHARGER SHALL BE PROVIDED FOR STAND-BY BATTERY POWER CAPACITY PER THE STATE'S FIRE LAWS (LATEST EDITION). E.C. SHALL SUBMIT BATTERY CALCULATIONS FOR THE MODIFIED SYSTEM DOCUMENTING CODE COMPLIANCE.
16. NEW NOTIFICATION APPLIANCE CIRCUIT EXPANDER PANELS SHALL BE PROVIDED WITH INTEGRAL BATTERY BACK-UP PER STATE'S FIRE LAWS (LATEST EDITION).

FIRE ALARM RISER NOTES

1. PROVIDE FIRE ALARM ISOLATION MODULE AT THE BEGINNING AND END OF EACH LOOP OF INITIATING DEVICES. ALSO PROVIDE FIRE ALARM ISOLATION MODULE AT A MAXIMUM OF EVERY 25 DEVICES ON LOOP.
2. PROVIDE 20 AMP CIRCUIT (2#12 + 1#12 GND. IN 3/4"C.) FROM SPARE BREAKER IN LOCAL 120/208V PANEL FOR EACH NEW NAC PANEL. PROVIDE BREAKER LOCK-ON DEVICE.
3. GROUND NEW NOTIFICATION APPLIANCE CIRCUIT EXTENDER PANEL, PER LATEST EDITION OF NATIONAL ELECTRICAL CODE.

NOTES:

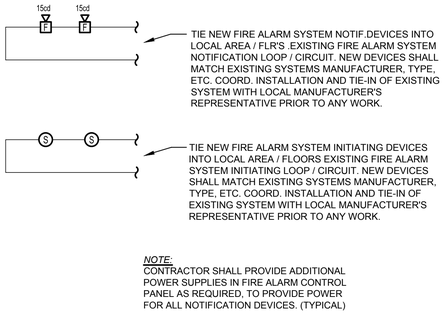
- CONTRACTOR SHALL PROVIDE ADDITIONAL POWER SUPPLIES IN FIRE ALARM CONTROL PANEL AS REQUIRED AS WELL AS NEW NOTIFICATION EXTENDER PANELS (NAC), TO PROVIDE POWER FOR ALL NOTIFICATION DEVICES. COORDINATE REQUIRED EQUIPMENT WITH LOCAL MANUFACTURER'S REPRESENTATIVE. (TYPICAL)
- CONTRACTOR SHALL ACQUIRE ACTUAL DEVICE COUNTS FROM FLOOR PLANS, NOT THIS RISER. THIS RISER DIAGRAM IS FOR WIRING INTENT PURPOSES ONLY.
- FIRE ALARM SYSTEM AND ASSOCIATED EQUIPMENT DESIGN HAS BEEN BASED AROUND EDWARDS SYSTEM TECHNOLOGY, INC. (EST). CONTRACTOR SHALL CONTACT AND COORDINATE WITH LOCAL MANUFACTURER'S REPRESENTATIVE, FOR ALL SPECIFIC INSTALLATION AND EQUIPMENT INFORMATION REQUIRED. (OR EQUAL) FIRE ALARM SYSTEM SHALL BE APPROVED DURING SUBMITTAL REVIEW.

EXISTING FIRE ALARM SYSTEM TO REMAIN FULLY OPERATIONAL DURING INSTALLATION, TESTING & APPROVAL OF NEW FIRE ALARM SYSTEM. UPON COMPLETION AS INDICATED ON NEW FIRE ALARM SYSTEM, THIS CONTRACTOR SHALL REMOVE ALL COMPONENTS, DEVICES, WIRING, ETC. ASSOCIATED WITH THE EXISTING FIRE ALARM SYSTEM.

COORDINATION NOTES

CONTRACTOR SHALL PROVIDE A SET OF COORDINATION DRAWING'S WITH ALL TRADES EQUIPMENT LOCATED, INDICATING ANY / ALL CONFLICTS WITH THE CURRENT ELECTRICAL DESIGN PRIOR TO THE START OF ANY WORK. THESE PLANS SHALL INCLUDE ARCHITECTURAL ELEVATION & DETAIL DRAWINGS WITH PROPOSED ELECTRICAL EQUIPMENT LOCATED FOR REVIEW AND APPROVAL. ANY COORDINATION ISSUES WITH EQUIPMENT, PRIOR TO THESE PLANS BEING APPROVED SHALL BE REPAIRED AT THIS CONTRACTOR'S EXPENSE.

ALL LOCATIONS & MOUNTING HEIGHTS OF ELECTRICAL DEVICES (LIGHTING, RECEPTACLES, FIRE ALARM, LIFE SAFETY DEVICES, ETC.) SHALL BE COORDINATED AND APPROVED BY ARCHITECT PRIOR TO ANY INSTALLATION. ANY DEVIATION FROM THIS REQUIREMENT RESULTING IN AN INCORRECT INSTALLATION OR LOCATION SHALL BE REPAIRED BY THIS CONTRACTOR AT THEIR OWN EXPENSE.



NOTE:
CONTRACTOR SHALL PROVIDE ADDITIONAL POWER SUPPLIES IN FIRE ALARM CONTROL PANEL AS REQUIRED, TO PROVIDE POWER FOR ALL NOTIFICATION DEVICES. (TYPICAL)

"PARTIAL" FIRE ALARM RISER DIAGRAM

NOT TO SCALE

TYPICAL FIRE STOPPING NOTES

A. GENERAL: FIRE STOPPING SHALL BE PROVIDED BY THIS CONTRACTOR FOR ALL FLOOR, CEILING AND FIRE RATED WALL PENETRATIONS FOR CONDUIT, SLEEVES AND/OR CABLING AS REQUIRED BY JOB CONDITIONS.

B. THE CONTRACTOR SHALL PROVIDE A FIRE STOP SYSTEM IN ACCORDANCE WITH THE FOLLOWING:

1. THE SYSTEM SHALL CONSIST OF A WATERBASED SEALANT AND SUITABLE DAMMING MATERIALS (WHERE REQUIRED) AND BE INSTALLED PER MANUFACTURER'S REQUIREMENTS.
2. THE SEALANT SUPPLIED SHALL BE A TWO STAGED INTUMESCENT AND CAPABLE OF EXPANDING UP TO 8 TIMES ITS ORIGINAL VOLUME.
3. THE SEALANT SUPPLIED SHALL CONTAIN NO ASBESTOS, NO FIBERGLASS, AND NO SOLVENTS NOT CORROSIVE MINERAL SALTS OF ANY KIND.
4. THE SEALANT SHALL FORM A SURFACE CAPABLE OF BEING SANDED AND PAINTED TO MATCH SURROUNDING SURFACES AND SHALL BE IMPERVIOUS TO WATER WHEN DRY.
5. THE FIRE STOP SYSTEM SHALL BE TESTED TO THE TIME/TEMPERATURE REQUIREMENTS OF ASTM E119 AND SHALL BE UL1479 (ASTM E814) AND CLASSIFIED FOR UP TO 3 HOURS.
6. THE FIRE STOP SEALANT SHALL BE SPECSEAL SEALANT AS MANUFACTURED BY SPECIFIED TECHNOLOGIES, INC. OR APPROVED EQUAL.
7. SPECIAL CARE SHALL BE TAKEN WITH ELECTRICAL SYSTEMS NOT TO COMPROMISE ANY OF THE BUILDING FIRE PARTITIONS, FLOORS, WALLS OR MEMBRANES. PROVIDE ALL FIRESTOPPING REQUIRED TO COMPLY WITH THE BUILDING CODE, THE ELECTRICAL CODE AND THE UL LISTING OF EACH ASSEMBLY. COORDINATE LOCATIONS AND TYPES OF MEMBRANES WITH ARCHITECT.

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PROJECT TITLE:
IT ROOM RENOVATION
444 WESTMINSTER ST
PROVIDENCE, RI 02903

ISSUED FOR:
BID SET
01/18/2023
REVISIONS:

STAMP:

SHEET TITLE:
ELECTRICAL - LIFE SAFETY NOTES & DETAIL

PROJECT NORTH: N

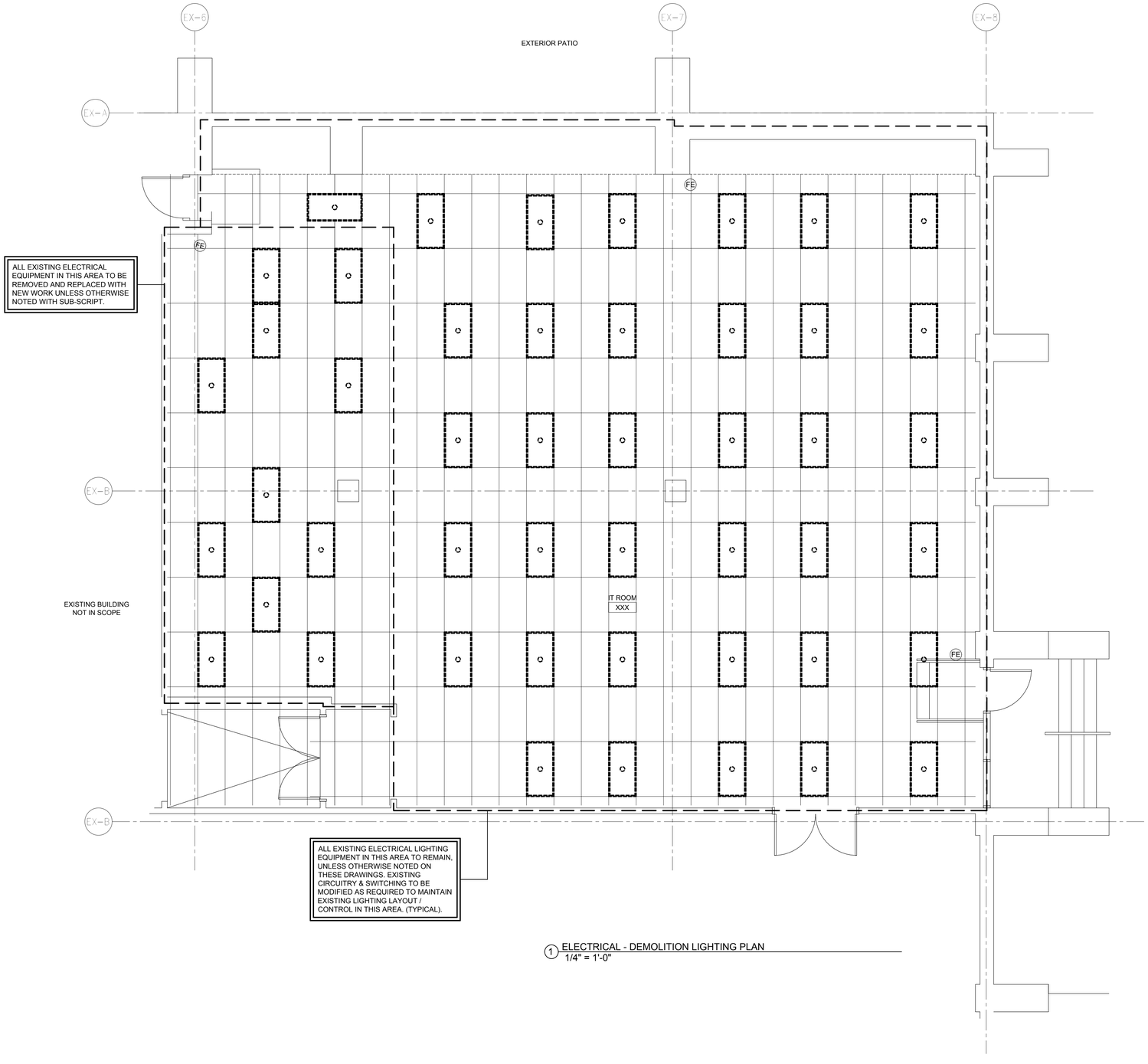
PROJECT ARCHITECT: BB
DRAWN: T.M.W.

PROJECT NUMBER:
#2224

SHEET NUMBER: E0.2
REV:

TYPICAL DEMOLITION NOTES

1. THE ELECTRICAL CONTRACTOR SHALL REVIEW ALL OF THE ARCHITECTS AND OTHER TRADES DRAWINGS TO VERIFY ALL AREAS OF RENOVATION AND TO GET A COMPLETE UNDERSTANDING OF THE DEMOLITION WORK REQUIRED BY THIS PROJECT.
2. PRIOR TO SUBMITTING BID, VISIT SITE AND IDENTIFY EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT WORK OF THIS SECTION. RENOVATION WORK WILL REQUIRE CAREFUL SITE EXAMINATION PRIOR TO BIDDING. NO COMPENSATION WILL BE GRANTED FOR ADDITIONAL WORK CAUSED BY UNFAMILIARITY WITH SITE CONDITIONS THAT ARE VISIBLE OR READILY CONSTRUED BY AN EXPERIENCED OBSERVER.
3. COORDINATE ALL WORK WITH THE BUILDING OWNER 10 DAYS PRIOR TO DISRUPTION TO ANY POWER.
4. DISCONNECT AND REMOVE ALL FIXTURES, WIRING DEVICES, CONDUIT AND FITTINGS, WIRING & CABLE, FIRE ALARM DEVICES/COMPONENTS , HANGERS, SUPPORTS, WIREWAYS, AND ALL OTHER ELECTRICAL COMPONENTS MADE OBSOLETE BY THIS PROJECT.
5. REFER TO ALL CONSTRUCTION DOCUMENTS TO GAIN A COMPLETE UNDERSTANDING OF THE DEMOLITION WORK REQUIRED.
6. ALL HVAC UNITS SCHEDULED TO BE REMOVED OR RE-LOCATED SHALL BE DONE SO BY THE HVAC CONTRACTOR. THE ELECTRICAL CONTRACTOR SHALL DISCONNECT AND MAKE-SAFE FOR REMOVAL.
7. TEMPORARY WALL OPENINGS AND/OR MODIFICATIONS REQUIRED FOR REMOVAL/INSTALLATION OF EQUIPMENT SHALL BE PROVIDED AS NEEDED AND COORDINATED WITH THE GENERAL CONTRACTOR.
8. CUT, REMOVE AND LEGALLY DISPOSE OF SELECTED ELECTRICAL EQUIPMENT, COMPONENTS AND MATERIALS AS INDICATED, INCLUDING, BUT NOT LIMITED TO, REMOVAL OF ELECTRICAL ITEMS INDICATED TO BE REMOVED AND ITEMS MADE OBSOLETE BY THE WORK. THE OWNER RESERVES THE OPTION OF SALVAGE RIGHTS TO DEMOLISHED MATERIAL AND REMOVED EQUIPMENT. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER'S REPRESENTATIVE TO OBTAIN A LIST OF MATERIALS AND REMOVED EQUIPMENT TO BE TURNED OVER TO THE OWNER. ALL OTHER MATERIAL AND REMOVED EQUIPMENT NOT BEING SALVAGED BY THE OWNER SHALL BE DISPOSED OF BY THE CONTRACTOR.
9. PROTECT THE STRUCTURE, FURNISHINGS, FINISHES, AND ADJACENT MATERIALS NOT INDICATED OR SCHEDULED TO BE REMOVED. PROTECT THE ELECTRICAL WORK AND THE WORK OF OTHERS IN A MANNER BEST SUITED TO THE PARTICULAR CASE. CORRECT ANY DAMAGE DONE TO ANY WORK AT NO ADDITIONAL COST.
10. PROVIDE AND MAINTAIN TEMPORARY PARTITIONS OR DUST BARRIERS ADEQUATE TO PREVENT THE SPREAD OF DUST AND DIRT TO ADJACENT AREAS.
11. MAINTAIN ACCESS TO EXISTING ELECTRICAL INSTALLATIONS WHICH REMAIN ACTIVE. MODIFY INSTALLATION OR PROVIDE ACCESS PANEL AS APPROPRIATE.
12. PROVIDE TEMPORARY WIRING AND CONNECTIONS TO MAINTAIN EXISTING SYSTEMS IN SERVICE DURING CONSTRUCTION. WHEN WORK MUST BE PERFORMED ON ENERGIZED EQUIPMENT OR CIRCUITS, USE PERSONNEL EXPERIENCED IN SUCH OPERATIONS.
    a. EXISTING ELECTRICAL SERVICE: MAINTAIN EXISTING SYSTEM IN SERVICE COMPLETE AND READY FOR SERVICE. DISABLE SYSTEM ONLY TO MAKE SWITCHOVERS AND CONNECTIONS. OBTAIN PERMISSION FROM OWNER AND ARCHITECT/ENGINEER AT LEAST TEN DAYS BEFORE PARTIALLY OR COMPLETELY DISABLING SYSTEM. MINIMIZE OUTAGE DURATION. MAKE TEMPORARY CONNECTIONS TO MAINTAIN SERVICE IN AREAS ADJACENT TO WORK AREA AS REQUIRED.
    b. EXISTING FIRE ALARM SYSTEM: MAINTAIN EXISTING SYSTEM IN SERVICE UNTIL THE MODIFIED/EXPANDED SYSTEM IS TESTED AND ACCEPTED BY THE FIRE DEPARTMENT. DISABLE SYSTEM ONLY TO MAKE SWITCHOVERS AND CONNECTIONS. NOTIFY OWNER, ARCHITECT/ENGINEER AND LOCAL FIRE DEPARTMENT AT LEAST TEN DAYS BEFORE PARTIALLY OR COMPLETELY DISABLING SYSTEM. MINIMIZE OUTAGE DURATION. MAKE TEMPORARY CONNECTIONS TO MAINTAIN SERVICE IN AREAS ADJACENT TO WORK AREA AS REQUIRED OR PROVIDE A "FIRE-WATCH" SYSTEM COORDINATED WITH THE LOCAL FIRE DEPARTMENT.
    c. EXISTING TELEPHONE & DATA SYSTEMS: MAINTAIN EXISTING SYSTEM IN SERVICE COMPLETE AND READY FOR SERVICE. DISABLE SYSTEM ONLY TO MAKE SWITCHOVERS AND CONNECTIONS. NOTIFY OWNER, ARCHITECT/ENGINEER AND TELEPHONE UTILITY COMPANY AT LEAST TEN DAYS BEFORE PARTIALLY OR COMPLETELY DISABLING SYSTEM. MINIMIZE OUTAGE DURATION. MAKE TEMPORARY CONNECTIONS TO MAINTAIN SERVICE IN AREAS ADJACENT TO WORK AREA.
13. THESE DRAWINGS HAVE BEEN COMPILED FROM THE BEST AVAILABLE INFORMATION AND ARE NOT INTENDED TO LIMIT THE SCOPE OF THE WORK. THE ELECTRICAL CONTRACTOR MAY ENCOUNTER HIDDEN OR COVERED CONDITIONS, NOT INDICATED IN THESE DOCUMENTS, REQUIRING THE ELECTRICAL CONTRACTOR TO PROVIDE ADDITIONAL WORK FOR THE COMPLETION OF HIS OR HER CONTRACT. IT WILL BE ASSUMED THAT THE CONTRACTOR HAS INSPECTED THE SITE PRIOR TO BIDDING AND VERIFIED THE INFORMATION SUPPLIED HEREIN.
14. PROTECT ALL EXISTING WALLS, FLOORS, CEILINGS, LIGHT FIXTURES, ETC. WHICH ARE TO REMAIN & TO PREVENT DAMAGE DURING ALL CONSTRUCTION PHASES



1 ELECTRICAL - DEMOLITION LIGHTING PLAN
1/4" = 1'-0"

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ELECTRICAL - DEMOLITION LIGHTING PLAN

PROJECT NORTH: N

PROJECT ARCHITECT: BB
DRAWN: T.M.W.

PROJECT NUMBER:
#2224

SHEET NUMBER: E1.0
REV:

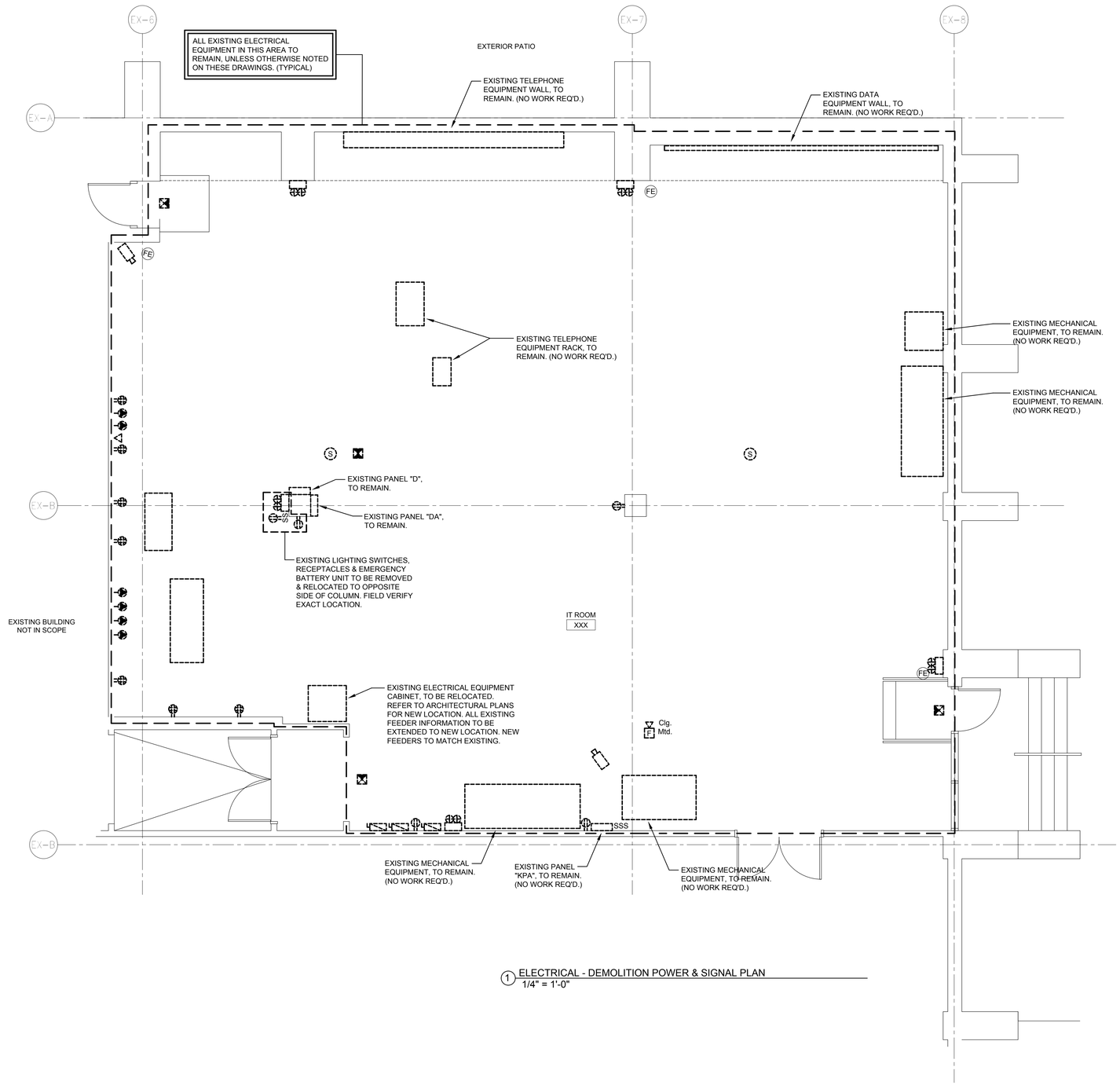
DEMOLITION ABBREVIATIONS

SUBSCRIPT	DESCRIPTION
ER	INDICATES EXISTING ELECTRICAL DEVICE TO BE COMPLETELY REMOVED AS WELL AS ASSOCIATED WIRING. IT SHALL BE THIS CONTRACTOR'S RESPONSIBILITY TO PROPERLY DISPOSE OF EQUIPMENT.
ERN	INDICATES EXISTING ELECTRICAL DEVICE TO REMAIN IN PLACE. E.C. SHALL ENSURE DEVICE IS PROTECTED AND FULLY OPERATIONAL UPON COMPLETION OF PROJECT. ANY DEVICE SCHEDULED TO REMAIN, NOT IN PROPERLY WORKING ORDER SHALL BE REPLACED IN KIND.
ERL	INDICATES EXISTING ELECTRICAL DEVICE TO BE REMOVED & RELOCATED, EXISTING WIRNG / CIRCUITRY TO BE EXTENDED. ANY NEW WIRING & INSTALLATIONS REQUIRED TO RELOCATE EQUIPMENT SHALL MATCH EXISTING ELECTRICAL CHARACTERISTICS.
RE	INDICATES EXISTING ELECTRICAL DEVICE IN NEW LOCATION. ANY DEVICE SCHEDULED TO BE RELOCATED, NOT IN PROPERLY WORKING ORDER SHALL BE REPLACED IN KIND.

EXISTING FIRE ALARM SYSTEM TO REMAIN FULLY OPERATIONAL DURING INSTALLATION, TESTING & APPROVAL OF NEW FIRE ALARM SYSTEM. UPON COMPLETION AS INDICATED ON NEW FIRE ALARM SYSTEM, THIS CONTRACTOR SHALL REMOVE ALL COMPONENTS, DEVICES, WIRING, ETC. ASSOCIATED WITH THE EXISTING FIRE ALARM SYSTEM.

MECHANICAL DEMOLITION NOTE

IT SHALL BE THIS CONTRACTOR'S RESPONSIBILITY TO PROPERLY REMOVE ALL WIRING ASSOCIATED WITH DEMOLISHED MECHANICAL EQUIPMENT, BACK TO SOURCE AND DISPOSE OF EQUIPMENT. REFER TO MECHANICAL DRAWINGS FOR EXACT SCOPE OF WORK. (TYPICAL)



1 ELECTRICAL - DEMOLITION POWER & SIGNAL PLAN
1/4" = 1'-0"

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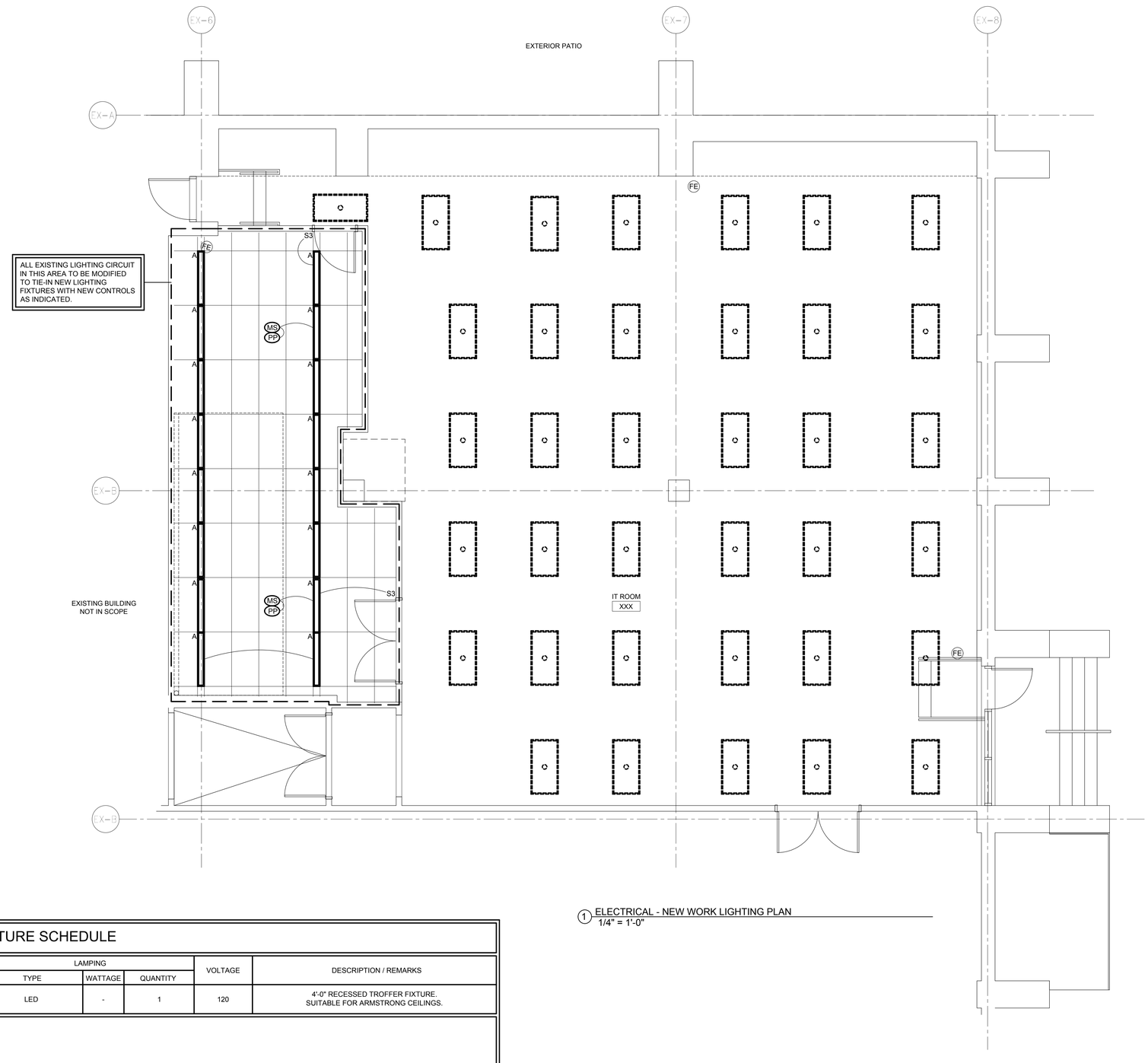

1 ELECTRICAL - NEW WORK LIGHTING PLAN
1/4" = 1'-0"

LIGHTING FIXTURE SCHEDULE

TYPE	MANUFACTURER	CATALOG No.	MOUNTING	LAMPING			VOLTAGE	DESCRIPTION / REMARKS
				TYPE	WATTAGE	QUANTITY		
A	XLA LIGHTING	LENO-TW-OP-35K-C80-UNV-010V-0695LF	RECESSED	LED	-	1	120	4'-0" RECESSED TROFFER FIXTURE. SUITABLE FOR ARMSTRONG CEILINGS.

NOTES:

1. PROVIDE ACCESSORIES AND MOUNTING HARDWARE AS REQUIRED FOR ALL FIXTURES.
2. ALL FIXTURE/ACCESSORY COLORS NOT INDICATED ON DRAWING'S SHALL BE SELECTED BY ARCHITECT.
3. PROVIDE LAMPING FOR ALL FIXTURES UNLESS LAMPING IS INCLUDED WITH FIXTURE AS INDICATED IN SCHEDULE.
4. PROVIDE TYPICAL UNIT MOCK UP FOR LIGHT FIXTURE HANGING HEIGHTS AND EXPOSED ELECTRICAL CONDUIT LAYOUT TO BE REVIEWED BY ARCHITECT.
5. FIXTURE TO BE WIRED TO PHOTO CELL AND TIME CLOCK PROVIDED BY G.C.
6. ALL LIGHT FIXTURES WITH INCANDESCENT LAMPING SHALL BE PROVIDED W/ CFL/LED LAMP IN LIEU OF INCANDESCENT LAMP.
7. CBA = COLOR TO BE SELECTED BY ARCHITECT (THE ELECTRICAL CONTRACTOR SHALL VERIFY COLOR & FINISH WITH ARCHITECT PRIOR TO SUBMITTAL OF SHOP DRAWINGS.
8. CC = CUSTOM COLOR TO BE SELECTED BY ARCHITECT (THE ELECTRICAL CONTRACTOR SHALL VERIFY CUSTOM COLOR & FINISH WITH ARCHITECT PRIOR TO SUBMITTAL OF SHOP DRAWINGS.

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PROJECT NORTH:
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PROJECT ARCHITECT: BB
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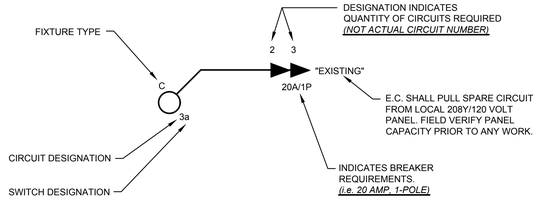


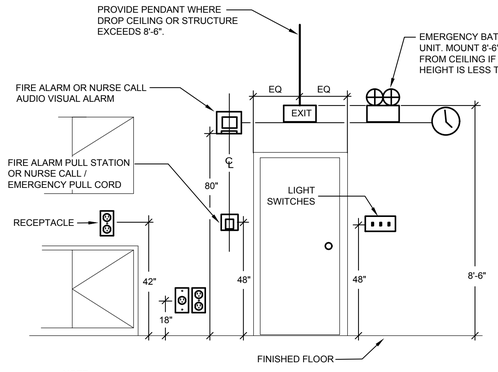
NOTES:

1. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED IN CONTRACT. INFORMATION AND COMPONENTS SHOWN ON RISER DIAGRAMS BUT NOT ON PLANS, AND VICE VERSA, SHALL APPLY OR SHALL BE PROVIDED AS THOUGH EXPRESSLY REQUIRED ON BOTH. IT IS NOT INTENDED THAT EVERY JUNCTION BOX, OFFSET, FITTING OR COMPONENT BE SPECIFIED OR SHOWN ON DRAWINGS; HOWEVER, CONTRACT DOCUMENTS REQUIRE PROVISION OF ALL COMPONENTS AND MATERIALS NECESSARY FOR COMPLETE AND OPERATIONAL ELECTRICAL INSTALLATION, WHETHER OR NOT INDICATED OR SPECIFIED.

2. BRANCH CIRCUIT WIRING MAY NOT BE GRAPHICALLY SHOWN ON DRAWINGS AND MAY BE SHOWN BY CIRCUIT NUMBERS BESIDE FIXTURES, DEVICES AND EQUIPMENT. PROVIDE COMPLETE WIRING SYSTEM WHETHER OR NOT SHOWN GRAPHICALLY. WIRING IS SHOWN BY CONDUIT RUNS ON DRAWINGS WHERE SPECIFIC ROUTING IS REQUIRED OR FOR OTHER SPECIAL REASONS. ONLY ROOMS WITH MULTIPLE SWITCHING HAVE "SWITCH CONTROL LETTERS" ASSIGNED. PROVIDE THHN CONDUCTORS IN AREAS WITH HIGH AMBIENT TEMPERATURES SUCH AS BOILER ROOMS, INCINERATOR ROOMS, MECHANICAL EQUIPMENT ROOMS ETC., FOR SIZES LARGER THAN NO. 10 AWG.

TYPICAL CIRCUITING DETAIL

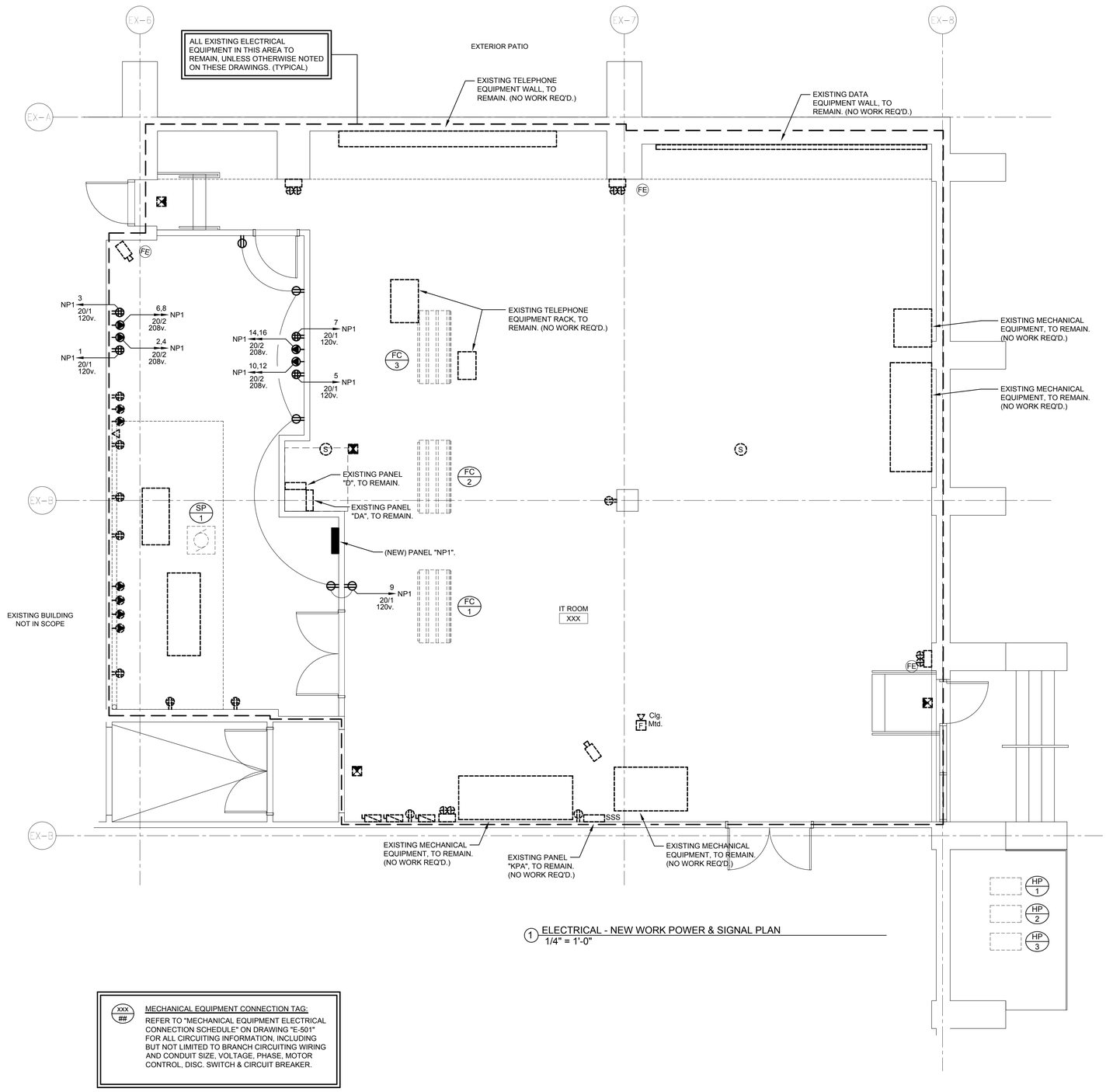
NOT TO SCALE



NOTE:
THIS DETAIL INDICATES CENTERLINE FOR FIRE ALARM/PULL STATION SWITCHES AND RECEPTACLES. HOWEVER THIS SAME CENTERLINE PRINCIPLE SHALL BE FOR ALL GROUP MTD. ELECTRICAL DEVICES. IF FIRE ALARM IS ON SAME SIDE OF DOOR AS SWITCHES, PULL STATION SHALL BE HORIZONTALLY SEPARATED BY A MINIMUM OF 18". THIS ELEVATION IS A GENERAL ARRANGEMENT OF OF DEVICES. ARCHITECT PLANS TAKE PRECEDENCE FOR EXACT LOCATIONS.

MOUNTING HEIGHT DETAIL

NOT TO SCALE



1 ELECTRICAL - NEW WORK POWER & SIGNAL PLAN
1/4" = 1'-0"

XXX / ## MECHANICAL EQUIPMENT CONNECTION TAG:

REFER TO "MECHANICAL EQUIPMENT ELECTRICAL CONNECTION SCHEDULE" ON DRAWING "E-501" FOR ALL CIRCUITING INFORMATION, INCLUDING BUT NOT LIMITED TO BRANCH CIRCUITING WIRING AND CONDUIT SIZE, VOLTAGE, PHASE, MOTOR CONTROL, DISC. SWITCH & CIRCUIT BREAKER.

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ELECTRICAL - NEW WORK POWER & SIGNAL PLAN

PROJECT NORTH:
N

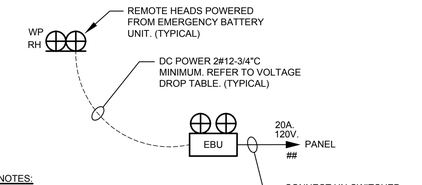
PROJECT ARCHITECT: BB
DRAWN: T.M.W.
PROJECT NUMBER:
#2224

SHEET NUMBER: REV:
E2.1

EMERGENCY LIGHTING
6-VOLT SYSTEM VOLTAGE DROP TABLE

TOTAL WATTS ON WIRE RUN	WIRE GAUGE 12	10	8	6
6	94	150	238	379
7	81	129	204	325
8	70	112	179	284
10	56	90	143	227
12	44	70	112	178
14	40	64	102	162
16	33	53	84	134
18	30	47	75	119
20	28	45	71	114
21	27	43	68	108
24	24	38	60	95
25	21	34	54	86
30	19	30	48	76
35	15	25	39	63
40	13	21	33	53
48	11	17	28	44
50	11	17	27	43
75	7	11	18	29
100	5	8	14	21
125	4	7	11	17
150	3	5	9	14
175	3	5	8	12
200	2	4	6	10
225	2	4	6	10
250	2	3	5	9

MAXIMUM LENGTH OF RUN IN FEET



NOTES:

1. E.C. SHALL PROVIDE CIRCUIT BREAKER "LOCK-ON" DEVICE FOR ALL CIRCUITS TO EMERGENCY BATTERY UNITS (EBU). (TYPICAL)

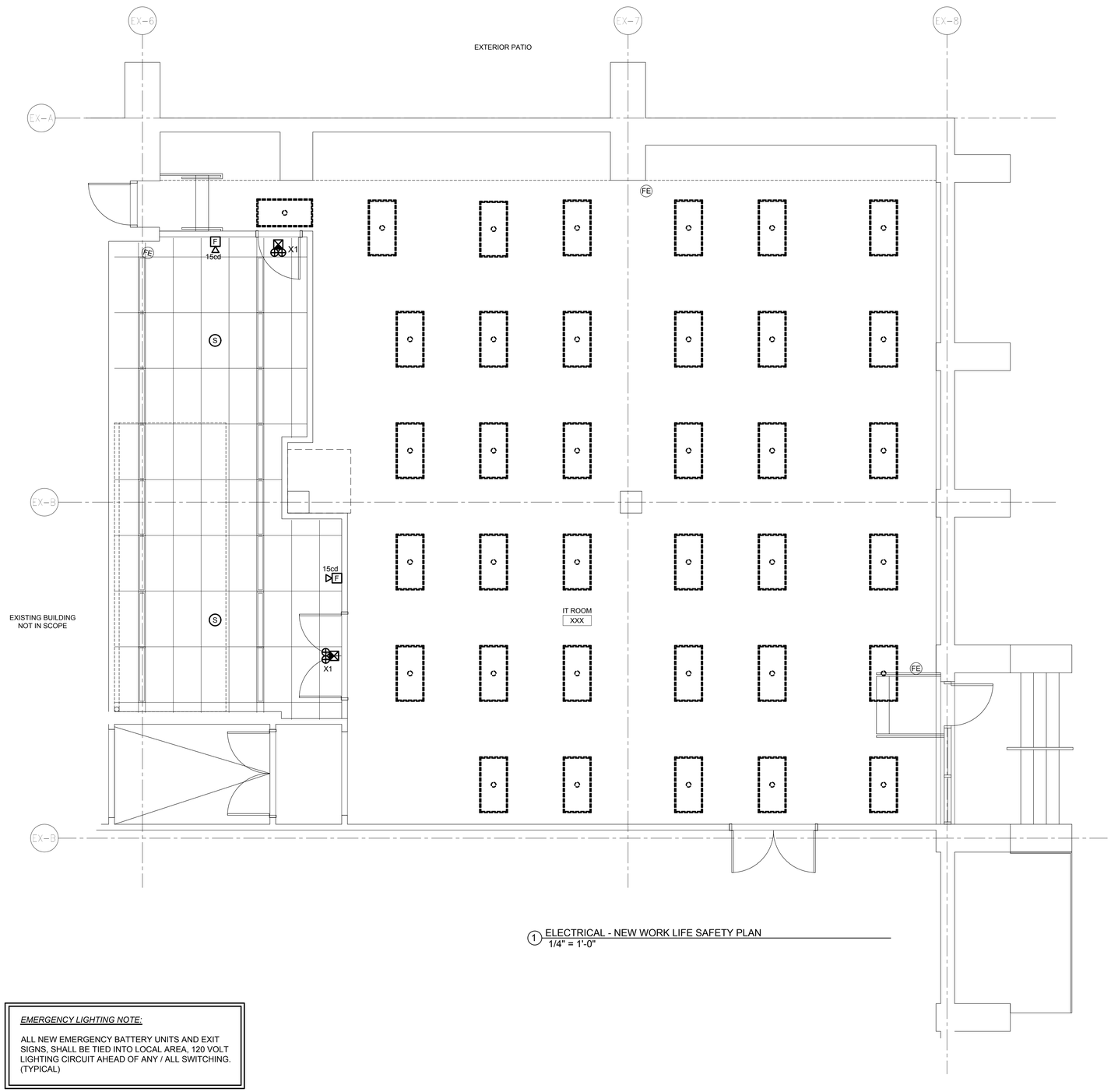
2. DETAIL IS TYPICAL TO ALL DRAWINGS, UON.

TYPICAL EMERGENCY LIGHTING CONNECTION DETAIL

NOT TO SCALE

EMERGENCY LIGHTING SYMBOL LEGEND

SYMBOL	DESCRIPTION	MOUNTING
	SELF-CONTAINED EMERGENCY, WALL MOUNTED LIGHTING FIXTURE WITH DUAL LIGHTING HEADS. COORDINATE WITH E.C. TO PROVIDE ALL NECESSARY ACCESSORIES FOR WIRING DEVICES. MFG. LITHONIA LIGHTING, CAT. #EU2C.	WALL
WP RH	WEATHER PROOF (LOW VOLTAGE) WALL MOUNTED LIGHTING FIXTURE. COORDINATE WITH E.C. TO PROVIDE ALL NECESSARY ACCESSORIES FOR WIRING DEVICES. MFG. LITHONIA LIGHTING, CAT. #ERE-B-T-WP.	UNIVERSAL (VERIFY IN FIELD)
	LOW VOLTAGE POWER WIRING BETWEEN EMERGENCY BATTERY UNITS AND REMOTE LIGHTING HEADS. REFER TO "EMERGENCY LIGHTING CONNECTION DETAIL" FOR WIRING REQUIREMENTS. CONTRACTOR TO VERIFY ALL ROUTING, LENGTHS AND TERMINATIONS OF WIRING .	
X	SINGLE FACE LED EDGE-LIT EXIT SIGN WITH EMERGENCY BATTERY BACK-UP. MFG. LITHONIA, CAT. #EXIT-(ARROWS). PROVIDE ARROWS AS INDICATED ON PLANS, FIELD VERIFY WALL (OR) CEILING MOUNTING.	WALL / CLG.
X1	COMBINATION SINGLE FACE LED LIGHTED EXIT SIGN WITH EMERGENCY LIGHTING HEADS, BATTERY BACK-UP & SPARE CAPACITY FOR REMOTE LIGHTING HEADS. MFG. LITHONIA LIGHTING, CAT. #ECR-LED-HO-M6. PROVIDE ARROWS AS INDICATED ON PLANS, FIELD VERIFY WALL (OR) CEILING MOUNTING.	WALL / CLG.



1 ELECTRICAL - NEW WORK LIFE SAFETY PLAN
1/4" = 1'-0"

EMERGENCY LIGHTING NOTE:

ALL NEW EMERGENCY BATTERY UNITS AND EXIT SIGNS, SHALL BE TIED INTO LOCAL AREA, 120 VOLT LIGHTING CIRCUIT AHEAD OF ANY / ALL SWITCHING. (TYPICAL)

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PROJECT TITLE:
IT ROOM RENOVATION
444 WESTMINSTER ST
PROVIDENCE, RI 02903

ISSUED FOR:
BID SET
01/18/2023
REVISIONS:

STAMP:

SHEET TITLE:
ELECTRICAL - NEW WORK LIFE SAFETY PLAN

PROJECT NORTH: N

PROJECT ARCHITECT: BB
DRAWN: T.M.W.

PROJECT NUMBER:
#2224

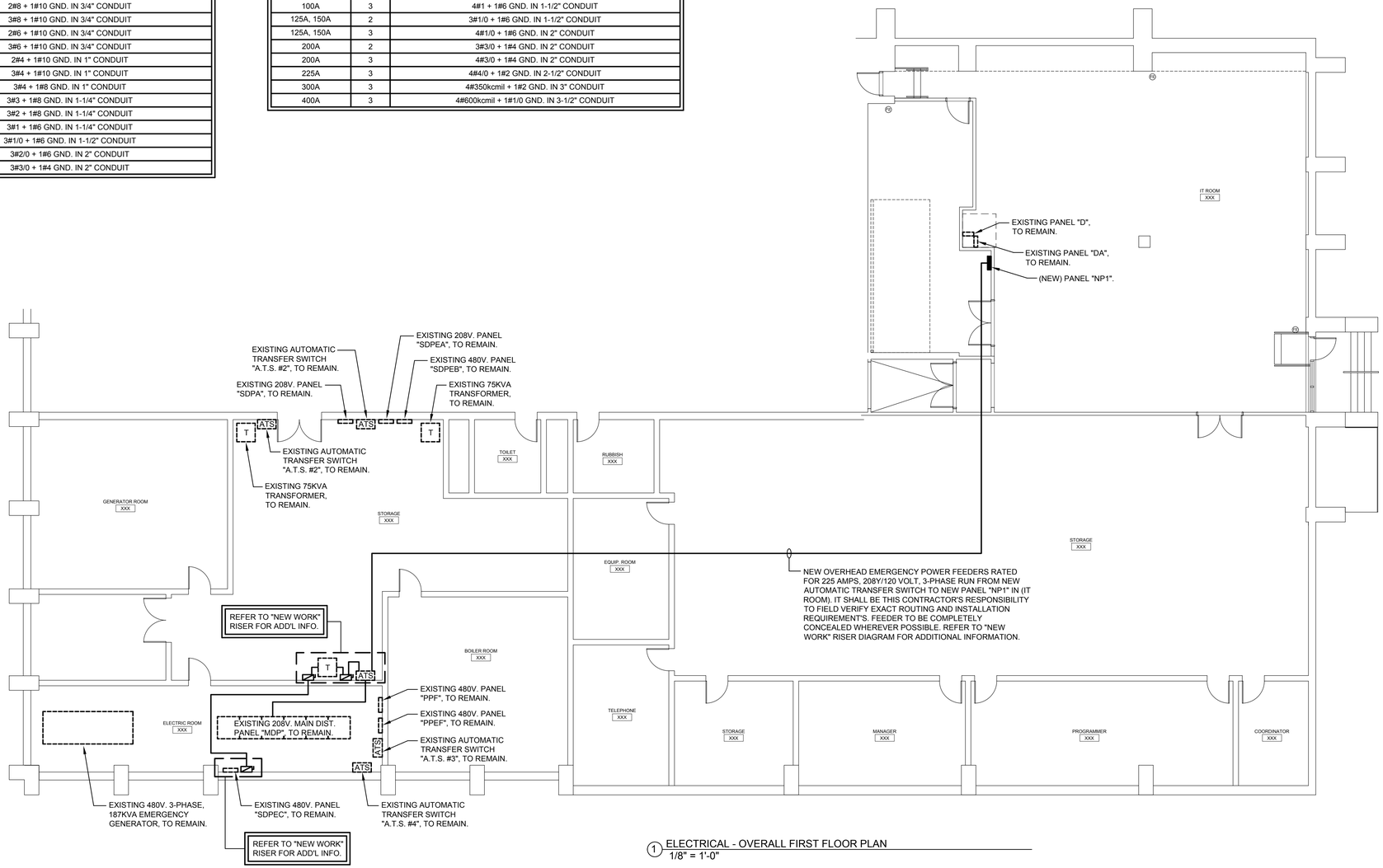
SHEET NUMBER: E2.2
REV:

(EQUIPMENT) SIZING CIRCUIT

AMP / POLE PANEL / SERVICE	POLES	TYPE (XHHW) COPPER CONDUCTORS
15A, 20A	1 (or) 2	2#12 + 1#12 GND. IN 3/4" CONDUIT
15A, 20A	3	3#12 + 1#12 GND. IN 3/4" CONDUIT
25A, 30A	1 (or) 2	2#10 + 1#10 GND. IN 3/4" CONDUIT
25A, 30A	3	3#10 + 1#10 GND. IN 3/4" CONDUIT
35A, 40A	1 (or) 2	2#8 + 1#10 GND. IN 3/4" CONDUIT
35A, 40A	3	3#8 + 1#10 GND. IN 3/4" CONDUIT
45A, 50A, 55A	1 (or) 2	2#6 + 1#10 GND. IN 3/4" CONDUIT
45A, 50A, 55A	3	3#6 + 1#10 GND. IN 3/4" CONDUIT
60A	2	2#4 + 1#10 GND. IN 1" CONDUIT
60A	3	3#4 + 1#10 GND. IN 1" CONDUIT
70A	3	3#4 + 1#8 GND. IN 1" CONDUIT
80A	3	3#3 + 1#8 GND. IN 1-1/4" CONDUIT
90A	3	3#2 + 1#8 GND. IN 1-1/4" CONDUIT
100A, 110A	3	3#1 + 1#6 GND. IN 1-1/4" CONDUIT
125A, 150A	3	3#1/0 + 1#6 GND. IN 1-1/2" CONDUIT
175A	3	3#2/0 + 1#6 GND. IN 2" CONDUIT
200A	3	3#3/0 + 1#4 GND. IN 2" CONDUIT

(PANEL / SWITCHBOARD / SERVICE) FEEDER SIZING

AMPERES	POLES	TYPE (XHHW) COPPER CONDUCTORS
30A	3	4#10 + 1#8 GND. IN 3/4" CONDUIT
60A	2	3#4 + 1#8 GND. IN 1" CONDUIT
60A	3	4#4 + 1#8 GND. IN 1-1/4" CONDUIT
100A	2	3#1 + 1#6 GND. IN 1-1/4" CONDUIT
100A	3	4#1 + 1#6 GND. IN 1-1/2" CONDUIT
125A, 150A	2	3#1/0 + 1#6 GND. IN 1-1/2" CONDUIT
125A, 150A	3	4#1/0 + 1#6 GND. IN 2" CONDUIT
200A	2	3#3/0 + 1#4 GND. IN 2" CONDUIT
200A	3	4#3/0 + 1#4 GND. IN 2" CONDUIT
225A	3	4#4/0 + 1#2 GND. IN 2-1/2" CONDUIT
300A	3	4#350kcmil + 1#2 GND. IN 3" CONDUIT
400A	3	4#600kcmil + 1#1/0 GND. IN 3-1/2" CONDUIT



1 ELECTRICAL - OVERALL FIRST FLOOR PLAN
1/8" = 1'-0"

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PROJECT TITLE:
IT ROOM RENOVATION
444 WESTMINSTER ST
PROVIDENCE, RI 02903

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SHEET TITLE:
ELECTRICAL - OVERALL FIRST FLOOR PLAN

PROJECT NORTH: N

PROJECT ARCHITECT: BB
DRAWN: T.M.W.

PROJECT NUMBER:
#2224

SHEET NUMBER: E2.3
REV:

MECHANICAL EQUIPMENT ELECTRICAL CONNECTION SCHEDULE

XXX / ## ITEM No.	DESCRIPTION	LOCATION	EQUIPMENT CHARACTERISTICS					CIRCUIT	CIRCUIT BREAKER (HACR TYPE)	FEEDER & CONDUIT	DISCONNECT SWITCH				MANUAL MOTOR CONTROLLER	REMARKS
			VOLTS	PH	FREQ.	(KW)/HP	FLA				SIZE	FUSE	POLES	NEMA		
FC-1	SPLIT SYSTEM INDOOR UNIT	(SEE PLANS)	208	1	60	-	4.4	NP1 / 11,13	15A/2P	2#12 + 1#12 GND. IN 3/4" C.	-	-	-	-	PROVIDE MOTOR RATED TOGGLE SWITCH WITH THERMAL OVERRIDES.	SEE BELOW
FC-3	SPLIT SYSTEM INDOOR UNIT	(SEE PLANS)	208	1	60	-	4.4	NP1 / 15,17	15A/2P	2#12 + 1#12 GND. IN 3/4" C.	-	-	-	-	PROVIDE MOTOR RATED TOGGLE SWITCH WITH THERMAL OVERRIDES.	SEE BELOW
FC-3	SPLIT SYSTEM INDOOR UNIT	(SEE PLANS)	208	1	60	-	4.4	NP1 / 19,21	15A/2P	2#12 + 1#12 GND. IN 3/4" C.	-	-	-	-	PROVIDE MOTOR RATED TOGGLE SWITCH WITH THERMAL OVERRIDES.	SEE BELOW
HP-3	SPLIT SYSTEM OUTDOOR UNIT	ON GRADE	208	1	60	-	36.0	NP1 / 23,25	40A/2P	2#8 + 1#10 GND. IN 3/4" C.	60	40	2	3R	PROVIDE "WP" DISCONNECT SWITCH WITH FUSING AS INDICATED.	SEE BELOW
HP-3	SPLIT SYSTEM OUTDOOR UNIT	ON GRADE	208	1	60	-	36.0	NP1 / 27,29	40A/2P	2#8 + 1#10 GND. IN 3/4" C.	60	40	2	3R	PROVIDE "WP" DISCONNECT SWITCH WITH FUSING AS INDICATED.	SEE BELOW
HP-3	SPLIT SYSTEM OUTDOOR UNIT	ON GRADE	208	1	60	-	36.0	NP1 / 31,33	40A/2P	2#8 + 1#10 GND. IN 3/4" C.	60	40	2	3R	PROVIDE "WP" DISCONNECT SWITCH WITH FUSING AS INDICATED.	SEE BELOW
SP-1	IN-FLOOR SUMP PUMP	(SEE PLANS)	??	1	60	-	-	???	(EXIST.)	(EXISTING)	-	-	-	-	(EXISTING TO REMAIN)	EXISTING IN-FLOOR SUMP PUMP TO BE REMOVED & RELOCATED WITHIN ROOM BY OTHERS. THIS CONTRACTOR SHALL EXTEND EXISTING CIRCUITRY TO NEW LOCATION. NEW WIRING REQUIRED TO EXTEND CIRCUITRY SHALL MATCH EXISTING ELEC. CHARACTERISTICS.

NOTES:

1. COORDINATE WITH HVAC CONTRACTOR & DRAWINGS FOR EXACT LOCATIONS OF ALL MECHANICAL EQUIPMENT PRIOR TO INSTALLING ELECTRICAL COMPONENTS.
2. COORDINATE WITH PLUMBING CONTRACTOR & DRAWINGS FOR EXACT LOCATIONS OF ALL PLUMBING EQUIPMENT PRIOR TO INSTALLING ELECTRICAL COMPONENTS.
3. ALL DISCONNECTING MEANS SHALL BE SUPPLIED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.
4. ALL STARTERS, VFD'S ETC. SHALL BE SUPPLIED AND INSTALLED BY THE MECHANICAL CONTRACTOR. ELECTRICAL CONTRACTOR SHALL WIRE ALL HVAC EQUIPMENT.
5. ALL HVAC CONTROL WIRING SHALL BE PROVIDED BY OTHERS.

DRY-TYPE TRANSFORMER SCHEDULE

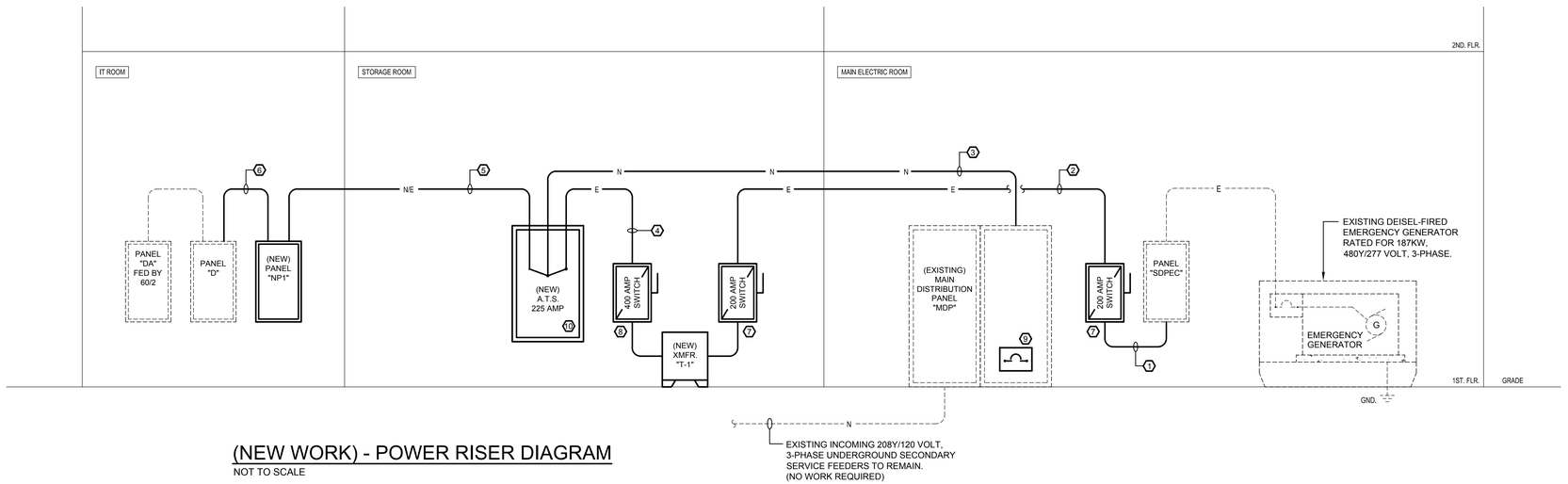
		PRIMARY				SECONDARY				
DESIG.	KVA	VOLTS	PROTECTIVE DEVICE LOCATION	PROTECTIVE DEVICE SIZE	FEEDER	VOLTS	PROTECTIVE DEVICE LOCATION	PROTECTIVE DEVICE SIZE	FEEDER	
T-1	75	480	DISC. SWITCH	125 AMP FUSING	3#1/0 + 1#6 GND. IN 1-1/2" C.	208Y/120	DISC. SWITCH	225A AMP FUSING	4#4/0 + 1#2 GND. IN 2-1/2" C.	NEW STEP-DOWN TRANSFORMER.

NOTES:

1. ALL TRANSFORMERS SHALL BE PROVIDED WITH AN ENGRAVED NAMEPLATE ON THE FRONT OF THE TRANSFORMER INDICATING IT'S DESIGNATION. ENGRAVED PLATE SHALL BE AS CALLED FOR IN THE SPECIFICATIONS.
2. ALL TRANSFORMERS PRIMARY AND SECONDARY CONNECTIONS SHALL BE MADE WITH A MINIMUM OF 18" OF FLEXIBLE METAL CONDUIT.

"NEW WORK" POWER RISER NOTES

1. CONTRACTOR SHALL TAP EXISTING LUGS OF PANEL "SDPEC", WITH FEEDERS CONSISTING OF: 3#1/0 + 1#6 GND. IN 1-1/2" CONDUIT. FEEDER SHALL TERMINATE ON NEW DISCONNECT SWITCH INDICATED IN NOTE #7.
2. CONTRACTOR SHALL RUN FEEDERS CONSISTING OF: 3#1/0 + 1#6 GND. IN 1-1/2" CONDUIT FROM DISCONNECT LOCATED ADJACENT TO EXISTING PANEL "SDPEC". FEEDER SHALL TERMINATE ON NEW DISCONNECT SWITCH INDICATED IN NOTE #7.
3. CONTRACTOR SHALL TIE NEW FEEDERS CONSISTING OF: 4#4/0 + 1#2 GND. IN 2-1/2" CONDUIT INTO NEW 225 AMP, 3-POLE BREAKER INDICATED IN NOTE #9. FEEDER SHALL TERMINATE ON NEW 225 AMP AUTOMATIC TRANSFER SWITCH INDICATED IN NOTE #10.
4. CONTRACTOR SHALL TIE NEW FEEDERS CONSISTING OF: 4#4/0 + 1#2 GND. IN 2-1/2" CONDUIT INTO NEW DISCONNECT SWITCH INDICATED IN NOTE #8. FEEDER SHALL TERMINATE ON NEW 225 AMP AUTOMATIC TRANSFER SWITCH INDICATED IN NOTE #10.
5. CONTRACTOR SHALL TIE NEW FEEDERS CONSISTING OF: 4#350kcmil + 1#2 GND. IN 3" CONDUIT INTO NEW 225 AMP AUTOMATIC TRANSFER SWITCH INDICATED IN NOTE #10. FEEDER TO BE RUN THROUGH FIRST FLOOR AS SHOWN ON THESE PLANS. CONTRACTOR SHALL BE RESPONSIBLE TO FIELD VERIFY EXACT ROUTING. RUN IS APPROX. 150'-0".
6. CONTRACTOR SHALL RUN FEEDERS CONSISTING OF: 4#1 + 1#6 GND. IN 1-1/2" CONDUIT FROM NEW 100 AMP, 3-POLE BREAKER IN NEW PANEL "NP1" TO EXISTING PANEL "D". PLEASE NOTE, THIS CONTRACTOR SHALL COMPLETELY REMOVE EXISTING PANEL "D" FEEDER AS NOTED IN PANEL BOARD SCHEDULE..
7. PROVIDE & INSTALL NEW 200 AMP, 3-POLE DISCONNECT SWITCH WITH 125 AMP FUSING.
8. PROVIDE & INSTALL NEW 400 AMP, 4-POLE DISCONNECT SWITCH WITH 225 AMP FUSING.
9. CONTRACTOR SHALL REMOVE AND REPLACE ONE (1) SPARE BREAKER IN EXISTING MAIN DISTRIBUTION PANEL "MDP", WITH A NEW 225 AMP, 3-POLE BREAKER. NEW BREAKER SHALL MATCH EXISTING SWITCHGEAR ELECTRICAL CHARACTERISTICS.
10. CONTRACTOR SHALL PROVIDE & INSTALL A NEW 225 AMP, 4-POLE AUTOMATIC TRANSFER SWITCH. IT SHALL BE THIS CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL WIRING AND CONTROLS WITH EXISTING EMERGENCY GENERATOR.



(NEW WORK) - POWER RISER DIAGRAM
NOT TO SCALE

PANEL BOARD SCHEDULE

DESIGNATION	BUS AMPS	MAIN	LOCATION	VOLTAGE	PH	BREAKERS USED 1-POLE	BREAKERS USED 2-POLE	BREAKERS USED 3-POLE	SPACES AVAILABLE	TOTAL POLES	MOUNTING	REMARKS
PPF	??	MLO	(ELEC. RM.)	480Y/277	3	-	-	-	-	??	SURFACE	EXISTING "POWER" PANEL, TO REMAIN. SHOWN FOR REFERENCE. (NO WORK REQUIRED)
PPEF	??	MLO	(ELEC. RM.)	480Y/277	3	-	-	-	-	??	SURFACE	EXISTING "POWER" PANEL, TO REMAIN. SHOWN FOR REFERENCE. (NO WORK REQUIRED)
SDPEB	??	MLO	(STOR. RM.)	480Y/277	3	-	-	-	-	??	SURFACE	EXISTING "POWER" PANEL, TO REMAIN. SHOWN FOR REFERENCE. (NO WORK REQUIRED)
SDPEC	??	MLO	(ELEC. RM.)	480Y/277	3	-	-	-	-	??	SURFACE	EXISTING "POWER" PANEL, TO BE RELOCATED. SHOWN FOR REFERENCE. (NO WORK REQUIRED)
SDPA	??	MLO	(STOR. RM.)	208Y/120	3	-	-	-	-	??	SURFACE	EXISTING "POWER" PANEL, TO REMAIN. SHOWN FOR REFERENCE. (NO WORK REQUIRED)
SDPEA	??	MLO	(STOR. RM.)	208Y/120	3	-	-	(1) 100A - "PNL. D"	-	??	SURFACE	EXISTING "POWER" PANEL, TO REMAIN. EXISTING PANEL "D" FEEDER TO BE REMOVED BACK TO SOURCE. EXISTING PANEL "D" BREAKER TO REMAIN FOR FUTURE USE. SEE POWER RISER FOR ADDITIONAL INFORMATION.
D	100A	100A	(I.T. RM.)	208Y/120	3	-	-	-	-	30	SURFACE	EXISTING "POWER" PANEL, TO REMAIN. PANEL TO BE RE-FED FROM NEW PANEL "NP1". SEE POWER RISER FOR ADDITIONAL INFORMATION.
DA	60A	MLO	(I.T. RM.)	120/208	1	-	-	-	-	30	SURFACE	EXISTING "POWER" PANEL, TO REMAIN. SHOWN FOR REFERENCE. (NO WORK REQUIRED)
NP1	225	MLO	(I.T. RM.)	208Y/120	3	(5) 20A	(3) 15A (4) 20A (3) 40A	(1) 100A - "PNL. D"	(5) 20A	42	SURFACE	(NEW), "POWER" PANEL. PROVIDE 42K A.I.C. RATING, MINIMUM.

NOTES:

1. ALL PANELBOARDS SHALL BE PROVIDED WITH AN ENGRAVED NAMEPLATE ON THE DOOR INDICATING THE PANELBOARD DESIGNATION, VOLTAGE, RATING OF MCB OR MAIN LUGS AND SOURCE OF SUPPLY. ENGRAVED PLATE SHALL BE AS CALLED FOR IN THE SPECIFICATIONS.
2. ALL PANELBOARDS SHALL BE PROVIDED WITH A TYPED (HAND WRITTEN IS NOT ALLOWED) CIRCUIT DIRECTORY INDICATING THE LOAD FED BY EACH CIRCUIT BREAKER AND ITS LOCATION IN THE BUILDING.
3. ALL PANELBOARDS SHALL BE PROVIDED WITH FULL SIZE EQUIPMENT GROUND AND NEUTRAL BUSSES ON EACH SIDE OF THE ENCLOSURE SO AS TO PROVIDE A SEPARATE EQUIPMENT GROUND AND NEUTRAL TERMINAL FOR EACH BRANCH CIRCUIT.
4. SPACES SHALL BE PROVIDED WITH ALL REQUIRED BUSSING, SUPPORTS, CONNECTORS, ETC.. NECESSARY FOR FUTURE INSTALLATION OF CIRCUIT BREAKERS.
5. FLUSH MOUNTED PANELBOARDS SHALL BE PROVIDED WITH FIVE (5) EMPTY 1" EMT CONDUITS INSTALLED UP TO ABOVE ACCESSIBLE CEILING FOR FUTURE USE.
6. ALL PANELBOARDS SHALL HAVE HINGED "DOOR-IN-DOOR" TYPE COVERS.
7. REFER TO THE SPECIFICATIONS FOR ALL OTHER PANELBOARD REQUIREMENTS.

NOTES:

1. ALL CONDUCTORS INDICATED ARE BASED ON COPPER.
2. ALL FEEDER SIZES SHOWN, HAVE HAD "VOLTAGE DROP" CALCULATIONS INCORPORATED. (TYPICAL)
3. ALL NEW ELECTRICAL SWITCHGEAR HAS BEEN BASED ON "SIEMENS".

MANUFACTURER CONTACT:
SIEMENS INDUSTRY, INC.
BRIAN KELLEY
1-860-208-8295
EMAIL: briankelley@siemens.com

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PROJECT TITLE:
IT ROOM RENOVATION
444 WESTMINSTER ST
PROVIDENCE, RI 02903

ISSUED FOR:
BID SET
01/18/2023
REVISIONS:

STAMP:

SHEET TITLE:
ELECTRICAL - POWER RISER, SCHEDULES & NOTES

PROJECT NORTH: N

PROJECT ARCHITECT: BB
DRAWN: T.M.W.

PROJECT NUMBER:
#2224

SHEET NUMBER: E3.0
REV:

Signal Works Architecture

PROJECT MANUAL

City of Providence – Capital Improvement Projects
444 Westminster IT Room Renovations

BID SET
January 18, 2022

Signal Works Project
#2224

11 Aleppo Street, Providence, RI 02909 • 401.400.ARCH
bryan@signalworksarchitecture.com • http://www.signalworksarchitecture.com

SECTION 00 0110

TABLE OF CONTENTS

PROCUREMENT AND CONTRACTING REQUIREMENTS

DIVISION 00 -- PROCUREMENT AND CONTRACTING REQUIREMENTS

PART 1 – PROJECT SPECIFICATIONS

DIVISION 01 -- GENERAL REQUIREMENTS

DIVISION 02 -- EXISTING CONDITIONS

DIVISION 03 -- CONCRETE

DIVISION 04 -- MASONRY

END OF SECTION

SECTION 00 6700
PREVAILING WAGE RATES

Prevailing Wage is the cost per hour, for labor wages set by law, involving construction work for various and related trades. It involves a bidding process for contractors that will use federal, state or municipal monies (taxpayer dollars) for work on projects that will be used for the public, by the public.

The successful contractor and sub-contractor shall comply with the provisions of Rhode Island General Laws (RIGL) Chapter 37 pertaining to the "Prevailing Wage Laws" for all municipal funded projects in excess of one thousand ($1,000) dollars. The RI Department of Labor has accepted the prevailing wage rates as determined by the Federal Wage and Hour Division under the Davis-Bacon Act. A copy of the most current wage decision pertaining to this bid is available from the Director of Labor at 457-1860 or on the web site: www.dlt.ri.gov/pw.

As required under RIGL 37-13-13, the successful contractor must certify and submit weekly payroll forms to the Finance Director's Office.

END OF DOCUMENT

DOCUMENT 00 7200
GENERAL CONDITIONS

1. General Conditions: AIA A201, General Conditions of the Contract for Construction.

2. General Conditions: AIA A271, General Conditions of the Contract for Furniture, Furnishings and Equipment.

3. General Conditions Forms: General Conditions are available from the American Institute of Architects, Washington, D.C., 202-626-7300. General Conditions will be prepared and approved for use on the project by the Owner in consultation with an attorney.

END OF DOCUMENT

DOCUMENT 00 73 00
SUPPLEMENTARY CONDITIONS

1. Supplementary Conditions: Supplementary Conditions will be prepared and approved for use on the project by the Owner in consultation with an attorney.

END OF DOCUMENT

SECTION 00 7400

MINORITY BUSINESS ENTERPRISE REQUIREMENTS AND WOMEN BUSINESS ENTERPRISE REQUIREMENT

The bidder will endeavor to obtain a minimum of ten (10%) of the awarded amount to minority business subcontractors and/or suppliers certified by the **State of Rhode Island**.

PART 1 This offer of minority participation will be considered a factor in the contract award

PART 2 The successful bidder shall substantiate this participation within ten (10) days after receipt of Notice of Award. The bidder will endeavor to obtain a minimum of ten (10%) of the awarded amount to women business subcontractors and/or suppliers certified by the **State of Rhode Island**.

- This offer of minority participation will be considered a factor in the contract award
- The successful bidder shall substantiate this participation within ten (10) days after receipt of Notice of Award.

END OF DOCUMENT

SECTION 01 4000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Quality Monitoring: Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality. Perform quality control procedures and inspections during installation.

B. Standards: Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

C. Tolerances: Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate. Comply with manufacturers' tolerances.

D. Reference Standards: For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

E. Manufacturer's Field Services: When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to perform the following as applicable, and to initiate instructions when necessary.
   1. Observe site conditions.
   2. Conditions of surfaces and installation.
   3. Quality of workmanship.
   4. Start-up of equipment.
   5. Test, adjust and balance of equipment.

F. Mock-Ups: Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes. Accepted mock-ups shall be a comparison standard for the remaining Work.

G. Removal of Mock-Ups: Where mock-up has been accepted by Architect and no longer needed, remove mock-up and clear area when directed to do so.

PART 2 PRODUCTS - Not Applicable to This Section

PART 3 EXECUTION - Not Applicable to This Section

END OF SECTION

SECTION 01 1000
SUMMARY

PART 1 GENERAL

1.1 SUMMARY

A. Project Identification: 444 Westminster – IT Room Renovations

B. Project Summary: The interior renovation of a part of the building's lower level to create a separate, protected space for the IT equipment, new HVAC system(s) to create redundancy, and the tie-in to back-up generator.

C. Particular Project Requirements:
1. Requirements for sequencing, scheduling and completion date: A full construction schedule is to be submitted as part of the bid for the review of the owner and stakeholders. Assume all work is to be conducted during normal business hours, but there will be after-hours work required for shutdowns, changeovers, etc. These required shifts are anticipated to be minimal.
2. Separate contracts to be awarded: Not Applicable
3. Prior hazardous waste or asbestos work: It assumed that there no hazardous materials present.

D. Permits and Fees: Apply for, obtain, and pay for permits, fees, and utility company back-charges required to perform the work. Submit copies to Architect.

E. Codes: Comply with applicable codes and regulations of authorities having jurisdiction. Submit copies of inspection reports, notices, and similar communications to Architect.

F. Dimensions: Verify dimensions indicated on drawings with field dimensions before fabrication or ordering of materials. Do not scale drawings.

G. Existing Conditions: Notify Architect of existing conditions differing from those indicated on the drawings. Do not remove or alter structural components without prior written approval.

H. Coordination:
1. Coordinate the work of all trades.
2. Prepare coordination drawings for areas above ceilings where close tolerances are required between building elements and mechanical and electrical work.
3. Verify location of utilities and existing conditions.

I. Installation Requirements, General:
1. Inspect substrates and report unsatisfactory conditions in writing.
2. Do not proceed until unsatisfactory conditions have been corrected.
3. Take field measurements prior to fabrication where practical. Form to required shapes and sizes with true edges, lines and angles. Provide inserts and templates as needed for work of other trades.
4. Install materials in exact accordance with manufacturer's instructions and approved submittals.
5. Install materials in proper relation with adjacent construction and with proper appearance.
6. Restore units damaged during installation. Replace units which cannot be restored at no additional expense to the Owner.
7. Refer to additional installation requirements and tolerances specified under individual specification sections.

J. Limit of Use: Limit use of work as indicated. Keep driveways and entrances clear.

K. Existing Construction: Maintain existing building in a weathertight condition. Repair damage caused by construction operations. Protect building and its occupants.

L. Definitions:
1. Provide: Furnish and install, complete with all necessary accessories, ready for intended use. Pay for all related costs.
2. Approved: Acceptance of item submitted for approval. Not a limitation or release for compliance with the Contract Documents or regulatory requirements. Refer to limitations of 'Approved' in General and Supplementary Conditions.
3. Match Existing: Match existing as acceptable to the Owner.

M. Intent: Drawings and specifications are intended to provide the basis for proper completion of the work suitable for the intended use of the Owner. Anything not expressly set forth, but which is reasonable implied or necessary for proper performance of the project shall be included.

N. Writing Style: Specifications are written in the imperative mode. Except where specifically intended otherwise, the subject of all imperative statements is the Contractor. For example, 'Provide tile' means 'Contractor shall provide tile.'

PART 2 **PRODUCTS** - Not Applicable to This Section

PART 3 **EXECUTION** - Not Applicable to This Section

END OF SECTION

SECTION 01 1100

VOLATILE ORGANICE COMPOUND (VOC) LIMITS FOR ADHESIVES, SEALANTS, AND PAINTS

1.0 GENERAL

1.1 Summary

A. The specification section includes requirements for volatile organic compound (VOC) content in adhesives, sealants, paints and coatings used for this project.

1.2 General Requirements

A. The Contractor is required to implement practices and procedures to meet the project's environmental goals, which include achieving NE-CHPS criteria. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in the related sections of the Contract Documents, are implemented to the fullest extent feasible.

1.3 References

A. Rule 1168 – "Adhesive and Sealant Applications," amended January 7, 2005: South Coast Air Quality Management District (SCAQMD), State of California, www.aqmd.gov

B. Rule 1113 – "Architectural Coatings," amended July 9, 2004: South Coast Air Quality Management District (SCAQMD), State of California, www.aqmd.gov

C. Green Seal Standard GS-11 – "Paints," of Green Seal, Inc., Washington, DC, www.greenseal.org

D. Green Seal Standard GC-03 – "Anti-Corrosive Paints," of Green Seal, Inc., Washington, DC, www.greenseal.org

1.4 VOC Requirements for Interior Adhesives

A. The volatile organic compound (VOC) content of adhesives, adhesive bonding primers or adhesive primers used in this project shall not exceed the limits defined in Rule 1168 – "Adhesive and Sealant Applications."

B. The VOC limits defined by SCAQMD are as follows. All VOC limits are defined in grams per liter, less water and less exempt compounds.

1.5 General

A. Unless otherwise specified below, the VOC content of all adhesive, adhesive bonding primers and adhesive primers are to be in excess of 250 grams per liter.

B. For specified building construction related applications, allowable VOC content is as follows:

1. Architectural Applications

a.	Indoor carpet adhesive	50
b.	Carpet pad adhesive	50
c.	Wood floor adhesive	100
d.	Rubber floor adhesive	60
e.	Subfloor adhesive	50
f.	Ceramic tile adhesive	65
g.	VCT and asphalt tile adhesive	50
h.	Drywall and panel adhesive	50
i.	Cove base adhesive	50
j.	Multipurpose construction adhesive	70
k.	Structural glazing adhesive	100

1.6 VOC Requirements for Interior Sealants

A. The VOC content of sealants, or sealant primers used in this project shall not exceed the limits defined in Rule 1168 – "Adhesive and Sealant Applications."

B. The VOC limits defined by SCAQMD are as follows. All VOC limits are defined in grams per liter, less water and less exempt compounds.

1. Sealants

a.	Architectural	250
b.	Other	420

2. Sealant Primer

a.	Architectural – Nonporous	250
b.	Architectural – Porous	775
c.	Other	750

1.7 VOC Requirements for Interior Paints

A. Paints and Primers: Paints and primers used in non-specialized interior applications (i.e., for wallboard, plaster, wood, metal doors and frames, etc.) shall meet the VOC limitations of the Green Seal Paint Standard GS-11, of Green Seal, Inc., Washington, DC. Product-specific environmental requirements are as follows:

1. Volatile Organic Compounds

a. The VOC concentrations (in grams per liter) of the product shall not exceed those listed below as determined by the U.S. Environmental Protection Agency (EPA) Reference Test Method 24.

1) Interior Paints and Primers (non-flat) – 150 g/l
2) Interior Paints and Primers (flat) – 50 g/l

B. Anti-Corrosive and Anti-Rust Paints

1. Anti-corrosive and anti-rust paints applied to interior ferrous metal substances shall meet the VOC limitations of the Green Seal Paint Standard GS-03 requirements as follows:

a. Volatile Organic Compounds

1) The VOC concentrations (in grams per liter) of the product shall not exceed those listed by the EPA Reference Test Method 24: Anti-Corrosive and Anti-Rust Paints – 250 g/l.

1.8 VOC Requirements for Interior Coatings

A. Clear wood finishes, floor coatings, stains, sealers and shellacs applied to the interior shall meet the VOC limitations defined in Rule 113. The VOC limits defined by SCAQMD, based on 07/09/04 amendments, are as follows. VOC limits are defined in grams per liter, less water and less exempt compounds.

1.	Clear wood finishes - Varnish	350
2.	Clear wood finishes – Sanding Sealers	350
3.	Clear wood finishes – Lacquer	550
4.	Shellac – Clear	730
5.	Shellac – Pigmented	550
6.	Stains	250
7.	Floor Coatings	100
8.	Waterproofing Sealants	250
9.	Sanding Sealers	275
10.	Other Sealers	200

2.0 PRODUCTS

Not Applicable

3.0 EXECUTION

Not Applicable

END OF DOCUMENT

SECTION 01 2000
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Price and Payment Procedures:
   1. Alternates
   2. Allowances

1.2 ALTERNATES

A. Total Price: Provide total price for each alternate in Bid Form. Include cost of modifications to other work to accommodate alternate. Include related costs such as overhead and profit.

B. Acceptance of Alternates: Owner will determine which alternates are selected for inclusion in the Contract.

C. Coordination of Alternates: Modify or adjust affected adjacent work as necessary to integrate work of the alternate into Project. Coordinate alternates with related work to ensure that work affected by each selected alternate is properly accomplished.

D. List of Alternates:
   1. Deduct-Alternate #01: Refer to alternate layout as shown on the drawings.

1.3 ALLOWANCES

A. Allowances: Lump sum allowances and unit cost allowances are listed below and as indicated on the Drawings. Amounts shall include all costs including overhead and profit except as specifically noted. Coordinate allowances with requirements for related and adjacent work.

B. Notification of Owner: Notify Owner of date when final decision on allowance items is required to avoid delays in the work.

C. Certification of Quantities: Furnish certification that quantities of products purchased are the actual quantities needed with reasonable allowance for cutting or installation losses, tolerances, mixing, waste, and similar margins.

D. Lump Sum Allowances: Include the following amounts in the base bid for materials, installation, overhead, profit and all costs for the following items.
   1. Not Applicable – Refer to Spec Section 01 2200 – Unit Prices

PART 2 PRODUCTS - Not Applicable to This Section

PART 3 EXECUTION - Not Applicable to This Section

END OF SECTION

SECTION 01 2200

UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

B. Related Requirements:

1. Division 01 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.

1.3 DEFINITIONS

A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured and verified by the Architect.

D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Unit Price No. 1: The Demolition of the Existing ACT (Tile/Grid/Accessories) in the main storage area, not currently called out for removal.

Unit Price No. 1: $_____ per Square Foot

B. Unit Price No. 2 The Installation of New ACT (Tile/Grid/Accessories) in the main storage area, not currently called out for new ACT

Unit Price No. 2: $_____ per Square Foot

END OF SECTION

SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Administration of Contract: Provide administrative requirements for the proper coordination and completion of work including the following:
   1. Supervisory personnel.
   2. Preconstruction conference.
   3. Project meetings, minimum of two per month; prepare and distribute minutes.

B. Work Schedule: Submit progress schedule, updated monthly.

C. Submittal Schedule: Prepare submittal schedule; coordinate with progress schedule.

D. Schedule of Tests: Submit schedule of required tests including payment and responsibility.

E. Perform Surveys: Lay out the work and verifying locations during construction.

F. Emergency Contacts: Submit and post a list of emergency telephone numbers and address for individuals to be contacted in case of emergency.

G. Record Documents: Submit record drawings and specifications; to be maintained and annotated by Contractor as work progresses.

1.2 SUBMITTALS

A. Types of Submittals: Provide types of submittals listed in individual sections and number of copies required below. All submittals are to be submitted digitally via email
   1. Shop drawings, reviewed and annotated by the Contractor – pdf format.
   2. Product data – pdf format.
   3. Samples - as required to indicate range of color, finish, and texture to be expected.
   4. Inspection and test reports – pdf format.
   5. Warranties – Sample Warranty with Product Data, Executed Warranty with Closeout Documents.
   6. Survey Data – As applicable
   7. Closeout submittals – Physical Thumb drive, 2 copies.

B. Submittal Procedures: Comply with project format for submittals. Comply with submittal procedures established by Architect including Architect's submittal and shop drawing stamp. Provide required resubmittals if original submittals are not approved. Provide distribution of approved copies including modifications after submittals have been approved.
   1. Submittals to be titled per the 32-Divisions of CSI,
      a. Example: 08 4313-001-00 – Aluminum Storefront PD
      b. Example: 08 4313-002-00 – Aluminum Storefront Shop Drawings

C. Samples and Shop Drawings: Samples and shop drawings shall be prepared specifically for this project. Shop drawings shall include dimensions and details, including adjacent construction and related work. Note special coordination required. Note any deviations from requirements of the Contract Documents.

D. Requests for Information (RFIs): RFIs are to be submitted with detailed descriptions of the issue(s) and include potential solutions from the contractor for remedying the issue for the Architect’s evaluation and response. RFIs not containing detailed information may be

rejected in part or in whole until the responsible contractor provides the necessary information. The responsible contractor will not dictate the method of response from the Architect, it is at the Architect and/or Design Team's discretion as to the formality of their response. RFIs are to begin at "001"

E. Warranties: Provide warranties as specified; warranties shall not limit length of time for remedy of damages Owner may have by legal statute. Contractor, supplier, or installer responsible for performance of warranty shall sign warranties.

1.3 LEED REQUIREMENTS AND SCORECARD

A. Not Applicable

PART 2 PRODUCTS - Not Applicable to This Section

PART 3 EXECUTION - Not Applicable to This Section

END OF SECTION

SECTION 01 3300
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

A. Refer to Spec Section 01 3000 – Administrative Requirements

B. Comply with project format for submittals.

C. Comply with submittal procedures established by Architect including Architect's submittal and shop drawing stamp. Provide required resubmittals if original submittals are not approved. Provide distribution of approved copies including modifications after submittals have been approved.

D. Samples and shop drawings shall be prepared specifically for this project. Shop drawings shall include dimensions and details, including adjacent construction and related work. Note special coordination required. Note any deviations from requirements of the Contract Documents.

E. Provide warranties as specified; warranties shall not limit length of time for remedy of damages Owner may have by legal statute. Warranties shall be signed by contractor, supplier, or installer responsible for performance of warranty.

F. Architect and engineers have 10-business days to review submittals, and 5-business days to review and respond to Requests for Information (RFIs).

PART 2 - **PRODUCTS** - Not Applicable to This Section

PART 3 - **EXECUTION** - Not Applicable to This Section

END OF SECTION

SECTION 01 3516
ALTERATIONS PROJECT PROCEDURES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Summary: The procedures and administrative requirements of this Section apply to all of the following Sections of the Specification which are involved in alterations to the existing building.

B. Extent Notes: Cut into or partially remove portions of the existing building as necessary to make way for new construction. Include such work as:

1. Cutting, moving or removal of items shown to be cut, moved, or removed.

2. Cutting, moving or removal of items not shown to be cut, moved, or removed, but which must be cut, moved, or removed to allow the new work to proceed. Work or items which are to remain in the finished work shall be patched or reinstalled after their cutting, moving, or removal, and their joints and finishes made to match adjacent or similar work.

3. Removal of existing surface finishes as needed to install new work and finishes.

4. Removal of abandoned items and removal of items serving no useful purpose, such as abandoned piping.

5. Repair or removal of dangerous or unsanitary conditions resulting from alterations work.

C. Patch, match, repair, refinish or reinstall existing items to remain in finished work, to specified condition for each material, with joints and finishes made to match adjacent or similar work.

D. Relocate and reinstall designated existing salvaged materials.

1.02 SCHEDULING AND ACCESS

A. Work Scheduling/Sequence:

1. Any work to be performed during hours other than normal business hours (8:00 A.M. to 5:00 P.M. Monday through Friday unless noted otherwise) must have prior approval of the Project Manager.

B. Maintenance of Access and Operations:

1. During period of construction, the Owner will continue to perform normal activities in existing building. Maintain proper and safe access to the Owner-occupied areas at all times.

2. Schedule demolition and remodeling operations with Owner in such a manner as to allow Owner operations to continue with minimum interruption.

3. During period of construction, do not obstruct in any manner existing exit ways of Owner-occupied areas. Prior to removal of existing exit ways (stairs, corridors, doors) as part of new Work, provide and maintain new exit ways so as to maintain same number of exit ways. Maintain existing fire doors in an operable condition.

C. Maintenance of Existing Services:

1. Maintain environmental control in existing building, especially temperature,

humidity and dust control.

2. Provide temporary lines and connections as required to maintain existing mechanical and electrical services in building.

3. Notify the Property Manager a minimum of three (3) days prior to each required interruption of mechanical or electrical services in building. Such interruptions shall be only at such times and for lengths of time as approved by the Property Manager. In no event shall interruption occur without prior approval of the Property Manager.

D. Building Access:

1. Contractor shall access building at time designated by Property Manager.

2. Access to construction areas within building shall be as designated by the Property Manager.

3. Restrict construction traffic to areas specifically designated by Property Manager.

1.03 ALTERATIONS, CUTTING AND PROTECTION:

A. Do not start any cutting or alterations work until dust protection is in place.

B. Extent:

1. Cutting and removal work shall be performed so as not to cut or remove more than is necessary and so as not to damage adjacent work.

2. Conduct work in such a manner as to minimize noise and to minimize accumulation and spread of dirt and dust.

3. Perform cutting for ductwork and other rectangular openings with carborundum saw with approved dust arrestor.

4. Drill holes for conduit and piping using core drills.

C. Shoring, Bracing and Capping: Provide shores, needling and bracing as needed to keep building structurally secure and free of deflection in all its parts, and as needed for installation of new structural members. In telephone equipment areas, all shoring shall be wood or other approved nonconductive material, and shall not be secured to, braced from, or supported by telephone equipment or cable racks.

D. Responsibility and Assignment to Trades:

1. Contractor shall assign the work of moving, removal, cutting, patching and repair to trades under his supervision so as to cause the least damage to each type of work encountered, and so as to return the building as much as possible to the appearance of new work.

2. Patching of finish materials shall be assigned to mechanics skilled in the work of the finish trade involved.

E. Protection:

1. Protect remaining finishes, equipment, and adjacent work from damage caused by cutting, moving, removal and patching operations. Protect surfaces which will remain a part of the finished work.

2. Protect existing facilities and features, within designated construction limits and along corridor access route to construction area.

3. Cover existing wall and floor finishes in work areas, in adjacent areas and along corridor access route to prevent damage from product delivery and construction operations. Use same UL listed sheeting material as specified for temporary partitions below.

4. Material to be stored on floor must be placed on 1/4 in. tempered hardboard (Masonite) sheeting or other approved substrate. Do not lean material against walls or equipment.

5. During demolition, cutting and construction, provide positive dust control by wetting dust debris and by completely sealing openings to Owner occupied areas with temporary partitions, so as to prevent spread of dust and dirt to adjacent areas.

6. After materials, equipment and machinery are installed, properly protect Work until final acceptance.

7. Any damage resulting from construction operations shall be repaired by the Contractor without cost to the Owner.

8. All access points to the building shall remain secure. Doors remaining open for a period of time for material delivery or removal shall be protected against unauthorized entry.

F. Salvage:

1. Salvage sufficient quantities of cut or removed material to replace damaged work or patch new work where required. Protect and provide dry, secure storage for items to be reused.

2. Salvage items specifically indicated for salvage and reuse, as noted on drawings.

3. Do not incorporate salvaged or used material in new construction, except where small quantities of finish material which are difficult to match or duplicate are approved for patching or extending purposes by Architect or except as specifically indicated.

4. Salvaged items left over after completion of Work shall be disposed of by Contractor, unless scheduled to be turned over to Owner.

G. Temporary Barricades/Partitions: As applicable, provide and maintain temporary and dust partitions to seal openings to Owner-occupied areas. Provide partitions as required to maintain dust control. Partition locations may or may not be indicated on the Drawings.

1. Type 1 Partitions: (Maintained in place for 30 days or less) Framing: Commercial softwood species, fire-retardant treated in accordance with AWPA C20, and bearing UL Label FR-S. Provide continuous 2 x 4 top and bottom plates, 2 x 4 studs at 24 in. o.c., and continuous 2 x 4 bridging 4 ft. studs may be used. At Contractor's option, drywall metal studs may be used. Provide 3-5/8 in. wide metal studs at 24 in. o.c., with continuous head and floor channels.

   Covering: Central Offices - Griffolyn type 55 FR or Durashield 8000FR reinforced sheeting, listed by Underwriters' Laboratories, Inc., as having a flame spread rating of less than 25 and smoke developed rating of less than 50. Apply double thickness of sheeting, fastened to one side with no-tear fasteners. Tape joints continuously.

   Note: In situations where Type 1 Partitioning will be installed within 2 ft. of existing or proposed telecommunications equipment, the sheeting shall be Griffolyn type 55 ASFR or Durashield 8000ASFR, anti-static, fire retardant sheeting.

2. Type II Partitions: (Maintained in place 18 months or less)

   Framing: (same as Type I above)

   Covering: 1/4 in. thick tempered hardboard or 1/2 in. thick plywood, listed by Underwriters' Laboratories, Inc., as having a flame spread rating of less than 25 and smoke developed rating of less than 50. Apply to one side and fasten to studs with drywall screws at 12 in. o.c., countersunk. Fire-retardant paint or fireproof coating is not required.

3. Type III Partitions: (Maintained in place longer than 18 months)

   Type: One hour fire rated gypsum drywall partition.

   Framing: 3-5/8 in. wide metal drywall studs. Provide continuous head and floor runners. Space studs at 24 in. o.c.

   Covering: One layer of 5/8 in. thick Type "X" gypsum board each side, fastened to studs and runners with drywall screws at 12 in. o.c. Tape and bed panel joints.

4. Doors: Type I and II Partitions: Single acting doors, opening out, with sturdy closer, closing against gasketed stops on frame to reduce passage of dust. Cover one side of each door with same material as used to cover partitions. Provide ample wood push bars and bump plates.

   Type III Partitions: Fire-resistive door and frame assembly bearing UL "C" Labels, complete, including metal frame, door, and hardware.

5. Sealing: Seal perimeter of partitions and doors to prevent passage of dust. At Type I and II partitions, tape fastener depressions, joints between panels and joints between panels and floors, ceilings, and columns with 2 in. wide pressure sensitive tape.

6. Mats: Provide mats at doors to reduce tracking of dust. Replace or clean daily.

H. Debris:

1. Remove debris promptly from the site each day.

2. Do not let piled material endanger structure.

3. During cutting and coring operations, use metal lined wood box secured tight against surface, to catch falling debris and water.

1.04 PATCHING, EXTENDING AND MATCHING:

A. Skill:

1. Patch and extend existing work using skilled mechanics who are capable of matching the existing quality of workmanship. The quality of patched or extended work shall not be less than that specified in the Sections of the product and execution Specifications which follow these General Requirements.

B. Patching:

1. In areas where any portion of an existing finished surface is damaged, lifted, stained, or otherwise made or found to be imperfect, patch or replace the imperfect portion of the surface with matching material.

2. Provide adequate support or substrate for patching of finishes.

3. If the imperfect surface was a painted or coated one, repaint or recoat the patched portion in such a way that uniform color and texture over the entire surface results.

4. If the surrounding surface cannot be matched, repaint, or recoat the entire surface.

C. Quality:

1. In the Sections of the product and execution of Specifications which follow these General Requirements, no concerted attempt has been made to describe each of the various existing products that must be used to patch, match, extend or replace existing work. Obtain all such products in time to complete the Work on schedule. Such products shall be provided in quality which is in no way inferior to the existing products.

2. The quality of the products that exist in the building, as apparent during pre-quotation site visits, shall serve as the Specification requirement of strength, appearance, and other characteristics.

D. Transitions:

1. Where new work abuts or finishes flush with existing work, make the transition as smooth and workmanlike as possible. Patched work shall match existing adjacent work in texture and appearance so as to make the patch or transition invisible to the eye at a distance of no closer than three (3) feet.

2. Where masonry or other finished surface is cut in such a way that a smooth transition with new work is not possible, terminate the existing surface in a neat fashion along a straight line at a natural line of division and provide trim appropriate to the finished surface.

3. Where two or more spaces are indicated to become one space, rework floors and ceilings so that horizontal planes, without breaks, steps or bulkheads result.

4. In cases of extreme change of level (3 in. or more), obtain instructions from Project Manager as to method of making transition. Either stepping, bulkheading, encasement, ramping, sloping or change of transition line shall be employed, or a combination of these, as directed in each case by the Project Manager.

E. Matching:

1. Restore existing work that is damaged during construction to a condition equal to its condition at the time of the start of the Work.

2. At locations in existing areas where partitions are removed, patch the floors, walls and ceilings with finish materials to match adjacent finishes.

F. Overall Requirement that the Work Be Complete:

1. Where a product or type of construction occurs in the existing building, and it is not specified as a part of the new work, provide such products or types of construction as needed to patch, extend or match the existing work.

2. These Specifications will generally not describe existing products or standards of execution, nor will they enumerate products which are not a part of the new construction. The existing product is its own specification.

3. The presence of any product or type of construction in the old work shall cause its patching, extending, or matching to be performed, as necessary to make the work complete and consistent, to identical standards of quality.

1.05 REPAIR:

A. Replace work damaged in the course of alterations, except at areas approved by the Project Manager for repair.

B. Where full removal of extensive amounts of almost-suitable work would be needed to replace damaged portions, then filling, spackling, straightening, and similar repair techniques, followed by full painting of other finishing, will be permitted.

C. If the repaired work is not brought up to the standard for new work, the Project Manager will direct that it be cut out and replaced with new work.

1.06 FIRESTOPPING:

A. Where existing fire-rated partitions, walls or floors are penetrated by new work, each trade providing such new work shall seal around penetrating conduit, pipe, duct or sleeve in accordance with manufacturer's printed instructions and specifications.

B. Refer to Section 07840 - Firestopping.

1.07 CLEANING:

A. Each Successive Trade:

1. As each trade finishes its work on each part of the alterations work and related new work, it shall clean up its work areas and make work surfaces ready for the work of the succeeding trades.

2. Spillage, overspray, collections of dust or debris, and damage to Owner-occupied spaces shall be cleaned or remedied immediately by the responsible trade.

B. Each Area as it is Completed:

1. As soon as work in each area of the alterations is complete, clean up all surfaces, remove equipment, salvage, and debris, and return in condition suitable for use by the Owner as quickly as possible.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

END OF SECTION

SECTION 01 4000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Quality Monitoring: Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality. Perform quality control procedures and inspections during installation.

B. Standards: Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

C. Tolerances: Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate. Comply with manufacturers' tolerances.

D. Reference Standards: For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

E. Manufacturer's Field Services: When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to perform the following as applicable, and to initiate instructions when necessary.
   1. Observe site conditions.
   2. Conditions of surfaces and installation.
   3. Quality of workmanship.
   4. Start-up of equipment.
   5. Test, adjust and balance of equipment.

F. Mock-Ups: Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes. Accepted mock-ups shall be a comparison standard for the remaining Work.

G. Removal of Mock-Ups: Where mock-up has been accepted by Architect and no longer needed, remove mock-up and clear area when directed to do so.

PART 2 **PRODUCTS** - Not Applicable to This Section

PART 3 **EXECUTION** - Not Applicable to This Section

END OF SECTION

SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. Temporary Services: Provide temporary services and utilities, including payment of utility costs including the following.
   1. Water (potable and non-potable).
   2. Lighting and power.
   3. Metering.
   4. Telephone.
   5. Toilet facilities.
   6. Materials storage.

B. Construction Facilities: Provide construction facilities, including payment of utility costs including the following.
   1. Construction equipment.
   2. Dewatering and pumping.
   3. Enclosures.
   4. Heating.
   5. Lighting.
   6. Elevator.
   7. Access.
   8. Roads.

C. Security and Protection: Provide security and protection requirements including the following.
   1. Fire extinguishers.
   2. Site enclosure fence, barricades, warning signs, and lights.
   3. Building enclosure and lock-up.
   4. Temporary jobsite protection.
   5. Environmental protection.
   6. Pest control during and at the end of construction.
   7. Snow and ice removal if applicable.

D. Personnel Support: Provide personnel support facilities including the following.
   1. ~~Architect's field office with telephone, fax and data connection.~~
   2. Contractor's field office.
   3. Sanitary facilities.
   4. Drinking water.
   5. Project identification sign.
   6. Cleaning.

PART 2 PRODUCTS - Not Applicable to This Section

PART 3 EXECUTION – Not Applicable to this Section

END OF SECTION

SECTION 01 6000
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Manufacturers: Provide products from one manufacturer for each type or kind as applicable. Provide secondary materials as acceptable to manufacturers of primary materials.

B. Product Selection: Provide products selected or equal approved by Architect. Products submitted for substitution shall be submitted with complete documentation and include construction costs of substitution including related work. It is the responsibility of the contractor to “prove” the product substitution can be considered “an equal”

C. Substitutions: Request for substitution must be in writing. Conditions for substitution include:
1. An 'or equal' phrase in the specifications.
2. Specified material cannot be coordinated with other work.
3. Specified material is acceptable to authorities having jurisdiction.
4. Substantial advantage is offered to the Owner in terms of cost, time, or other valuable consideration.

D. Substitution Requests: Substitutions shall be submitted prior to award of contract, unless otherwise acceptable. Approval of shop drawings, product data, or samples containing substitutions is not an approval of a substitution unless an item is clearly presented as a substitution at the time of submittal.

PART 2 PRODUCTS - Not Applicable to This Section

PART 3 EXECUTION - Not Applicable to This Section

END OF SECTION

SECTION 01 7000
EXECUTION & CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Substantial Completion: The following are prerequisites to substantial completion. Provide the following.
   1. Punch list prepared by Contractor and subcontractors as applicable.
   2. Supporting documentation.
   3. Warranties.
   4. Certifications.
   5. Occupancy permit.
   6. Start-up and testing of building systems.
   7. Change over of locks.
   8. Meter readings.
   9. Commissioning documentation.

B. Final Acceptance: Provide the following prerequisites to final acceptance.
   1. Final payment request with supporting affidavits.
   2. Completed punch list.

C. As-Built Drawings: Provide a marked-up set of drawings including changes, which occurred during construction.

D. Project Closeout: Provide the following during project closeout.
   1. Submission of record documents.
   2. Submission of maintenance manuals.
   3. Training and turnover to Owner's personnel.
   4. Final cleaning and touch-up.
   5. Removal of temporary facilities.

PART 2 PRODUCTS - Not Applicable to This Section

PART 3 EXECUTION

3.1 CUTTING AND PATCHING

A. Cutting and Patching: Provide cutting and patching work to properly complete the work of the project, complying with project requirements for:
   1. Structural work.
   2. Mechanical/electrical systems.
   3. Visual requirements, including detailing and tolerances.
   4. Operational and safety limitations.
   5. Fire resistance ratings.
   6. Inspection, preparation, and performance.
   7. Cleaning.

B. Means and Methods: Do not cut and patch in a manner that would result in a failure of the work to perform as intended, decrease energy performance, increase maintenance, decrease operational life, or decrease safety performance.

C. Inspection: Inspect conditions prior to work to identify scope and type of work required. Protect adjacent work. Notify Owner of work requiring interruption to building services or Owner's operations.

D. Performance of Operations: Perform work with workmen skilled in the trades involved. Prepare sample area of each type of work for approval.

E. Cutting: Use cutting tools, not chopping tools. Make neat holes. Minimize damage to adjacent work. Inspect for concealed utilities and structure before cutting.

F. Patching: Make patches, seams, and joints durable and inconspicuous. Comply with tolerances for new work.

G. Cleaning: Clean work area and areas affected by cutting and patching operations.

END OF SECTION

SECTION 02 4113
SELECTIVE DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of building elements for alteration purposes.

B. Removal and disposal of obsolete equipment.

C. Abandonment and removal of obsolete utilities and conduit.

1.02 RELATED REQUIREMENTS

A. Section 01 1000 - Summary: Limitations on Contractor's use of site and premises.

B. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

C. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of benchmarks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

1.03 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Project Record Documents: Accurately record actual locations of capped and active utilities.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 SCOPE

A. Remove portions of the existing construction as required to install new work.

B. Remove equipment being replaced.

C. Remove MEP and other items being upgraded or replaced.

D. Remove items so noted on the drawings.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   3. Provide, erect, and maintain temporary barriers and security devices.
   4. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.

5. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
6. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Protect existing structures and other elements that are not to be removed.
1. Provide bracing and shoring.
2. Prevent movement or settlement of adjacent structures.
3. Stop work immediately if adjacent structures appear to be in danger.

D. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

E. Perform demolition in a manner that maximizes salvage and recycling of materials.
1. Dismantle existing construction and separate materials.
2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

3.03 EXISTING UTILITIES

A. Protect existing utilities to remain from damage.

B. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

C. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

D. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

E. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

3.04 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Separate areas in which demolition is being conducted from other areas that are still occupied.
1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 5000 in locations indicated on drawings.

B. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.

C. Remove existing work as indicated and as required to accomplish new work.
1. Remove items indicated on drawings.

D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
3. Verify that abandoned services serve only abandoned facilities before removal.
4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

E. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.

2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
3. Repair adjacent construction and finishes damaged during removal work.
4. Patch as specified for patching new work.

3.05 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

1. Footings.
2. Foundation walls.
3. Mechanical Housekeeping Pad
4. Slabs-on-grade.

B. Related Sections include the following:

~~1. Division 2 Section "Earthwork" for drainage fill under slabs-on-grade.~~
~~2. Division 2 Section "Cement Concrete Pavement" for concrete pavement and walks.~~

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustment.

1. Indicate amounts of mixing water to be withheld for later addition at Project site.

B. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

C. Qualification Data: For Installer and manufacturer.

D. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

E. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Steel reinforcement and accessories.
4. Curing compounds.
5. Floor and slab treatments.
6. Bonding agents.
7. Adhesives.
8. Vapor retarders.
9. Semi rigid joint filler.
10. Joint-filler strips.
11. Repair materials.

F. Field quality-control test and inspection reports.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

C. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

D. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specification for Structural Concrete."
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

E. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 FORM-FACING MATERIALS

A. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

C. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
2. Furnish ties that, when removed, will leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60.

B. Plain-Steel Wire: ASTM A 82.

C. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

2.4 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.5 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I/II.

B. Normal-Weight Aggregates: ASTM C 33. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: 3/4 inch (19 mm) nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94M and potable.

2.6 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M.
5. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

C. Plastic Vapor Retarder: ASTM E 1745, Class C or polyethylene sheet, ASTM D 4397, not less than 10 mils. Include manufacturer's recommended adhesive or pressure-sensitive joint tape.

a. Fortifiber Corporation; Moistop Plus.
b. Raven Industries Inc.; Dura Skrim 6.
c. Reef Industries, Inc.; Griffolyn Type-65.
d. Stego Industries, LLC; Stego Wrap, 10 mils.

D. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.

2.7 CURING MATERIALS

A. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

1. Available Products:

a. Burke by Edoco; Cureseal 1315 WB.
b. ChemMasters; Polyseal WB.
c. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Sealcure 1315 WB.
d. Euclid Chemical Company (The); Super Diamond Clear VOX.
e. Kaufman Products, Inc.; Sure Cure 25 Emulsion.
f. Lambert Corporation; UV Safe Seal.
g. L&M Construction Chemicals, Inc.; Lumiseal WB Plus.
h. Meadows, W. R., Inc.; Vocomp-30.
i. Metalcrete Industries; Metcure 30.
j. Symons Corporation, a Dayton Superior Company; Cure & Seal 31 Percent E.
k. Tamms Industries, Inc.; LusterSeal WB 300.
l. Unitex; Hydro Seal 25.
m. US Mix Products Company; US Spec Radiance UV-25.
n. Vexcon Chemicals, Inc.; Vexcon Starseal 1315.

2.8 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.9 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.

4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi (34.5 MPa) at 28 days when tested according to ASTM C 109/C 109M.

2.10 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.

C. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing admixture in all concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

2.11 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Exterior Concrete

1. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.45.
3. Slump Limit: 4 inches (100 mm)**,** plus or minus 1 inch (25 mm).
4. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch (38-mm) nominal maximum aggregate size.

B. Interior Concrete

1. Minimum Compressive Strength: 3,000 psi (20.7 MPa**)** at 28 days.
2. Minimum Cementitious Materials Content: 470 lb/cu. yd. (279 kg/cu. m).
3. Slump Limit: 5 inches (125 mm**),** plus or minus 1 inch (25 mm).
4. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.

2.12 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.13 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, brace, and maintain formwork, according to ACI 301, to support lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:

1. Class A, 1/8 inch (3.2 mm) for smooth-formed finished surfaces.
2. Class B, 1/4 inch (6 mm) for rough-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.

F. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

G. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

H. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

I. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.3 VAPOR RETARDERS

A. Plastic Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

B. Granular Course: Compact granular fill with mechanical equipment to elevation tolerances of plus 0 inch (0 mm) or minus 3/4 inch (19 mm).

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

3.5 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

F. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.6 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

B. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.7 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing.

C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile, or another thin-film-finish coating system.
2. Finish surfaces to the following tolerances, according to ASTM E 1155 (ASTM E 1155M), for a randomly trafficked floor surface:
   a. Specified overall values of flatness, F(F) 30; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 15; for suspended slabs.

3. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-foot- (3.05-m-) long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed 3/16 inch (4.8 mm).

D. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.8 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place

construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

3.9 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

    a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
    c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project..

3. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial

application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.10 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semi rigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.11 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension in solid concrete, but not less than 1 inch (25 mm) in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.

3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.12 FIELD QUALITY CONTROL

A. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

B. Inspections:

1. Steel reinforcement placement.
2. Steel reinforcement welding.
3. Headed bolts and studs.
4. Verification of use of required design mixture.
5. Concrete placement, including conveying and depositing.
6. Curing procedures and maintenance of curing temperature.
7. Verification of concrete strength before removal of shores and forms from beams and slabs.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
6. Compression Test Specimens: ASTM C 31/C 31M.

    a. Cast and laboratory cure four standard cylinder specimens for each composite sample.

7. Compressive-Strength Tests: ASTM C 39/C 39M; test one laboratory-cured specimen at 7 days and three specimens at 28 days.
    a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
10. Test results shall be reported in writing to Architect, Structural Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

END OF SECTION

SECTION 05 5213
PIPE AND TUBE RAILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Free-standing railings at steps with color galvanizing.

B. Pipe & Tube Railings at ADA Ramps

1.02 RELATED REQUIREMENTS

A. Section 03 3300 - Cast-in-Place Concrete: Placement of anchors in concrete.

B. Section 05 5113 - Metal Pan Stairs: Handrails other than those specified in this section.

1.03 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2013.

C. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.

D. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2013.

E. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).

F. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.04 SUBMITTALS

A. See Section 01 3300 - for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

PART 2 PRODUCTS

2.01 RAILINGS - GENERAL REQUIREMENTS

A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of ASTM E985 and applicable local code.

B. Allow for expansion and contraction of members and building movement without damage to connections or members.

C. Dimensions: See drawings for configurations and heights.

D. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.

E. Provide welding fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.02 STEEL RAILING SYSTEM

A. Steel Tube: ASTM A500/A500M, Grade B cold-formed structural tubing.

B. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.

C. Galvanizing: In accordance with requirements of ASTM A123/A123M. Basis of Design – Duncan Glavanizing Color Galv. 616-389-8440.
   1. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I – Inorganic compatible with color galvanizing.
   2. ColorGalv 15 finish in color to be selected by Design Agent from full range. 20-year warranty against rust and 15-year warranty on the finish.

D. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction, matching ColorGalv.

2.03 FABRICATION

A. Accurately form components to suit specific project conditions and for proper connection to building structure.

B. Fit and shop assemble components in largest practical sizes for delivery to site.

C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.

D. Welded Joints:
   1. Exterior Components: Continuously seal joined pieces by intermittent welds and plastic filler. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
   2. Interior Components: Continuously seal joined pieces by intermittent welds and plastic filler.
   3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Finish: Galvanize after assembly.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply items required to be cast into concrete or embedded in masonry with setting templates, for installation as work of other sections.

C. Apply one coat of bituminous paint to concealed aluminum surfaces that will be in contact with cementitious or dissimilar materials.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.

C. Install railings in compliance with ADA Standards for accessible design at applicable locations.

D. Anchor railings securely to structure.

E. Field weld anchors as indicated on drawings. Grind welds smooth. Touch-up to maintain finish color and warranty.

F. Conceal anchor bolts and screws whenever possible and in compliance with approved shop drawings. Where not concealed, use flush countersunk fastenings.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6 mm) per floor level, non-cumulative.
B. Maximum Offset From True Alignment: 1/4 inch (6 mm).
C. Maximum Out-of-Position: 1/4 inch (6 mm).

END OF SECTION

SECTION 08 1113
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Steel doors and frames
B. Thermally insulated steel doors
C. Steel glazing frames
D. Accessories

1.02 RELATED REQUIREMENTS

A. Section 08710 - Door Hardware.
B. ~~Section 08800 - Glazing: Glass for doors and borrowed lites.~~
C. Section 09900 - Paints and Coatings: Field painting.

1.03 REFERENCE STANDARDS

A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.
B. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames; 2003.
C. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 1998 (R2011).
D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2011.
E. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2006.
F. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 2007.
G. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2013.
H. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.
I. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.
B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.
C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store in accordance with NAAMM HMMA 840.
B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Steel Doors and Frames:
   1. Assa Abloy Ceco, Curries, or Fleming: www.assaabloydss.com.
   2. Republic Doors; www.republicdoor.com.
   3. Steelcraft, an Ingersoll Rand brand; www.steelcraft.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DOORS AND FRAMES

A. Requirements for All Doors and Frames:
   1. Accessibility: Comply with ANSI/ICC A117.1.
   2. Door Top Closures: Flush with top of faces and edges.
   3. Door Edge Profile: Beveled on both edges.
   4. Door Texture: Smooth faces.
   5. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
   6. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
   7. Galvanizing for Units in Wet Areas: All components hot-dipped zinc-iron alloy-coated (galvannealed), manufacturer's standard coating thickness.
   8. Finish: Factory primed, for field finishing.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 STEEL DOORS

A. Exterior Doors:
   1. Grade: ANSI A250.8 Level 3, physical performance Level A, Model 2, seamless.
   2. Core: Polystyrene foam.
   3. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.
   4. Weatherstripping: Separate, see Section 08 7100.

B. Interior Doors:
   1. Grade: ANSI A250.8 Level 1, physical performance Level C, Model 1, full flush.
   2. Core: Mineral fiberboard.
   3. Thickness: 1-3/4 inches (44 mm).

2.04 STEEL FRAMES

A. General:
   1. Comply with the requirements of grade specified for corresponding door.
      a. ANSI A250.8 Level 1 Doors: 16 gage frames.
   2. Finish: Same as for door.
   3. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches (100 mm) high to fill opening without cutting masonry units.
   4. Frames Wider than 48 Inches (1200 mm): Reinforce with steel channel fitted tightly into frame head, flush with top.

B. Exterior Door Frames: Face welded, seamless with joints filled.
   1. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.
   2. Weatherstripping: Separate, see Section 08 7100.

C. Interior Door Frames: Knock-down type.

E. Frames for Interior Glazing or Borrowed Lights: Construction and face dimensions to match door frames, and as indicated on drawings.

2.05 ACCESSORY MATERIALS

A. Glazing: As specified in Section 08 8000, factory installed.

B. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.

C. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.

2.06 FINISH MATERIALS

A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard.

B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

3.02 PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.

B. In addition, install fire rated units in accordance with NFPA 80.

C. Coordinate frame anchor placement with wall construction.

D. Coordinate installation of hardware.

E. Coordinate installation of glazing.

3.04 TOLERANCES

A. Maximum Diagonal Distortion: 1/16 in (1.5 mm) measured with straight edge, corner to corner.

3.05 ADJUSTING

A. Adjust for smooth and balanced door movement.

END OF SECTION

SECTION 08 7100
FINISH HARDWARE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes

1. Furnishing and installation of all mechanical finish hardware necessary for all doors, and hardware as specified herein and as enumerated in hardware sets and as indicated and required by actual conditions at the building. The hardware shall include the furnishing of all necessary screws, bolts, expansion shields, drop plates, and all other devices necessary for the proper application of the hardware. Installation shall include field modification and preparation of existing doors and/or frames for new hardware being installed. Provide necessary fillers, Dutchmen, reinforcements, and fasteners for mounting new hardware and to cover existing door/frame preps.

B. Related Sections

1. Division 6 Section - Finish Carpentry

2. Division 8 Section - Wood Doors

C. Specific Omissions: Hardware for the following is specified or indicated elsewhere, unless specifically listed in the hardware sets:

1. Windows

2. Cabinets of all kinds, including open wall shelving and locks.

3. Signage, except as noted.

4. Complete toilet accessories including coat hooks, unless note otherwise.

5. Overhead doors, unless noted otherwise.

1.03 REFERENCES

A. Applicable state and local building codes and standards.

B. FIRE/LIFE SAFETY

1. NFPA - National Fire Protection Association

a. NFPA 70 – National Electric Code
b. NFPA 80 - Standard for Fire Doors and Fire Windows
c. NFPA 101 - Life Safety Code
d. NFPA 105 - Smoke and Draft Control Door Assemblies

C. UL - Underwriters Laboratories

1. UL 10B - Fire Test of Door Assemblies

2. UL 10C - Positive Pressure Test of Fire Door Assemblies

3. UL 1784 - Air Leakage Tests of Door Assemblies

4. UL 305 - Panic Hardware

D. Accessibility

1. ADA - Americans with Disabilities Act

2. Rhode Island Accessibility Code – SBC-14, 15, 16

E. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule

2. Recommended Locations for Builders Hardware

F. ANSI - American National Standards Institute

1. ANSI/BHMA A156.1 - A156.29, and ANSI A156.31 - Standards for Hardware and Specialties

1.04 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 requirements. Prior to submittal field verify existing doors and/or frames receiving new hardware and/or existing conditions receiving new openings. Verify new hardware is compatible with the existing door/frame preparation and/or existing conditions. Advise architect within the submittal package of incompatibility or issues.

B. Catalog Cuts: Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.

C. Final Hardware Schedule Content: Submit schedule with hardware sets in vertical format as illustrated by the Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, Include the following information:

1. Door Index; include door number, heading number, and Architects hardware set number.

2. Opening Lock Function Spreadsheet; list locking device and function for each opening.

3. Type, style, function, size, and finish of each hardware item.

4. Name and manufacturer of each item.

5. Fastenings and other pertinent information.

6. Location of each hardware set cross-referenced to indications on Drawings.

7. Explanation of all abbreviations, symbols, and codes contained in schedule.

8. Mounting locations for hardware.

9. Door and frame sizes and materials.

10. Name and phone number for the local manufacturer's representative for each product.

11. Operational Description of openings with any electrified hardware (locks, exits, electromagnetic locks, electric strikes, automatic operators, door position switches, magnetic holders or closer/holder units, and/or access control components). Operational description should include how the door will operate on egress, ingress, and/or fire/smoke alarm connection.

D. Key Schedule: After a keying meeting between representatives of the Owner, Architect, hardware supplier, and, if requested, the representative for the lock manufacturer, provide a keying schedule, listing the levels of keying, as well as an explanation of the key system's function, the key symbols used, and the door numbers controlled. Utilize ANSI A156.28 “Recommended Practices for Keying Systems” as a guideline for nomenclature, definitions, and approach for selecting the optimal keying system.

E. Samples: If requested by the Architect, submit production sample or sample installations as requested of each type of exposed hardware unit in the finish indicated, and tagged with a full description for coordination with the schedule.

1. Samples will be returned to the supplier in like-new condition. Units that are acceptable to the Architect may, after final check of operations, be incorporated into the Work, within limitations of key coordination requirements.

F. Templates: After final approval of the hardware schedule, provide templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware.

G. Riser and Wiring Diagrams: After final approval of the hardware schedule, submit riser and wiring diagrams as required for the proper installation of complete electrical, electromechanical, and electromagnetic products.

H. Operations and Maintenance Data: Provide in accordance with Division 01 and include the following:

1. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.

2. Catalog pages for each product.

3. Name, address, and phone number of local representative for each manufacturer.

4. Parts list for each product.

5. Copy of final approved hardware schedule, edited to reflect “As installed.”

6. Copy of final keying schedule.

~~7. As installed "Wiring Diagrams" for each opening connected to power, both low voltage and 110 volts.~~

8. One (1) complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

9. Copy of warranties including appropriate reference numbers for manufacturers to identify the project.

I. Certificates of Compliance: Upon request of Architect or Authority Having Jurisdiction certificates of compliance for fire-rated hardware and installation instructions shall be made available.

1.05 QUALITY ASSURANCE

A. Substitutions: Products are to be those specified to ensure a uniform basis of acceptable materials. Requests for substitutions must be made in accordance with Division 1 requirements. If proposing a substitute product, submit product data for the proposed item with product data for the specified item and indicate basis for substitution and savings to be made. Provide sample if requested. Certain products have been selected for their unique characteristics and particular project suitability.

1. Items specified as "no substitute" shall be provided exactly as listed.

2. Items listed with no substitute manufacturers listed have been requested by the Owner or Architect to match existing for continuity and/or future performance and maintenance standards or because there is no known equal product.

3. If no other products are listed in a category, then "no substitute" is implied.

B. Supplier Qualifications: A recognized architectural hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides a certified Architectural Hardware Consultant (AHC) available to the Owner, Architect, and Contractor, at reasonable times during the course of the Work for consultation.

C. Single Source Responsibility: Obtain each type of hardware (latch and locksets, hinges, exit devices, closers, etc.) from a single manufacturer.

D. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by Underwrites Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to the authorities having jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and door frame labels.

E. Electronic Security Hardware: When electrified hardware is included in the hardware specification, the hardware supplier must employ an individual knowledgeable in electrified components and systems, who is capable of producing wiring diagrams and consulting as needed. Coordinate installation of the electronic security hardware with the Architect and electrical engineers and provide installation and technical data to the Architect and other related subcontractors. Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Tag each item or package separately with identification related to the final hardware schedule and include installation instructions with each item or package.

B. Each article of hardware shall be individually packaged in manufacturer's original packaging.

C. Contractor will provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

D. Items damaged in shipment shall be replaced promptly and with proper material and paid for by whomever did the damage or caused the damage to occur.

E. Hardware shall be handled in a manner to avoid damage, marring, or scratching. Irregularities that occur to the hardware after it has been delivered to the Project shall be corrected, replaced, or repaired by the Contractor. Hardware shall be protected against malfunction due to paint, solvent, cleanser, or any chemical agent.

F. No direct shipments will be allowed unless approved by the Contractor.

1.07 WARRANTY

A. Provide manufacturer's warrantees as specified in Division 1 and as follows:

1. Closers: 10 years

2. Locksets: 3 years

3. Other hardware: 1 year.

B. No liability is to be assumed where damage or faulty operation is due to improper installation, improper use, or abuse.

C. Products judged to be defective during the warranty period shall be replaced or repaired in accordance with the manufacturer's warranty, at no additional cost to the Owner.

1.08 MAINTENANCE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The Awarding Authority has determined that certain products should be selected for their unique characteristics and particular project suitability to ensure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: “No Substitute” (NO OTHER PRODUCTS WILL BE CONSIDERED FOR THOSE LISTED IN PROJECTS DOCUMENTS.)

B. Approval of manufacturers other than those listed shall be in accordance with paragraph 1.05.A.

C. Note that even though an acceptable substitute manufacturer may be listed, the product must provide all the functions and features of the specified product, or it will not be approved.

Item	Scheduled Manufacturer	Acceptable Substitute
Hinges	Assa Abloy	NO SUBSTITUTE
Locksets	Assa Abloy	NO SUBSTITUTE
Stops & Holders	Assa Abloy	NO SUBSTITUTE
Cylinders & Keying	Assa Abloy	NO SUBSTITUTE

D. Hand of Door: Drawings show direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.

E. Where the hardware specified is not adaptable to the finished shape or size of the members requiring hardware, furnish suitable types having the same operation and quality as the type specified, subject to the Architect's approval.

2.02 MATERIALS

A. Fasteners

1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.

2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.

3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent that no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of reinforcing the work adequately to fasten the hardware securely. Review door specification and advise Architect if thru-bolts are required.

4. Hardware shall be installed with the fasteners provided by the hardware manufacturer.

B. Hinges

1. Provide five-knuckle, ball bearing hinges of type, material, and height as outlined in the following guide for this specification:

a. 1-3/4-inch-thick doors, up to and including 36 inches wide:
Exterior: standard weight, bronze/stainless steel, 4-1/2 inches high
Interior: standard weight, steel, 4-1/2 inches high
b. 1-3/4-inch-thick doors over 36 inches wide:
Exterior: heavy weight, bronze/stainless steel, 5 inches high
Interior: heavy weight, steel, 5 inches high
c. 2 inches or thicker doors:
Exterior: heavy weight, bronze/stainless steel, 5 inches high
Interior: heavy weight, steel, 5 inches high

2. Provide three hinges per door leaf for doors 90 inches or less in height, and one additional hinge for each 30 inches of additional door height.

3. Where new hinges are specified for existing doors and/or existing frames, the new hinge size must be identical to hinge preparation present in the existing door and/or existing frame.

4. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

   a. Steel Hinges: Steel pins
   b. Non-Ferrous Hinges: Stainless steel pins
   c. Out-Swinging Exterior Doors: Non-removable pins
   d. Out-Swinging Interior Lockable Doors: Non-removable pins
   e. Interior Non-lockable Doors: Non-rising pins

5. The width of hinges shall be 4-1/2 inches at 1-3/4-inch-thick doors, and 5 inches at 2 inches or thicker doors. Adjust hinge width as required for door, frame, and/or wall conditions to allow proper degree of opening.

6. Provide hinges with electrified option where specified. Provide with sufficient number and gage of concealed wires to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to the electrified locking component.

7. Provide mortar guard for each electrified hinge specified, unless specified in hollow metal frame specification.

8. Acceptable manufacturers and/or products: Ives 5BB series, Hager BB series, Stanley FBB Series.

~~C. Cylindrical Locks - Grade 1~~

~~1. Provide cylindrical locks conforming to ANSI A156.2 Series 4000, Grade 1. Cylinders: Refer to 2.04 KEYING.~~

~~2. Provide solid steel rotational stops to control excessive rotation of the lever.~~

~~3. Lockset to be completely refunctionable. Lockset design shall allow function of lock to be changed into over twenty other common functions by swapping easily accessible parts.~~

~~4. Provide locks with a standard 2-3/4 inches backset, unless noted otherwise, with a 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.~~

~~5. Provide locksets with a separate anti-rotation throughbolts and shall have no exposed screws. Levers shall operate independently and shall have two external return spring cassettes mounted under roses to prevent lever sag.~~

~~6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.~~

~~7. Lever trim shall be solid cast levers without plastic inserts, and wrought roses on both sides. Locksets shall be thru-bolted to assure proper alignment.~~

~~a. Lever design shall be Schlage Rhodes.~~
~~b. Lever trim on the secure side of doors serving rooms considered by the authority having jurisdiction to be hazardous shall have a tactile warning.~~

~~8. Acceptable manufacturers and/or products: Schlage ND series, No Substitute.~~

D. Door Stops and Holders

1. Provide door stops for all doors in accordance with the following requirements:

    a. Provide wall stops wherever possible. Provide convex type where mortise type locks are used and concave type where cylindrical type locks are used.
    b. Where wall stops cannot be used, provide dome type floor stops of the proper height.
    c. At any opening where a wall or floor stop cannot be used, a medium duty surface mounted overhead stop shall be used.

2. Acceptable manufacturers and/or products: Assa Abloy's Product Lines.

~~E. Silencers~~

~~1. Provide "Push-in" type silencers for each hollow metal or wood frame. Provide three for each single frame and two for each pair frame. Omit where gasketing is specified or required by code.~~

~~2. Acceptable manufacturers and/or products: Ives, Burns, Rockwood.~~

2.03 FINISHES

A. Finish of all hardware shall be US26D (BHMA 626/652) with the exceptions as follows:

~~2.04 KEYING~~

~~A. Provide cores and cylinders for the Owner's Existing Schlage Everest D Restricted Conventional Core, key system conforming to the following requirements:~~

~~1. Provide restricted patented conventional cylinders at al keyed devices, locksets, and exit device cylinder dogging. Restricted shall control the access to the products by requiring a signed letter of authorization and/or authorization form from the Owner or authorized agent of the Owner. Patent shall protect against the unauthorized manufacturing and duplication of the products. Restricted patented cylinders shall not be operable by non-patented key blanks. Restricted patented cylinders shall incorporate a mechanism to check for the patented features on the keys. Provide Split Key Construction Keys for use during construction. The hardware supplier, accompanied by the Owner or Owner's security agent, shall remove all Construction Inserts upon completion of the building.~~

~~2. Provide permanent cores and cylinders keyed by the manufacturer or authorized distributor into the existing key system as directed by the Owner. Provide owner with a copy of the bitting list, return receipt requested.~~

~~3. The hardware supplier, accompanied by a qualified factory representative for the manufacturer of the cores and cylinders, shall meet with Owner and Architect to review keying requirements and lock functions prior to ordering finish hardware. Submit a keying schedule to Architect for approval.~~

~~4. Provide keys as follows~~

~~a. Ten grand master keys for each set.~~
~~b. Ten master keys for each set.~~
~~c. Three keys per core and/or cylinder.~~
~~d. Six extractor tools.~~
~~e. Six split key construction keys for each type (Contractor is to provide one set of split key construction keys to Architect).~~

~~5. Visual key control:~~

~~a. Keys shall be stamped with their respective key set number and stamped "DO NOT DUPLICATE".~~
~~b. All keys shall be stamped with their respective key set letters.~~
~~c. Do not stamp any keys with the factory key change number.~~
~~d. Do not stamp any cores with key set on face (front) of Core. Stamp on back or side of cores so not to be visible when core is in cylinder.~~

~~6. Deliver all keys and/or key blanks from the factory or authorized distributor directly to the Owner in sealed containers, return receipt requested. Failure to comply with these requirements may be cause to require replacement of all or any part of the keying system that was compromised at no additional cost to the Owner.~~

~~7. Approved products: Schlage Everest D Restricted, No Substitute.~~

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to installation of any hardware, examine all doors, frames, walls, and related items for conditions that would prevent proper installation of finish hardware. Correct all defects prior to proceeding with installation.

3.02 INSTALLATION

A. Coordination:

1. Prior to installation of hardware, schedule and hold a meeting for the purpose of instructing installers on proper installation and adjustment of finish hardware. Representatives of locks, exit devices, closers, automatic operators, and electrified hardware shall conduct training; provide at least 10 days notice to representatives. After training a letter of compliance, indicating when the training was held and who was in attendance, shall be sent to the Architect.

2. Prior to ordering electrified hardware, schedule and hold a meeting for the purpose of coordinating finish hardware with security, electrical, doors and frames, and other related suppliers. A representative of the supplier of finish hardware, and doors and frames, the electrical subcontractor, and the Owner's security contractor shall meet with the Owner, Architect, and General Contractor prior to ordering finish hardware. After meeting a letter of compliance, indicating when the training was held and who was in attendance, shall be sent to the Architect.

B. Hardware will be installed by qualified tradesmen, skilled in the application of commercial grade hardware. For technical assistance, if necessary, installers may contact the manufacturer's rep for the item in question, as listed in the hardware schedule.

C. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.

D. Install each hardware item in compliance with the manufacturer's instructions and recommendations, using only the fasteners provided by the manufacturer.

E. Do not install surface mounted items until finishes have been completed on the substrate. Protect all installed hardware during painting.

F. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

G. Operating parts shall move freely and smoothly without binding, sticking, or excessive clearance.

H. Existing Doors and/or Frames: Remove existing hardware being replaced, tag, and store according to contract documents. Field modify and prepare existing door and/or frame for new hardware being installed. Provide necessary fillers, Dutchmen, reinforcements, and fasteners for mounting new hardware and to cover existing door/frame preps.

I. Wire (including low voltage), conduit, junction boxes, and pulling of wire is by Division 16, Electrical. Electrical Contractor shall connect wire to door position switches and run wire to central room or area as directed by the Architect. Wires shall be tested and labeled with the Architects opening number. Connections to/from power supplies to electrified hardware and any connection to fire/smoke alarm system, and/or smoke evacuation system where specified is by Division 16 Electrical.

3.03 ADJUSTING, CLEANING, AND DEMONSTRATING

A. Adjust and check each operating item of hardware and each door, to insure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly.

B. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make a final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

C. Clean adjacent surfaces soiled by hardware installation.

D. Instruct Owner’s personnel in the proper adjustment, lubrication, and maintenance of door hardware and hardware finishes.

3.04 FIELD QUALITY CONTROL

A. Prior to Substantial Completion, the installer, accompanied by representatives of the manufacturers of locks, exit devices, closer, and any electrified hardware, shall perform the following work:

1. Examine and re-adjust each item of door hardware as necessary to restore function of doors and hardware to comply with specified requirements.

2. Consult with and instruct Owner’s personnel in recommended additions to the maintenance procedures.

3. Replace hardware items that have deteriorated or failed due to faulty design, materials, or installation of hardware units.

4. Prepare a written report of current and predictable problems of substantial nature in the performance of the hardware.

5. At completion of project, a qualified factory representative for the manufacturers of locksets, closer, exit devices, and access control products shall arrange and hold a training session to instruct the Owner’s personnel on the proper maintenance, adjustment, and/or operation of their respective products. After training a letter of compliance, indicating when the training was held and who was in attendance, shall be sent to the Architect.

3.05 PROTECTION

A. Provide for the proper protection of complete items of hardware until the Owner accepts the project as complete. Damaged or disfigured hardware shall be replaced or repaired by the responsible party.

3.06 HARDWARE SCHEDULE

A. Provide hardware for each door to comply with requirements of Section “Finish Hardware,” hardware set numbers indicated in door schedule, and in the following schedule of hardware sets.

B. It is intended that the following schedule includes complete items of finish hardware necessary to complete the work. If a discrepancy is found in the schedule, such as a missing item, improper hardware for a frame, door or fire codes, the preamble will be the deciding document.

C. Locksets, exit devices, and other hardware items are referenced in the Hardware Sets for series, type, and function. Refer to the preamble for special features, options, cylinders/keying, and other requirements.

D. Hardware Sets: To be provided by the contractor for the Architect’s review.

END OF SECTION

SECTION 09 2116
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal stud wall framing.

B. Gypsum wallboard.

C. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.

B. Section 07 9200 - Joint Sealants: Sealing gaps in construction other than gypsum board or plaster work.

1.03 REFERENCE STANDARDS

A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.

B. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2014.

C. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2015.

D. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.

E. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2015.

F. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2014.

G. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2014a.

H. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014a.

I. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels; 2015.

J. GA-216 - Application and Finishing of Gypsum Board; 2013.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.

2.02 METAL FRAMING MATERIALS

A. Manufacturers - Metal Framing, Connectors, and Accessories:
   1. Clarkwestern Dietrich Building Systems LLC; www.clarkdietrich.com.
   2. Marino; www.marinoware.com.
   3. Substitutions: See Section 01 6000 - Product Requirements.

B. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf (L/120 at 240 Pa).
   1. Studs: "C" shaped with flat or formed webs with knurled faces.

2. Runners: U shaped, sized to match studs.

2.03 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
   1. American Gypsum Company; www.americangypsum.com.
   2. Georgia-Pacific Gypsum; www.gpgypsum.com.
   3. National Gypsum Company; www.nationalgypsum.com.
   4. USG Corporation; www.usg.com.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
   2. Thickness:
      a. Vertical Surfaces: 5/8 inch (16 mm).
   3. Paper-Faced Products:
      a. American Gypsum Company; LightRoc Gypsum Wallboard.
      b. Georgia-Pacific Gypsum; ToughRock.

C. Impact Resistant Wallboard:
   1. Application: High-traffic areas indicated.
   2. Indentation: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
   3. Soft Body Impact: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
   4. Paper-Faced Type: Gypsum wallboard as defined in ASTM C1396/C1396M.
   5. Thickness: 5/8 inch (16 mm).
   6. Edges: Tapered.

2.04 ACCESSORIES

A. Beads, Joint Accessories, and Other Trim: ASTM C1047, galvanized steel, or rolled zinc, unless noted otherwise.
   1. Corner Beads: Low profile for tape embedment, for 90 degree outside corners and archways.
   2. J-Beads: for tape embedment, at all joints to dissimilar materials

B. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
   1. Tape: 2 inch (50 mm) wide, creased paper tape for joints and corners, except as otherwise indicated.
   2. Ready-mixed vinyl-based joint compound.

C. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch (0.84 mm) in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.

D. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch (0.84 to 2.84 mm) in Thickness: ASTM C954; steel drill screws, corrosion resistant.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Studs: Space studs at 16 inches on center (at 406 mm on center).
   1. Extend partition framing to structure where indicated and to ceiling in other locations.
   2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.

C. Blocking: Install wood blocking for support of:

1. Wall mounted door hardware.
2. Visual Display Monitors
3. White boards

3.03 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Installation on Metal Framing: Use screws for attachment of gypsum board.

3.04 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim (J Bead): Install at locations where gypsum board abuts dissimilar materials.

3.05 JOINT TREATMENT

A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.

B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).

END OF SECTION

SECTION 09 2216
NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal partition, ceiling, and soffit framing.

B. Framing accessories.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Wood blocking within stud framing.

B. Section 07 9200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.

C. Section 08 3100 - Access Doors and Panels.

D. Section 09 2116 - Gypsum Board Assemblies: Metal studs for gypsum board partition framing.

1.03 REFERENCE STANDARDS

A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2012.

B. AISI SG02-1 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2001 with 2004 supplement. (replaced SG-971)

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2013.

D. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2013.

E. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.

F. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2011.

G. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2007 (Reapproved 2013).

H. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.

I. ASTM E413 - Classification for Rating Sound Insulation; 2010.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:
   1. Indicate prefabricated work, component details, stud layout, framed openings, anchorage to structure, acoustic details, type and location of fasteners, accessories, and items of other related work.
   2. Describe method for securing studs to tracks, splicing, and for blocking and reinforcement of framing connections.

C. Product Data: Provide data describing framing member materials and finish, product criteria, load charts, and limitations.

D. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience and approved by manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Framing, Connectors, and Accessories:
   1. CEMCO: www.cemcosteel.com.
   2. Clarkwestern Dietrich Building Systems LLC: www.clarkdeitrich.com.
   3. Marino: www.marinoware.com.
   4. Simpson Strong Tie: www.strongtie.com.
   5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FRAMING MATERIALS

A. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf (240 Pa).
   1. Studs: C shaped with flat or formed webs with knurled faces.
   2. Runners: U shaped, sized to match studs.
   3. Ceiling Channels: C shaped.
   4. Furring: Hat-shaped sections, minimum depth of 7/8 inch (22 mm).

B. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.

C. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
   1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.
   2. Material: ASTM A653/A653M steel sheet, SS Grade 50, with G60/Z180 hot dipped galvanized coating.

D. Tracks and Runners: Same material and thickness as studs, bent leg retainer notched to receive studs with provision for crimp locking to stud.

E. Furring and Bracing Members: Of same material as studs; thickness to suit purpose; complying with applicable requirements of ASTM C754.

F. Fasteners: ASTM C1002 self-piercing tapping screws.

G. Anchorage Devices: Powder actuated.

H. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: fill wall cavity.

I. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board. Refer to section 07 9005 Joint Sealers.

2.03 FABRICATION

A. Fabricate assemblies of framed sections to sizes and profiles required.

B. Fit, reinforce, and brace framing members to suit design requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that rough-in utilities are in proper location.

3.02 INSTALLATION OF STUD FRAMING

A. Comply with requirements of ASTM C754.

B. Extend partition framing to structure where indicated and to ceiling in other locations.

C. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.

D. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.

E. Align and secure top and bottom runners at 24 inches (600 mm) on center.

F. At partitions indicated with an acoustic rating:
   1. Provide components and install as required to produce STC rating of 45-49, based on published tests by manufacturer conducted in accordance with ASTM E90 with STC rating calculated in accordance with ASTM E413.
   2. Place one bead of acoustic sealant between runners and substrate, studs and adjacent construction.
   3. Place one bead of acoustic sealant between studs and adjacent vertical surfaces.

G. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.

H. Install studs vertically at 16 inches (400 mm) on center.

I. Align stud web openings horizontally.

J. Secure studs to tracks using crimping method. Do not weld.

K. Fabricate corners using a minimum of three studs.

L. Double stud at wall openings, door and window jambs, not more than 2 inches (50 mm) from each side of openings.

M. Brace stud framing system rigid.

N. Coordinate erection of studs with requirements of door frames; install supports and attachments.

O. Coordinate installation of bucks, anchors, and blocking with electrical, mechanical, and other work to be placed within or behind stud framing.

P. Blocking: Use wood blocking secured to studs. Provide blocking for support of plumbing fixtures.

3.03 CEILING AND SOFFIT FRAMING

A. Install furring after work above ceiling or soffit is complete. Coordinate the location of hangers with other work.

B. Install furring independent of walls, columns, and above-ceiling work.

C. Securely anchor hangers to structural members or embed in structural slab. Space hangers as required to limit deflection to criteria indicated. Use rigid hangers at exterior soffits.

D. Space main carrying channels at maximum 72 inch (1 800 mm) on center, and not more than 6 inches (150 mm) from wall surfaces. Lap splice securely.

E. Securely fix carrying channels to hangers to prevent turning or twisting and to transmit full load to hangers.

F. Place furring channels perpendicular to carrying channels, not more than 2 inches (50 mm) from perimeter walls, and rigidly secure. Lap splices securely.

G. Reinforce openings in suspension system that interrupt main carrying channels or furring channels with lateral channel bracing. Extend bracing minimum 24 inches (600 mm) past each opening.

H. Laterally brace suspension system.

3.04 TOLERANCES

A. Maximum Variation From True Position: 1/8 inch in 10 feet (3 mm in 3 m).

B. Maximum Variation From Plumb: 1/8 inch in 10 feet (3 mm in 3 m).

END OF SECTION

SECTION 09 5100
SUSPENDED ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system.

B. Acoustical units.

1.02 RELATED REQUIREMENTS

A. Section 23 3700 - Air Outlets and Inlets: Air diffusion devices in ceiling.

B. Section 26 5100 - Interior Lighting: Light fixtures in ceiling system.

1.03 REFERENCE STANDARDS

A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2013a.

B. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on suspension system components.

C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acoustic Tiles/Panels:
   1. Basis-of-Design: Armstrong World Industries, Inc; www.armstrong.com.
   2. CertainTeed Corporation; www.certainteed.com.
   3. USG; www.usg.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

B. Suspension Systems:
   1. Basis-of-Design: Armstrong World Industries, Inc; www.armstrong.com.
   2. CertainTeed Corporation; www.certainteed.com.
   3. USG; www.usg.com.

C. ~~Cloud System:~~
   ~~1. Basis of Design: Armstrong Axiom Trim~~

2.02 ACOUSTICAL UNITS

A. Acoustical Units - General: ASTM E1264, Class A.

B. Acoustical Tile Type III: Painted mineral fiber, ASTM E1264 Type III, with the following characteristics:
   1. Size: 24 by 24 inches
   2. Thickness: 3/4 inches
   3. Edge: Square.
   4. Surface Color: White.
   5. Products:
      a. Armstrong ULTIMA Health Zone

2.03 SUSPENSION SYSTEM(S)

A. Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

B. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled; intermediate-duty.
   1. Profile: Tee; 15/16 inch (24 mm) wide face.
   2. Construction: Double web.
   3. Finish: White painted.

2.04 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

B. Armstrong Axiom Trim or equal, 8” profile as detailed or square edge if not shown. White.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM

A. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

B. Locate system on room axis according to reflected plan.

C. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

D. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

E. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

F. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

G. Support fixture loads using supplementary hangers located within 6 inches (150 mm) of each corner, or support components independently.

H. Do not eccentrically load system or induce rotation of runners.

3.03 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Install units after above-ceiling work is complete.

D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

E. Cutting Acoustical Units:
   1. Make field cut edges of same profile as factory edges.

END OF SECTION

SECTION 09 9100
PAINTING & COATING

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Complete painting and finishing of new surfaces included in the Work.
   1. Surfaces that are left unfinished by other sections of Specifications shall be painted or finished as a part of this section.
   2. Copper, bronze, chromium plate, nickel, stainless steel, aluminum, Monel metal, lead, and lead coated copper shall not be painted or finished.
   3. Other surfaces not to be painted include items with factory applied final finish; concealed ducts and pipes; and plenums above suspended ceilings, except as noted otherwise.

B. Painting or finishing existing surfaces where scheduled or required as a result of alterations work.

1.2 RELATED SECTIONS:

A. Caulking and sealing - 07 9000
B. Taping and bedding of gypsum board - 09 2116.

1.3 SUBMITTALS:

A. Product Data: Submit paint schedule in accordance with Section 01 3300. List each surface and its proposed paint products and systems, including manufacturer's name, product name and line number for each material.

1.4 QUALITY ASSURANCE:

A. Product Labels: Include manufacturer's name, type of paint, stock number, color and label analysis **on label of containers.**

1.5 DELIVERY, STORAGE AND HANDLING:

A. Deliver materials in original containers with seals unbroken and labels intact.
B. Store materials and equipment in a single lockable area of project site. Provide adequate means to protect floors and adjacent surfaces of this area from damage.
C. Store rags, paint, and solvents in closed metal containers located in designated area.
D. Comply with applicable health and fire regulations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Except as otherwise specified, materials shall be products of following manufacturers:
   1. Basis-of-Design: Sherwin-Williams Co (SW)
   2. Pittsburgh Paints. (PPG)
   3. Pratt and Lambert, Inc. (PL)
   4. ICI Paint Stores. (ICI)

B. Materials selected for coating systems for each type surface shall be product of a single manufacturer, unless otherwise specified

2.2 MATERIALS:

A. Select products from Material List below. Select primary products of a single manufacturer for each coating or paint system, unless otherwise specified.
B. Secondary products such as linseed oil, turpentine and shellacs shall be first line quality products of a reputable manufacturer.
C. Colors: As indicated.
D. Paint Material List:
   1. Ornamental Metal Primer:
      SW, Pro Industrial Pro-Cryl Primer, B66-310 Series
      - Or approved equal.
   2. Interior Galvanized Metal Primer:

SW, Pro Industrial Pro-Cryl Primer, B66-310 Series
- Or approved equal.

3. Interior Wood Primer:
   SW, ProBlock Primer, Interior Oil Based, B79W8810
   - Or approved equal.
   - To be applied off site.
4. Interior Drywall Primer:
   SW, ProMar 200 Zero VOC Latex Primer, B28W2600
   - Or approved equal.
4. Alkyd Satin Enamel:
   SW, Pro-Green 200 Alkyd Semi-Gloss Enamel, Low or Zero VOC.
   - Or approved equal.
5. Latex Eggshell Enamel:
   SW, Pro-Industrial Zero VOC Acrylic Eg-Shel, Series B66-600, Zero VOC.
   - Or approved equal.
6. Latex Flat Wall Paint:
   SW, Pro-Mar 200 Latex Flat Wall Paint, Series B30-200, Zero VOC.
   - Or approved equal.
7. Latex Semi-gloss Paint:
   SW, Pro-Industrial Zero VOC Acrylic Semi-Gloss, Series B66-650, Zero VOC.
   - Or approved equal.
8. Latex Flat Wall Paint: - Fire retardant
   SW, Pro-Mar 200 Latex Flat Wall Paint, Series B30W200. Low or Zero VOC.
   - Or approved equal.
9. Conversion Varnish:
   SW, Kem Var, Dull Sheen.
   - Or approved equal.
   - To be applied offsite.
10. Texture Paint: USG Sheetrock Wall and Ceiling Spray Texture Finish.
11. Wood Stain:
    SW, Wood Classics, Interior Oil Stain, Series A49-200
    - Or approved equal.
    - To be applied off site.
12. Wood Varnish:
    SW, Wood Classics, Waterborne, Polyurethane Varnish, Series A68 Series
    - Or approved equal.
    - To be applied off site.

2.3 MIXING AND TINTING:

A. Accomplish job site tinting and mixing only when approved by Architect. Use tinting colors recommended by paint manufacturer for specific type of finish.
B. Thin paints only when specifically allowed by manufacturer; do not exceed thinning directions.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine surfaces scheduled to receive paint and finishes for conditions that will adversely affect execution, permanence, or quality of finish work, and which cannot be put into an acceptable condition through normal preparatory work.
B. Do not proceed with surface preparation or coating applications until conditions are suitable. Application of paint or finish to surfaces shall constitute acceptance of that surface.

3.2 GENERAL APPLICATION REQUIREMENTS:

A. The intent of these Specifications is to produce highest quality appearance of paint and finish surfaces. Employ skilled mechanics only.

B. Finish tops, bottoms, and edges of doors same as balance of doors after they are fitted.
C. Clean surfaces free of foreign matter before applying paint or finishes.
D. Maintain ambient temperature in building of not less than 60°F. for 24 hours prior to and minimum of 24 hours after interior painting.
E. Provide a minimum of 20-foot candles illumination for surfaces to be painted or finished.

3.3 PREPARATION OF SURFACES:

A. Remove dirt, dust, oil, grease, and other contaminants from surfaces to be painted.
B. Sand woodwork smooth and clean surface before finishing.
C. Paste wood filler, applied on open grain wood, when set shall be wiped across grain of wood, then with grain to secure a clean surface.
D. Coat surfaces to be stained with a uniform coat of stain and wipe excess off.
E. Sand enamel and varnish finish on wood between coats using a fine sandpaper to produce an even, smooth finish. Thoroughly clean surfaces.
F. Wash metal surfaces with mineral spirits to remove dirt, oil, or grease before applying primer. Remove rust or scale by wire brushing or sanding clean before painting. Clean marred shop coats and touch up with primer.
G. Pretreat galvanized metal surfaces as recommended by paint manufacturer.
H. Fill scratches, cracks, and abrasions in gypsum board with a spackling compound flush with adjoining surface. Remove ridges and other protrusions by scraping flush with surfaces. When dry, sand smooth and seal before application of priming coat.
I. Properly prepare existing surfaces required to be repainted. Remove loose, chipped or cracked existing paint. Thoroughly clean surfaces prior to painting. Fill and sand cracks and depressions. Lightly sand existing metal surfaces.
J. Provide full primer/sealer coat on existing painted surfaces unless specified finish coat material is compatible with existing paint.
K. Completely remove existing finish on existing wood doors scheduled to be refinished.
L. Fill and sand metal door frames to provide a smooth surface before finishing. Touch-up factory prime coat before applying first coat.
M. Touch-up shop coats on metal surfaces before applying finish.

3.4 APPLICATION:

A. Final coat of paint shall have visual evidence of solid hiding and uniform appearance, and shall be smooth, free of brush marks, streaks, sags, runs, laps, or skipped areas.
B. Apply paint with suitable brushes, rollers, or spray equipment, as recommended by manufacturer.
C. Allow previous coats to thoroughly dry before applying succeeding coats.
D. Edges of paint adjoining other materials or colors shall be sharp and clean with no overlapping.
E. Slightly vary color of successive coats.
F. Adjust transparent finishes to obtain matching appearance between new and existing doors.
G. Sand and dust between each coat to remove visual defects.
H. Apply each coat of paint uniformly to minimum wet film (MWF) thickness specified in schedule below, or as recommended by manufacturer.

3.5 CLEANING AND PATCHING:

A. Upon completion of work, remove paint spots from floor, glass, and other finished surfaces. Remove from premises rubbish and accumulated materials. Leave work in clean, orderly, and acceptable condition.
B. Spot painting will be allowed to correct soiled or damaged paint surfaces only when touch-up spot will blend into surrounding finish and is invisible to normal viewing. Otherwise, re-coat entire section to corners or visible stopping point.

3.6 PROTECTION:

A. Protect completed finish and painting work, and protect adjacent finish surfaces from paint splatter, spills and stains.
B. Use adequate drop cloths and masking procedures during progress of work.

3.7 SCHEDULE OF PAINTING:

A. Interior Hollow Metal Frames:
Touch up shop primer or existing paint.

1st coat - Alkyd Satin Enamel (MWF 2.9 mils)
2nd coat - Same (Omit on existing frames).

B. Interior Metals:
1st coat - Ornamental Metal Primer (MWF 3.6 mils)
2nd coat - Alkyd Satin Enamel (MWF 2.9 mils)

C. Interior Galvanized Metals:
1st coat - Interior Galvanized Steel Primer (MWF 3.6 mils)
2nd coat - Alkyd Satin Enamel (MWF 3.6 mils)

D. Interior Wood - Transparent Finish (Existing Doors):
Completely remove existing finish down to bare wood. Apply new finish as follows:
Light stained conversion varnish finish, dull rubbed sheen, closed grain effect (AWI System TR-2/TR-4, Premium Grade).
1st coat - Paste Filler
2nd coat - Wood Stain to match existing
3rd coat - Sealer (Sand w/222 grit)
4th coat - Conversion Varnish (MWF 3.2 mils)
5th coat - Same

E. Interior Wood - Transparent Finish (New Doors):
Light stained conversion varnish finish, dull rubbed sheen, closed grain effect (AWI System TR-2/TR-4, Premium Grade).
1st coat - Paste Filler
2nd coat - Wood Stain to match existing
3rd coat - Sealer (Sand w/222 grit)
4th coat - Conversion Varnish (MWF 3.2 mils)
5th coat - Same

F. Gypsum Board Walls:
1st coat - Texture Paint - apply with roller to match existing texture
2nd coat - Latex Eggshell Enamel (MWF 3.6 mils)
3rd coat - Same

G. Gypsum Board Ceilings:
1st coat - Texture Paint - apply with roller to match existing texture
2nd coat - Latex Interior Flat Wall Paint (MWF 4.0 mils)

H. Fire Retardant Plywood Wall Panels:
1st coat - Latex Interior Flat Wall Paint - Fire Retardant (MWF 4.8 mils)
2nd coat - Same

END OF SECTION

SECTION 23 0000
MECHANICAL

PART 1: GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this section.

1.2 SUMMARY OF WORK

A. Provide complete functional Heating, Ventilating and Air Conditioning system as shown on Mechanical Construction Documents.

1.3 REFERENCE STANDARDS

A. NFPA Standards

B. ANSI Standards

C. ASME Standards

D. ASTM Standards

E. AWWA Standards

F. ASHRAE Standards

G. SMACNA Standards

H. OSHA Standards

I. NEBB Standards

J. Local Codes and Ordinances

K. Owner's Insurance Company Requirements

L. Where the contract documents indicate more stringent requirements than the above codes and ordinances, the contract documents shall take precedence.

M. File all documents, pay all fees and secure all permits, inspections and approvals necessary for the work of this section.

1.4 CONTRACT DRAWINGS & SPECIFICATIONS

A. The Contract Drawings are generally diagrammatic and convey the Scope of Work and General Arrangement of apparatus and equipment. The locations of all items shown on the drawings or called for in the specifications that are not definitely fixed by dimensions are approximate only. The exact locations necessary to secure the best conditions and results must be determined at the project and shall have the approval of the Architect and Engineer before being installed. The Subcontractor shall follow drawings in laying out work and shall check drawings of the other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. If directed by the General Contractor, Engineer and/or Architect, the Subcontractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or before proper execution of the work.

B. Specifications: The specifications are intended only to complement the drawings; however, work detailed and/or noted only on the drawings or work described only in the specifications shall all be considered as part of the scope of work.

1.5 CONFLICT BETWEEN PLANS AND SPECIFICATIONS

A. In case of conflict between the contract drawings and specifications, the Engineer shall determine which takes precedence.

1.6 SHOP DRAWINGS AND PRODUCT DATA

A. SUBMITTALS: Submit shop drawings, manufacturers data and certificates for equipment, materials and finish, and pertinent details for each system where specified in each individual section, and have them approved before procurement, fabrication, or delivery of the items to the job site. Partial submittals will not be acceptable and will be returned without review. Submittals shall include the manufacturer's name, trade name, catalog model or number, nameplate data, size, layout dimensions, capacity, project specification and paragraph reference, applicable industry, and technical society publication references, and other information necessary to establish contract compliance of each item the Contractor propose to furnish.

B. Submit in accordance with Division 1.

C. It is the intent of these specifications that all equipment, materials and workmanship used on this project be in complete conformance with all local, state and national codes, ordinances and standards.

D. Substitutions shall be equivalent to specified equipment in all aspects of quality and performance and shall conform to the intent stated above. It is the contractor's responsibility to submit only those items that meet these requirements. Should any non-conforming items be installed, they shall be replaced by the contractor at no additional cost to the owner.

E. The approval of the equipment does not relieve the Subcontractor of responsibility of shop drawing errors related to details, sizes, quantities, wiring diagram arrangements and dimensions which deviate from the Specifications, and/or job conditions as they exist.

F. Refer to General Requirements for the substitutions of equipment and submittal of shop drawings. If apparatus or materials are substituted for those specified, and such substitution necessitates changes in, or additional connections, piping, supports, or construction, it shall be provided. Contractor to assume cost and entire responsibility thereof.

1.7 INSPECTION AND TESTS

A. During the progress of the work it shall be subject to the inspection of the Owner and to such other inspectors, as may have jurisdiction.

B. At completion of the work, Contractor shall submit to the Owner's representative in writing a statement stating: (1) that the work is complete; (2) that the entire installation is in accordance with the specification; (3) that preliminary tests have been made; and (4) that the work is ready for final inspection and test.

C. A final inspection of the installation to determine compliance with the drawing and specifications will be made by the Owner's representative. Work will be checked for quality of materials, quality of workmanship, proper installation and finished appearance. This Contractor shall provide the services of the project foreman for inspection purposes. The foreman shall remove and reinstall access panels, ceiling tiles, etc., as required to facilitate any inspections required by the Owner's representative.

D. The Contractor shall arrange and conduct operating tests on all equipment in the presence of the Owner's representative. The component parts of systems and the various systems shall be demonstrated to operate in accordance with the requirements and intent of this specification. Any non-complying or defective materials or workmanship disclosed as a result of the inspection and the Contractor shall correct tests promptly, and the tests repeated as often as necessary until approved and accepted by the Owner's representative.

1.8 ELECTRICAL EQUIPMENT

A. Electrical components of mechanical equipment and systems, such as motors, factory mounted motor starters, disconnects, and control equipment shall be provided under the related Section of Division 23.

B. Temperature control equipment, including thermostats, zone valves, relays, aquastats, etc. shall be provided under related sections of Division 23. Temperature control wiring not specifically shown on electrical drawings shall be provided under related Section of Division 23.

C. Upon completion of temperature control system wiring, the responsibility of the control system will fall under Division 23.

D. All electrical equipment installed in concealed spaces shall be provided with a hard-wired electrical connection. Plug-type disconnects shall not be allowed in concealed spaces. Equipment provided with plug-in cords shall not have their cords modified.

1.9 OPENINGS IN EXTERIOR WALLS OR ROOF

A. Openings in exterior walls or roof shall be kept properly plugged and caulked at all times, except when being worked on to preclude the possibility of flooding due to storm or other causes. After completion of work, openings shall be permanently sealed and caulked in a manner approved by the Architect.

1.10 GUARANTEE

A. Except as otherwise specified, all work, materials and equipment shall be guaranteed against defects resulting from the use of inferior materials, equipment, or workmanship for one year from the date of final completion of the contract, or from full acceptance by the Owner, whichever is earlier.

B. If, within any guarantee period, repairs or changes to guaranteed work are required as a result of the use of defective materials or equipment, inferior workmanship or work that is not in accordance with the terms of the contract, and upon receipt of notice from the Owner, the following shall be done without expense to the Owner.

C. Place in satisfactory condition in every particular all of such guaranteed work and correct all defects therein.

D. Repair all damage to the building or site/equipment or contents thereof which is the result of the use of defective materials or equipment or inferior workmanship, or of work not in accordance with the terms of the contract.

E. Make good any work or materials, or the equipment and contents of said building or site disturbed in fulfilling any such guarantee.

F. In fulfilling the requirements of the contract or of any guarantee embraced in or required thereby, any work guaranteed under another contract is disturbed, restore such disturbed work to original condition and guarantee such restored work to the same extent as it was guaranteed under such other contract.

G. If upon failure to proceed promptly after notice to comply with the terms of the guarantee, the Owner may have the defects corrected and Contractor and his surety shall be liable for all expenses incurred.

H. This Contractor shall obtain in the General Contractor's and Owner's name, the standard written manufacturer's guarantee of all materials furnished under this Section where such guarantees are offered in the manufacturer's published product data. All these guarantees shall be in addition to, and not in lieu of, other liabilities, which the Contractor may have by law or other provisions of the Contract Documents. The guarantee shall be for a period of one (1) year minimum from the date of acceptance or final payment.

1.11 CLEANING OF SYSTEM

A. Thoroughly clean piping, ducts, fixtures and equipment of all foreign substances inside and out before placing in operation. All air handling equipment shall be provided with “construction filters” for use during construction. Once construction is substantially complete and prior to final testing adjusting and balancing, furnish and install new filters for each piece of equipment.

B. If any foreign matter should stop any part of a system after being placed in operation, clean and reconnect system.

C. Remove all covers of interior floor drains and cleanouts, clean of all dirt, concrete traces, etc., then lightly grease and reinstall.

D. Existing HVAC systems which are being tied into or otherwise modified shall be thoroughly cleaned and refurbished prior to being placed back in service.

1. Duct Systems shall be cleaned of all foreign contaminants, dust and debris.
2. Hydronic Systems shall be fully flushed, cleaned, refilled and treated.
3. During contractor shall bring to the attention of the owner and engineer any perceived deficiencies in existing systems including but not limited to:
    a) Code deficiencies
    b) Inoperable equipment
    c) Leaking ductwork and/or piping
    d) Missing or deteriorating insulation
    e) Excessive noise

1.12 TEMPORARY OPENINGS

A. Coordinate construction and provide temporary openings in the building as required for the admission of equipment furnished under this Division.

1.13 DEFINITIONS

A. "Piping" includes, in addition to pipe, all fittings, valves, hangers, and other accessories relating to such piping.

B. "Concealed" means hidden from sight in trenches, chases, furred spaces, shafts, hung ceilings, embedded in construction or in crawl spaces.

C. "Exposed" means not installed underground or "concealed" as defined above.

D. "Provide" means furnish and install complete and ready to operate.

1.14 EQUIPMENT DEVIATIONS

A. Where proposals to use an item of equipment other than that specified which requires any redesign of the structure, partitions, foundations, piping, wiring or any other part of the mechanical, electrical or architectural layout, all such redesign, and all new drawings and detailing required therefore, shall be prepared by the Architect at the Contractor’s expense.

B. Where such approved deviation requires a different quantity and arrangement of ductwork, piping, wiring, conduit, and equipment from that specified or indicated on the drawings, furnish and install any such ductwork, piping, structural supports, insulation, controllers, motors, starters, electrical wiring and conduit, and any other additional equipment required by the system, at no additional cost to the Owner.

1.15 EQUIPMENT PADS

A. All grade and floor mounted equipment shall be provided with a reinforced concrete pad. Refer to architectural plans for pad locations, thickness, sizes, and construction requirements.

B. If grade and/or floor mounted equipment is shown but no pad indicated on the architectural plans the contractor shall be responsible for clarifying the necessity, size, and location of any pads during the bidding process. No additional compensation will be given for pads which are required by this section but not indicated on the plans if no formal request for clarification was issued during the bidding process.

1.16 EQUIPMENT VISIBILITY

A. Where equipment is located on the roof or outside the building at grade in a place that is visible to the owner or general public, the following shall take place prior to roofing, placement of roof curbs or concrete equipment pads, routing of piping/electrical/controls/etc.:

1. The contractor shall construct a full-size temporary mock-up of the equipment in the proposed location.
2. The contractor shall review mock-up with architect and owner to obtain approval of equipment location. After approval, contractor shall remove and dispose of mockup materials.
3. Any modification to equipment location to satisfy architect/owner requirements shall be noted on a shop drawing and submitted to the architect/engineer for comment and approval prior to final placement of equipment.

1.17 ELECTRICAL ROOM REQUIREMENTS

A. Do not install any piping, ductwork or equipment in or through electrical rooms, transformer rooms, electrical closets, telephone rooms or elevator machine rooms, unless piping or ductwork of equipment is intended to serve these rooms. Additionally, no ductwork or piping will be installed above electric panels. If the Contractor violates this requirement, he shall remove and/or relocate all items as required at his expense and to the satisfaction of the Architect.

1.18 COOPERATION WITH OTHER TRADES

A. Give full cooperation to other trades and furnish in writing to the Architect any information necessary to permit the work of all trades to be installed satisfactorily and with the least possible interference or delay.

B. Coordination drawings shall be initiated by this contractor. It this contractor's responsibility for preparation of project coordination drawings showing the installation of all equipment, piping, ducts and accessories to be provided under Section 230000 of the Specifications. These drawings shall be prepared at not less than 1/4 in. = 1 ft. scale, and shall show building room layouts, structural elements, ductwork and lighting layouts of function. Drawings shall indicate horizontal and vertical dimensions, to avoid interference with structural framing, ceilings, partitions, and other services. A reproducible copy of each drawing prepared shall then be submitted to each Contractor working under Sections 210000, 220000, and 260000, who shall be responsible to coordinate his equipment and systems and shall show these on the drawings submitted. After each Contractor has fulfilled his obligation, he shall return the drawings to the HVAC Contractor. After each drawing has been coordinated between trades, and appropriate revisions made, each trade shall sign each drawing, indicating acceptance of the installation. The HVAC Contractor shall then print the coordination original and these prints submitted through the General Contractor to the architect for review and comment, similar to shop drawings. Comments made on these drawings shall result in a correction and re-submittal of the drawings.

C. Furnish to other trades, as required, all necessary templates, patterns, setting plans, and

shop details for the proper installation of work and for the purpose of coordinating adjacent work.

1.19 PROJECT RECORD DOCUMENTS:

A. Each Contractor shall record clearly, neatly, accurately, and promptly as work progresses the following data:

1. Changes made resulting from change orders or instructions issued by the Architect.
2. Changes in routing made to avoid conflict with other trades or structural conditions.
3. Final location of equipment and panels if different than contract documents.

B. Upon completion of the project submit to the Architect a set of electronic media noting "as built" conditions indicating all variations and deviations of his work from contract documents.

1.20 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS

A. Operating Instructions: Provide operating instructions to the Owner's designated representative with respect to the operation functions and maintenance procedures for all equipment and systems installed. The cost of providing a manufacturer's representative at the site for instructional purposes shall be included in the Contract Price.

B. Maintenance Manuals: At the completion of the project, turn over to the General Contractor four (4) complete manuals in 3-ring binders, indexed, containing the following:

1. Complete shop drawings of all material and equipment of this section.
2. Operation descriptions of all systems.
3. Names, addresses and telephone numbers of all suppliers of system components.
4. Preventative maintenance instructions for all systems.
5. Spare parts list of all system components.
6. Copies of all valve charts.

1.21 PROTECTION

A. Protect all work and material from damage by work and workmen, and accept liability for all damage thus caused.

B. Be responsible for work and equipment until finally inspected, tested, and accepted. Protect work against theft, injury or damage; and carefully store material and equipment received on site, which is not immediately installed. Close open ends of work with temporary covers or plugs during storage and construction to prevent entry of obstructing material.

C. All openings in stored & installed ductwork shall be covered & sealed when not in use to prevent contamination from dust & debris.

1.22 SCAFFOLDING, RIGGING AND HOISTING

A. Provide scaffolding, rigging, hoisting and services necessary for delivery, erection and installation of material, equipment and apparatus furnished under this division. Remove same from premises upon completion of work.

B. Coordinate propose routing with architect prior to rigging and protect all existing building components against damage.

1.23 MATERIALS AND WORKMANSHIP

A. All materials and apparatus required for the work, except as specifically specified otherwise,

shall be new, of first-class quality, and shall be furnished, delivered, erected, connected and finished in every detail, and shall be so selected and arranged as to fit properly into the building spaces. Where no specific kind or quality of material is given, a first-class standard article as approved by the Architect shall be furnished.

B. Furnish the services of an experienced foreman who shall be constantly in charge of the installation of the work, together with all skilled workmen, fitters, metal workers, welder, helpers, and labor required to unload, transfer, erect, connect, adjust, start, operate, and test each system.

C. All equipment and materials shall be installed in strict accordance with the manufacturer's recommended installation instructions as well as UL Listing instructions and all Local, State and National codes.

1.24 QUIET OPERATION AND VIBRATION

A. Work shall operate under all conditions of load without any objectionable sound or vibration. In case of moving machinery, sound, or vibration noticeable outside of room in which it is installed, or annoyingly noticeable inside its own room, will be considered objectionable. Sound or vibration conditions considered objectionable shall be corrected in an approved manner at no expense to the Owner. Vibration control shall be means of approved vibration eliminators in a manner as recommended by the manufacturer of the eliminators.

1.25 ACCESSIBILITY

A. Assure and be responsible for the adequacy of shafts and chases, the adequate clearance in double partitions and hung ceilings for the proper installation of the work. Cooperate with all other trades whose work is in the same space. Such spaces and clearances shall, however, be kept to the minimum size required.

B. Locate all equipment, which must be serviced, operated, adjusted or maintained fully accessible positions. Equipment shall include, but not be limited to, valves, traps, cleanouts, motors, controllers, filters, dampers, starters, coils, fire dampers, smoke dampers and drain points. If required for better accessibility, furnish access doors for this purpose. Minor deviations from drawings may be made to allow for better accessibility, and the engineer shall approve any change.

C. Provide access panels for installation in concrete block walls or gypsum wallboard ceilings and partitions in locations, which require access for service to the items located behind the permanent gypsum wallboard or concrete block finish.

D. Access panels shall be installed where required to gain access to valves, dampers, controls, etc. Panels shall be flush, insulated, contain continuous steel hinge and screwdriver operated latch. Panels shall be rated equal to the assembly that they are being installed in panels shall be UL listed.

E. Access panels located in fire rated partitions shall be fire panels. The frame and panel assembly of these fire panels shall be manufactured under the Factory Inspection Service of the Underwriters' Laboratories, Inc., and shall bear a label reading: "Frame and Fire Panel Assembly, Rating 2 hours. (B) Temperature Rise 30 Minutes, 250° F. Maximum." Rated panels shall be equipped with automatic closing mechanism and be self-latching.

F. Panels shall be provided with screwdriver operated flush cam locks.

G. Panel size shall be 12 inches x 12 inches except furnish a larger size if required to service a particular item. The exact location and size of each access panel shall be reviewed with, and approved by, the Engineer.

H. The exact location and size of each access panel shall be noted on a shop drawing and reviewed with, and approved by, the Architect and Engineer in writing prior to installation.

1.26 CUTTING AND PATCHING

A. Provide all cutting and patching necessary to install the work specified in this division. Patching shall match adjacent surfaces.

B. At floor slabs & wall openings to be cored drilled or cut, contractor shall find and mark on both faces all reinforcing, rebar, conduits, utilities, etc.. by means of x-ray, pach-ometer or prof-ometer. Submit sketch showing locations of all findings and proposed cuts or cores for review.

C. No structural members shall be cut without the approval of the Structural Engineer, and all such cutting shall be accomplished in a manner directed by the Structural Engineer.

1.27 GROUNDING

A. All components of mechanical piping systems shall be properly grounded to building ground. Where ground path is interrupted by non-conductive materials, appropriate bonding or grounding to building ground shall be provided.

1.28 WATERPROOFING

A. Where any work pierces waterproofing including waterproof concrete, the method of installation shall be as approved by the Architect before work is started. Furnish all necessary sleeves required.

1.29 DEMOLITION (WHERE APPLICABLE)

A. Prior to submitting bid, visit site and identify existing conditions and difficulties that will affect work of this section. Demolition work will require careful site examination prior to bidding. No compensation will be granted for additional work caused by unfamiliarity with site conditions that are visible or readily construed by experienced observers.

B. Prior to commencing demolition, contractor shall identify with owner any equipment to be returned to the owner after demolition. All other debris shall be disposed of by this contractor in accordance with all applicable regulations. Any shutdowns required for demolition shall be coordinated with building owner to avoid impact to operations.

C. During demolition, any equipment, ductwork, piping, etc. found to be abandoned shall be demolished. Existing unused connections to existing ducts or piping shall be cut back to the mains and capped accordingly.

D. Under demolition, the following is, in brief, the extent of the work to be performed by the mechanical contractor under this contract.

1. The mechanical contractor shall be responsible for the disconnection and removal of the existing mechanical equipment, ductwork, piping, valves, etc.,in designated areas. Cut & cap piping and ductwork back to mains. Patch all roof and wall penetrations to match existing.
2. This contractor shall protect work against injury or damage; and carefully store material and equipment to be relocated. Open ends of work shall be closed with temporary covers or plugs during storage and construction to prevent entry of obstructing material.
3. All existing HVAC components, including but not limited to ductwork, piping, equipment, controls & accessories, shall be removed from the area of renovation.
4. Coordinate all demolition with other trades to ensure all relevant portions of the system including associated electrical and plumbing components are removed.
5. Refer to drawing plans and notes for additional information.

1.30 DESIGN BUILD PROVISIONS (WHERE APPLICABLE)

A. The Work will be performed based on a Design/Build approach in which the Mechanical Subcontractor provides the engineering needed to satisfy performance criteria and other requirements listed herein. The criteria and requirements are meant to establish the general intent and do not always give specific sizes and types. This proposal must therefore include both system design and engineering services.

B. Shop Drawings shall clearly describe the limits of the Work and identify related work by other trades. Work that the Mechanical Subcontractor requires to be done by other trades should also be noted. Formal coordination drawings will not be produced. Instead each major subcontractor will circulate their drawings to the other trades for review and comments. This will conclude with a coordination meeting in which all conflicts will be identified and resolved.

C. The responsibility to insure that all Work items fit in the space available lies with the Mechanical Subcontractor. The Shop Drawings must in turn include dimensioned details drawn to scale.

D. The Mechanical Subcontractor shall revise the Shop Drawings to include all required changes. Final revised drawings shall be issued prior to starting work.

PART 2: PRODUCTS

2.1 IDENTIFICATION, MARKING AND TAGGING

A. Systems and equipment to be identified and marked and valves tagged include, but are not limited to the Heating, Air Conditioning & Ventilating systems.

B. Submit samples of marking and tagging devices and wording, lettering and numbering scheme for each system.

C. Equipment Identification:

1. Manufacturer's nameplates or trademark shall be permanently affixed to all equipment and materials furnished under this division. Manufacturer's nameplates shall include all pertinent data relative to the piece of equipment including model number, serial number, and operating characteristics as applicable.

2. Separate Equipment Identification Markers shall identify each item of equipment with a permanently attached marker indicating designation and/or number corresponding to design documents.

3. Markers shall be of rigid black Bakelite or phenolic construction with white engraved or incised letters.

4. Lettering on equipment markers shall be of adequate size to be legible from floor levels. In all cases marker lettering shall no be less than 1 inch high.

D. Piping System Identification:

1. Piping Systems shall be identified as indicated herein or as required by applicable codes and/or officials having jurisdiction.

2. Pipe Markers shall be color coded according to " Designations to Colors" - ASME A13.1-2007.

3. All piping and equipment shall be identified by pipe markings, which shall be provided by this Contractor. Markers shall be applied every 20 ft. Markings shall indicate pipe content, system, operating pressure & temperature, and direction of flow. The markers shall be as manufactured by Seton Name Plate Corp. or equal

4. Pipe Markers shall be of the pressure sensitive type as manufactured by the Seton

Nameplate Corp. (F10-Code)

5. Valve Identification: Provide laminated plastic nameplates on all valves installed under Division 23, except stop valves in supplies to fixtures. Tags shall be constructed of 0.125 inches thick melamine plastic conforming to Fed. Spec. L-P-387. Surface shall be matte finish. Accurately align lettering and engrave into white core. Nameplates shall be to 2 inches round or hexagonal. Lettering shall be minimum of 0.375 inch high normal block lettering. Key the nameplates to a chart and schedule for each system. Frame one chart and schedule for each system under glass and place where directed in mechanical room. Furnish four copies of each chart and schedule. Each inscription shall identify its function. Attach nameplates with "S" hooks and chain to each valve. Valve nameplates shall be numbered and "keyed".

2.2 SLEEVES, INSERTS AND ESCUTCHEONS

A. Provide sleeves for all work passing through floor, wall, and ceiling construction. Locate and provide sleeves and inserts before the floor, wall or ceiling is constructed. If this contractor does not comply with the above, he shall bear all costs incurred for cutting and patching required for the installation of sleeves and inserts. Holes required for sleeves in existing walls and floors, or to conform to the above shall be saw cut or core drilled. This Contractor shall provide all drilling required for the installation of hangers.

B. Pipe sleeves through outside walls shall be Schedule 80 black steel pipe with 150 lb. black steel slip-on welded flanges welded at the center of the outside. Extend sleeves 1/2 inch beyond each side of the wall. Pack the space between sleeve and pipe with oakum to within 2 inches of each face of the wall. Pack the remaining space and make watertight with an approved waterproof compound.

C. Pipe sleeves through concrete floors or interior masonry walls shall be Schedule 40 black steel pipe, set flush with finished wall or ceiling surfaces, but extending 2 inches above finished floors. Plastic, PVC, or light metal sleeves shall not be installed.

D. Provide individual or strip type inserts pressed steel construction with accommodation for removable nuts and threaded rods up to 3/4-inch diameter, permitting lateral adjustment. Individual inserts shall have an opening at the top to allow reinforcing rods to 1/2 inch diameter to be passed through the insert body. Strip inserts shall have attached rods with hooded ends to allow fastening to reinforcing rods.

E. Where pipe motion due to expansion and contraction will occur, make sleeves of sufficient diameter to permit free movement of pipe. Where sleeves pass insulated pipes, the sleeves shall be large enough to pass the pipe and the insulation. Check floor and wall construction finishes to determine proper length of sleeves for various locations.

F. Provide 22 gauge galvanized steel duct sleeves through interior walls, floors and ceilings set flush with finished surfaces.

G. Pack the space between sleeves and structure, and sleeves and pipes or ducts passing through fire rated interior walls, floors, and ceilings with an approved fire and smoke proof packing material. Fire-stopping material shall maintain its dimensions and integrity while preventing the passage of flame, smoke, and gases under conditions of installation and user when exposed to the ASTM E119 time-temperature curve for a time period equivalent to the rating of the assembly penetrated. Cotton waste shall not ignite when placed in contact with the non-fire side during the test. Fire-stopping material shall be non-combustible as defined by ASTM E136; and in addition, for insulation materials, melt point shall be a minimum of 1700 degrees F. for 1-hour protection and 1850 degrees F. for 2-hour protection.

H. Fasten sleeves securely in floors, walls, etc. so that they will not become displaced when concrete is poured or when construction is built around them. Take precautions to prevent concrete, plaster, or other materials being forced into the space between pipe and sleeve

during construction.

I. In all areas where ducts are exposed and pass through floors, the hole shall be surrounded by a 4-inch high by 3-inch wide concrete curb, or otherwise protected as determined by the Engineer.

J. Escutcheon plates shall be provided for all exposed un-insulated pipes passing through walls, floors, and ceilings. Plates shall be nickel plated, of the split ring type, of size to match the pipe. Where plates are provided for pipes passing through sleeves, which extend above the floor surface, provide deep recessed plates to conceal pipe sleeves.

2.3 SUPPORTS & ATTACHMENTS

A. Provide all necessary supports and bases required for all equipment, piping and for all other equipment furnished under this contract. Submit shop drawings to the Architect for approval before purchase, fabrication or construction of same.

B. All equipment, unless shown otherwise, shall be securely attached to the building structure in an approved manner. Attachments shall be of a strong and durable nature and any attachments that are not strong enough shall be replaced as directed.

C. Vibration Isolation: All mechanical equipment, piping and ductwork shall be mounted on vibration isolators/inertia bases to prevent the transmission of vibration and mechanically transmitted sound to the building structure.

1. Vibration isolators shall be selected in accordance with the weight distribution so as to produce reasonably uniform deflections.

2. All isolators and isolation materials shall be of the same manufacturer and shall be certified by the manufacturer.

2.4 SEISMIC RESTRAINTS

A. It is the intent of this seismic specification that this contractor shall provide all necessary seismic restraints required to keep all mechanical building system components in place during a seismic event as required by the Building Code.

B. All mechanical systems must be installed in strict accordance with seismic codes, component manufacturer's and building construction standards. Whenever a conflict occurs between the manufacturer's or construction standards, the most stringent shall apply.

C. This contractor shall engage a professional structural engineer registered in the jurisdiction of this project to review the entire installation to determine all seismic restraint requirements and methods. Contractor shall submit a report outlining the structural engineer’s review as well as seismic restraint shop drawings and supporting calculations prepared by the professional structural engineer for review by the Architect.

1. Any questions relative to Component Importance factors shall be issued to the Architect/Engineer for resolution prior to seismic analysis.

D. Seismic restraints shall be designed in accordance with seismic force levels as detailed in the applicable building code.

2.5 ELECTRIC MOTORS/VARIABLE FREQUENCY DRIVES

A. Electric motors and starters shall conform to requirements of the AIEE, NEMA, UL, and NEC and shall be suitable for load duty, voltage, phase, frequency, service and location required. Provide inverter duty rated motors for use with variable frequency drives. Provide shaft grounding rings for all VFD controlled motors.

B. All motors shall be rated at 85% power factor at full rated load. Motors less than 85% power factor shall be corrected to 90% power factor at the factory. All motors shall be rated high

efficiency.

C. Variable Frequency Drives:

1. Furnish and install variable frequency drives as required by sequence of operation. Drives shall be provided with line reactors as required to eliminate harmonics transmitted upstream and downstream of drive and as required by local utility. Furnish VFDs with bypass to allow operation of motor in case of VFD failure. Drives shall be commissioned and tested and a report prepared by a company specializing in the field. Division 26 will energize drives.
2. Ratings
    a) The VFD must operate, without fault or failure, for the following 3-phase supply voltage range:
    b) 200V units: 200 to 240V +/- 10%
3. The VFD shall function for an input supply frequency range between 48 and 65Hz.
4. Phase imbalance: The VFD shall function for up to 2% negative phase sequence (equivalent to 3% tolerance of voltage imbalance between phases)
5. Displacement Power Factor (Cos φ): Greater than 0.97over the entire ranges of operating speed and load.
6. Operating Ambient Temperature range: 0° C to 40° C (32° F to 104° F) continuous. Operation at 50° C (122° F) shall be possible with de-rating
7. Storage Temperature: -40° C to 50° C (-40° F to 122° F)
8. Humidity: 0% to 95% non-condensing at 40° C.
9. Altitude: 0 to 3,300 feet, without any de-rating. Above 3,300 feet operation shall be possible with 1% current de-rating for every additional 328 feet.
10. Minimum Efficiency: 96% at full speed
11. Overload capability: The full load continuous output current rating of the VFD must meet or exceed that of the motor nameplate full load amp rating. The VFDs shall be able to provide 110% of drive rated current for 60 seconds and 225% of drive rated current as instantaneous overload.
12. Total Harmonic Distortion (THD) compliance:
13. Given the information provided by the customer's electric power single line diagram and distribution transformer data, the VFD manufacturer shall carry out a Harmonic estimation for the system. The Harmonic estimation reviews the potential for the proposed equipment, and any existing equipment, to meet IEEE 519, latest version, (tables 10.2 and 10.3) recommendations at the Point of Common Coupling (PCC). The result of the Harmonic estimation shall determine if additional power quality improvement measures should be included in the proposal to meet the THD recommendations of IEEE 519. The PCC shall be at the primary side of the main distribution transformer.
14. VFDs must be rated for a symmetrical short circuit rating of 100 kA RMS
15. Carrier (Switching) Frequency:
    a) The VFD shall be selected for operation at carrier frequencies at or above 3 kHz to satisfy the conditions for current, voltage, and horsepower as indicated on the equipment schedule. Higher carrier frequencies shall be possible for quieter operation.
    b) VFD shall have an adjustable carrier frequency with the ability to adjust while

the VFD is running. It shall include automatic carrier frequency reduction to reduce tripping in the event of high temperature operation.

16. The VFD shall have a built-in AC or DC reactor equivalent to 3% of line impedance or else must include an equivalent external line reactor in order to protect from AC line transients & to reduce harmonics.
17. The VFD shall include an onboard EMC/RFI filter meeting CE and EN61800-3 standard for First Environment restricted level.
18. Serial Communications / Field bus options: All VFDs shall have a built-in RS-485 port.
    a) VFD shall have embedded Modbus RTU, BACnet and Johnson Controls Metasys N2 protocols as standard for building automation systems network communications accessible via a RS-485 communication port.
    b) Optional protocols shall include LonWorks, Ethernet, DeviceNet and Profibus.
    c) Use of third party gateways, multiplexers or non-certified protocols is not acceptable.
    d) Serial communication capabilities shall include setting and saving parameter values, controlling operation such as Start/Stop and speed adjustment and monitoring faults and feedback.
19. VFD shall include programmable electronic thermal overload protection for both the drive and motor. The electronic thermal motor overload shall be approved by UL. VFDs without a UL Listed will not be accepted.
20. The VFD shall include a fireman's override input. This mode shall override all other control modes (analog, digital, serial and keypad commands) and the motor shall run at an adjustable preset speed. The keypad shall display 'Override Mode' status. Upon removal of the override signal, normal operation shall be resumed.
21. Three Contactor Electronic Bypass shall be provided when indicated by the schedule. VFD and bypass components shall be mounted, fully pre-wired, tested and made available for installation as one UL listed assembly by the drive manufacturer.
22. Integral Soft Start on transfer to bypass shall be offered as an option if required by the schedule.
23. The enclosure shall be of one of the following types depending on the schedule:
    a) NEMA 1 extended enclosure, to house additional equipment within the VFD enclosure for VFDs not requiring Bypass.
    b) UL 1A Positive Pressure, Blown & Filtered (PPBF) enclosures with filters and blower.
    c) NEMA 3R enclosures for outdoor installations.

D. Disconnects provided by this contractor will be installed by Division 26, with the exception of factory mounted disconnects.

E. Motors smaller than 1/2 HP shall be capacitor-start or split phase type, single phase, 60-hertz alternating current for voltage required. Motors 1/2 HP and larger shall be squirrel-cage induction three phase 60 hertz alternating current for voltage required, unless specifically noted otherwise.

F. Where available, starters and disconnects shall be factory mounted by the unit manufacturer.

2.6 USE OF INSTALLATION

A. The Owners shall have the privilege of using any part of the installation when sufficiently complete, but such use thereof, or partial or final payment shall not be considered as an acceptance of such work in lieu of a written certificate from the Engineer.

2.7 DUCTWORK

A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, supports and sealing for operating pressures indicated.

B. Galvanized Steel Ducts: ASTM A525 and ASTM A527 galvanized steel sheet, lock-forming quality, having G90 zinc coating of in conformance with ASTM A90.

1. Sealant: As recommended by manufacturer specifically for sealing joints and seams in ductwork.

2. Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic.

3. Hanger Rod: ASTM A36; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

C. Hanger Rod: ASTM A36; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

D. Flexible Connections

1. Flexible connections shall be provided where a fan connects to a duct or casings to prevent transmission of vibration to ductwork.

2. Flexible connections shall fit tightly around ducts and fans and be securely bolted or clamped in place. Taping shall not be allowed.

3. Flexible duct connections shall be 6” long and made of straight, waterproof, flame retardant fabric having a flame spread rating of not over 25 and a smoke development rating of not over 50

E. 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:

a) On each supply, return and general duct take-off.

b) At each take-off to register, grille or diffuser (not all are shown on drawing).

2. Dampers are 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. Note: All required volume dampers may not be indicated on drawings but dampers shall be provided as necessary for systems balancing.

5. Dampers 12” and larger in height shall be opposed multi-blade equal to Greenheck, Nailor or Vent Products.
6. Where dampers are inaccessible, use Young Rectangular 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.
7. Where dampers are to be located above hard ceilings Young Regulator Bowden Cable Control Dampers shall be utilized. Controllers (actuators) shall be of the concealed ceiling type. Controller type, finish & locations to be approved by architect prior to purchase & installation. The cable between the damper and controller shall be provided by the contractor.
8. Damper blades shall be two gauges heavier than adjoining ductwork, and shall be riveted to supporting rods. Hem over edges parallel to rods.
9. Brackets shall be galvanized metal, secured to ductwork with sheetmetal screw with locking quadrant arms (see seal class section for additional requirements). Provide 2” handle extension for all dampers on externally insulated ductwork.
10. Note: All required volume dampers may not be indicated on Drawings but dampers shall be provided as necessary for system balancing.

2.8 DUCT INSULATION

A. Compliance: Insulation thickness, conductivity and installation shall comply with local Mechanical and Energy Codes. Where local code conflicts with specifications, the more stringent shall apply.

B. Definitions:

1. Conditioned Space: An area, room or space that is enclosed within the building thermal envelope and is directly or indirectly heated or cooled. Spaces are indirectly heated or cooled where they communicate through openings with conditioned spaces, where they are separated from conditioned spaces by uninsulated walls, floors, or ceilings or where they contain uninsulated ducts, piping or other sources of heating or cooling,
2. Unconditioned Space: An enclosed space within a building that is not a conditioned space or a semiheated space. Crawlspaces, attics, and parking garages with natural or mechanical ventilation are not considered enclosed spaces.

C. Supply and Return Air Duct Insulation:

1. Insulation: ASTM C553; flexible, foil faced, noncombustible blanket.
    a) Exposed Conditioned
        (i) Supply Air: No Insulation Required
        (ii) Return Air: No Insulation Required
        (iii) Outside Air: No Insulation Required
    b) Concealed Conditioned
        (i) Supply Air: R-Value of 6.0 installed.
        (ii) Return Air: No Insulation Required
        (iii) Outside Air: R-Value of 6.0 installed.
    c) Unconditioned

(i) Supply Air: R-Value of 6.0 installed.

(ii) Return Air: R-Value of 6.0 installed.

(iii) Outside Air: No Insulation Required

2. Vapor Barrier Jacket:

a) Kraft paper with glass fiber yarn and bonded to aluminized film.

(i) Moisture vapor transmission: ASTM E96; 0.02 perms.

(ii) Secure with pressure sensitive tape.

3. Vapor Barrier Tape:

a) Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

2.9 PIPING

A. Equipment Drains and Overflows

1. Copper Tubing: ASTM B88, Type L, hard drawn.

a) Fittings: ASME B16.18, cast brass, or ASME B16.22 solder wrought copper.

b) Joints: Solder, lead free, 95-5 tin-antimony, or tin and silver, with melting range 430 to 535 degrees F (220 to 280 degrees C) or Victaulic grooved joints.

2. PVC Pipe: ASTM D1785, Schedule 40 and Schedule 80 for sizes 8 inch (200 mm) and larger or ASTM D2241, SDR 21 or 26.

a) Fittings: ASTM D2466 or D2467, PVC.

b) Joints: ASTM D2855, solvent weld.

B. Refrigerant Piping Copper Tubing: ASTM B280, Type ACR hard drawn.

1. Fittings: ASME B16.22 wrought copper.

2. Joints: Braze, AWS A5.8 BCuP silver/phosphorus/copper alloy with melting range 1190 to 1480 degrees F.

3. Provide all valves and accessories required for complete installation.

C. Plenum Return Applications

1. Where piping is installed in a return air plenum piping shall be plenum rated.

2. PVC and/or PEX piping shall not be allowed in return air plenums.

2.10 PIPING INSTALLATION

A. Piping shall be inspected, tested and approved before being buried, covered or concealed. Horizontal piping shall be pitched with a minimum grade of one inch in 50 feet. Fittings shall be provided for changes in direction of piping, and for all connections. Fuel supply piping shall allow for ample tank movement and pipe expansion.

B. Install piping free from traps and drain toward tank.

C. Pipe Sleeves: Firmly pack space between the pipe or tubing, and sleeve with oakum and caulk on both ends of sleeve with elastic cement.

D. Field Testing: Upon completion and before final acceptance of the work, each system shall be tested as in service to demonstrate conformance with the contract requirements and in accordance with the requirements of ANSI B31.3 and NFPA 30.

E. Each new piping system will be hydrostatically tested at not less than 1.5 times the working pressure in accordance with ANSI B16.3, but in no case less than 200 psig and shall show no leakage or dials indicating not less than 1.5 times nor more than 2 times the test being placed in operation. Remove fuel quality monitor elements and water separator elements from filter separators before hydrostatic tests. Do not subject tank to pipe test pressures. Refer to tank manufacturers data for maximum test conditions.

F. Contractor shall provide one full tank load of fuel oil of the proper grade after successful testing.

G. Piping which contains any fluid which could potentially freeze is strictly prohibited from being installed within areas which may be subject to freezing temperatures. If, during the installation process, it is noted that such piping will be located in an area subject to freezing temperatures it must be brought immediately to the attention of the engineer. If such an installation is unavoidable affected piping shall be provided with additional insulation as required by the energy code as well as heat tracing and associated power circuiting as required to avoid the fluid freezing.

2.11 PIPING INSULATION

A. Insulation

1. Low Temperature Fluid Applications: Provide insulation with integral wick material. Product shall include a factory applied integral vapor retarder extending under the evaporator area of the wick and covering not less than 98% of the circumference of the product. Exposed evaporator area shall be not less than 0.1 sq. ft./linear ft. of product.
2. Refrigerant Piping: Flexible closed cell insulation.
3. Plenum Return Applications: All insulation, jackets and accessories shall be rated for use in return air plenums.

B. Compliance: Insulation thickness, conductivity and installation shall comply with local Mechanical and Energy Codes.

C. Condensate Piping

1. All condensate piping, regardless of temperature, shall be provided with insulation.
2. Condensate generated by cooling coils shall be considered Low Temperature Fluid.

D. Fittings: Factory precut insulation inserts, thickness to be same as adjacent. Enclose in premolded, PVC fitting covers.

1. Low Temperature Applications: Fittings and valves shall be wrapped continuously with wicking material prior to installing insulation to ensure a continuous path for removal of condensation.

E. Jackets:

1. Interior: Factory applied, all service jacket of white Kraft bonded to aluminum foil reinforced with fiberglass yarn and suitable for painting. Longitudinal and butt joints shall be made with factory applied pressure sensitive material.
2. Exterior/Exposed (Low Temperature): Field applied, 20 mil, PVC sheet material.
3. Exterior/Exposed (High Temperature): Field applied, Aluminum sheet material.
4. All jackets exposed to the weather shall be reflective, UV resistant and sealed watertight.

F. Preparation

1. Install materials after piping has been tested and approved.

G. Installation

1. Install materials in strict accordance with manufacturer's instructions.
2. Continue all insulation through penetrations.
3. In piping exposed to view, locate insulation and cover seams in least visible locations.
4. On piping that requires condensation control, (i.e. chilled or cold) insulate fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.
5. On piping not requiring condensation control (i.e. steam, condensate hot water) do not insulate flanges and unions at equipment, but bevel and seal ends of insulation at such locations.
6. Provide pipe insulation with weatherproof jacket on exterior piping that has heat trace.

H. Supports:

1. All piping shall be supported in such a manner that the insulation is not compromised by the hanger or the effects of the hanger. In all cases, hanger spacing shall be such that the circumferential joint may be made outside the hanger. Cover the evaporating holes with contractor supplied VaporWick Sealing Tape for the length of the metal saddle.
2. Piping systems 3" (75 mm) in diameter or less, insulated with fiberglass pipe insulation, may be supported by placing saddles of the proper length and spacing under the insulation as designated in Owens Corning Pub. 1-IN-14210.
3. For hot or cold piping systems larger than 3" (75 mm) in diameter, operating at temperatures less than +200F (93C) and insulated with fiberglass, inserts such as foam or high-density fiberglass with sufficient compressive strength shall be used to support the weight of the piping system.
4. On vertical runs, insulation support rings shall be used.

I. Accessories:

1. Insulation Bands: ¾ inch wide; 0.015 stainless steel
2. Metal Jacket Bands: ½ inch wide; 0.015 thick aluminum.
3. Insulating Cement: ANSI/ASTM C195; hydraulic setting mineral wool.
4. Finishing Cement: ASTM C449.
5. Fibrous Glass Cloth: Untreated; 8oz/sq. yd. Weight.
6. Adhesives: Compatible with insulation.
7. Wick material for wrapping valves and fittings
8. Closure Materials –Sealing Tape, and mastics.
9. Support Materials - Hanger straps, hanger rods, saddles, support high-density blocks, and support rings.
10. All accessory materials shall be installed in accordance with project drawings and specifications, manufacturer's instructions, and/or in conformance with the current edition of "Commercial & Industrial Insulation Standards."

2.12 DRIP PANS & LEAK DETECTION

A. Drip pans shall be provided where indicated on plans and under all new and existing piping within critical spaces.

B. Drip pans shall be constructed of continuously welded sheet metal. Each section shall be provided with a wire type leak detection sensor compatible with fluids present in piping. Leak detection alarms shall be tied back to Building Management System.

C. Provide new leak detection sensors in all existing drip pans. Tie alarms back to Building Management System.

2.13 SECONDARY DRAIN PANS

A. A secondary drain pan shall be provided under each piece of concealed (above ceilings, in closets, etc.) HVAC equipped which produces condensate.

B. The pan shall have a minimum depth of 1.5” and shall not be less than 3” larger than the unit or the coil dimensions in width and length and shall be constructed of corrosion resistant material. Metallic pans shall have a minimum thickness of not less than 0.0276-inch galvanized sheet metal and non-metallic pans shall have a minimum thickness of not less than 0.0625 inch.

C. The secondary drain pan with a separate drain shall discharge to a conspicuous point of disposal to alert occupants in the event of a stoppage of the primary drain. The overflow drain line shall connect to the drain pan at a higher level than the primary drain connection.

D. A secondary drain pan without a separate drain shall be equipped with water level detection device that will shut off the equipment served prior to overflow of the pan

PART 3: EXECUTION

3.1 OPERATING INSTRUCTIONS

A. Instruction to the Owner's Personnel - After completion of all work and all tests and at such times as designated by the Architect, provide the necessary skilled personnel to operate the entire installation until receipt of owners acceptance.

B. During the operating period, instruct the Owner's representative in the complete operation, adjustment, and maintenance of the entire installation.

C. Give at least forty-eight (48) hours advance notice to the Owner to coordinate scheduling of this instructional period.

D. Furnish to the Architect five (5) complete bound sets of typewritten or blueprinted instruction manuals for operating and maintaining all systems and equipment included in the contract. All instruction manuals shall be submitted in draft, for approval, prior to final issue. Manufacturer's advertising literature or catalogs will not be acceptable for operating and maintenance instructions.

E. The above-mentioned instructions shall include the maintenance schedule for the principal items of equipment furnished under this contract.

3.2 MANUFACTURER'S RECOMMENDATIONS:

A. Where installation procedures or any part thereof are required to be in accordance with the recommendations of the manufacturer of the material being installed, printed copies of these recommendations shall be furnished to the Architect prior to installation. Installation of the item will not be allowed to proceed until the recommendations are received. Failure to furnish these recommendations can be cause for rejection of the material.

3.3 TESTING, ADJUSTING, STARTING UP AND COMMISSIONING

A. Testing: All work must be proved satisfactory. The tests herein specified shall be applied in the presence of, and to the satisfaction of, the Architect before the work is covered, concealed or made inaccessible to testing, repair, correction or replacement. Accommodate the testing operation to the progress of the project as a whole. Correct all defects appearing under test and repeat the tests until all parts of the work have been successfully tested. Apply the specific tests herein described. Present all work for acceptance in clean condition, properly adjusted and in good working order; for instance, all machinery must be quiet, well balanced, and must be in place and reading accurately. All systems, equipment, controls, and devices in this work shall be tested in operation and must prove for their purposes in the judgment of the Architect or his authorized representative. All internal surfaces of all lines and equipment shall be blown or flushed clean. Where pressure tests are specified, the apparatus shall be clean before the tests are applied. Contractor shall provide adequate protection of piping and duct systems to prevent vandalism and/or accidental damage, blockage, etc., that will hinder or prevent proper operation of the finished systems.

1. Provide instruments, pumps, gauges, supplies, equipment, materials, and labor for testing and starting up. Dispose of test water and wastes after test, in a manner approved by all applicable codes.
2. Perform tests which may be required by authorities or agencies in addition to those herein specified.
3. Piping for steam, hot water, chilled water, supply and return, drain, escape and relief valve discharge shall be tested with water and made tight under pressure of 150 pounds per square inch gauge maintained for one hour without pumping or as long as required to inspect all joints. Repair all leaks and retest. Piping shall be made tight without caulking. Apply pressure tests to piping only before connection of equipment. In no case shall piping, equipment or accessories be subjected to a pressure exceeding it's rating. Low-pressure elements shall be isolated or removed before tests are conducted.
4. Test valve bonnets for tightness. Test operate all valves at least once from closed-to-open-to-closed positions while valve is under pressure. Test all automatic valves for proper operation at the settings indicated. Test pressure relief valves at least three (3) times.
5. Test piping specialties for proper operation. Test air vent points to ensure that air has been vented.
6. Furnish certified shop test records for all pressure vessels. After installation, test at full operating pressures and temperatures maintained for one hour. Set and test all pressure control, relief and safety devices.
7. Repair or replace all defective work and repeat tests until the particular system and component parts thereof receive the approval of the Architect.
8. The duration of tests shall be as determined by authorities having jurisdiction, but in no case less than the time prescribed in each section of the specifications.
9. Test equipment and systems, which normally operate during seasons of the year during the appropriate season. Perform tests on individual equipment, systems and their controls. Whenever the equipment or system under test is interrelated with and depends upon the operation of other equipment, systems and controls for proper operation, function, and performance; the latter shall be operated simultaneously with the equipment of system being tested.

B. Adjusting, Balancing and Starting Up

1. Flush clean all systems prior to starting up the system. Any damages to the building

or system components caused by failure to clean the systems properly shall be corrected to the satisfaction of the Architect or his authorized representative at no additional cost to the Owner.

2. In duct and piping systems, eliminate all noise and vibration and take all measures to secure proper circulation.
3. Run motor-driven equipment continuously for at least two hours in the presence of the Architect. Correct all defects of noise, vibration, alignment and balance. Replace all motors, which overheat or are noisy.
4. Balance systems completely for temperature, volume, and pressure per NEBB performance standards. Balancing subcontractor shall provide proof of certification by NEBB.
5. Air and water volumetric flow rates shall be within ten (10) percent of those specified. Air and water quantities and pressures shall be tested, balanced and recorded at all terminal devices. Volumetric flows and pressures shall be recorded on suitable forms and submitted for approval.
6. Provide any and all labor and equipment necessary to properly balance the installation including but not limited to dampers, valves, flow stations, test ports, sheaves, belts, etc.
7. All sequences of the system shall be checked and all temperature controls operated and commissioned as required to insure that all systems operate per Engineers intent.

C. Commissioning

1. This Contractor shall provide the deliverables to the engineer/owner.
2. Copies of all records shall be provided to the Engineer by this Contractor including, but not limited to:
    a) Equipment manuals including the name of at least one service agency;
    b) Testing and Balancing reports;
    c) Functional performance testing of the equipment, controls, economizers, and lighting control systems.
3. All commissioning shall be performed as indicated here and elsewhere in the specifications and shall comply with provisions of the applicable Energy Conservation Code.
4. Start-up shall be provided by factory representatives and a full start-up report shall be provided for review and approval for the following equipment:
    a) Variable Refrigerant Flow (VRF) Systems

3.4 SEQUENCE OF OPERATIONS

A. Sequence of Operations: This is a performance-based specification intended to convey the control intent of the various systems. The contractor shall provide detailed shop drawings including P&ID diagrams, equipment lists and finalized sequences for review by the Engineer prior to installation. Any questions concerning specific details shall be referred to the engineer for clarification.

B. System: It is the intent of this specification that programmable electronic controls be provided to control occupied/unoccupied modes of all HVAC systems within the facility. Systems shall be provided with all additional required controls including, but not limited to, space mounted monitoring and user interface devices, to provide the specified sequence.

C. Equipment and Wiring: This contractor shall provide all control equipment, and wiring (regardless of voltage) to accomplish the sequence of operations as detailed below.

D. Control and Monitoring: Sensors shall be provided throughout the HVAC systems (hydronic and air) as required to control and monitor their operation and verify performance at BMS. Provide sensors with remote mounted stats where indicated on the drawings. Where multiple space mounted sensors are required for a given unit they shall be located in the same general area.

E. Safety Controls: This contractor shall provide all safety controls required to protect the building and all controlled equipment from damage as well as those controls necessary to signal abnormal operation or malfunction of equipment. These shall include but not be limited to high limits, low limits, freezestats, flow switches, interlocks and relays.

F. Energy Efficiency: All controls and sequences shall be configured to provide maximum energy efficiency while maintaining occupant comfort.

G. Functional Performance Testing: The contractor shall perform complete and thorough Control Functional Performance Test (FPT) and Commissioning of the control systems. Upon completion of the FPT, a report shall be submitted to the engineer for review and comment. The FPT shall include testing of:

1. Safeties in every mode, i.e., in manual run mode as well as auto mode.
2. Signals to and from the fire alarm, security and entry systems.
3. Sequences of operation step by step in every mode and possible situation.
4. The operation of all control loops under actual operating conditions.
5. The interlocked operation of all equipment (i.e., the operation of starters in manual and off modes as well as auto mode, damper end switch interlock, etc.)
6. Commissioning should test every conceivable life safety scenario and every conceivable operational scenario that the system will encounter and document this testing with printed graphs of trend logs.

H. Split AC Unit Control

1. IT room air conditioning system cooling circuit shall cycle the three split systems in sequence to maintain space set points as directed by packaged lead-lag controller.
2. Packaged controller shall be provided to allow the monitoring of space temperature, space humidity, unit fan status, unit compressor status, unit operational status, etc. Controller shall have the ability to provide Wi-Fi alarm to designated personnel upon equipment failure or if space conditions are outside of specified values.
3. Controls shall interlock air conditioning systems with associated motorized dampers, controls, etc. to provide redundancy and allow lead-lag control as well as equal operating time on each air conditioning unit.
4. Scheduling shall be set at the central controller and be capable of being temporarily overridden by the space mounted controllers.

I. Overflow cut-off switches:

1. Provide an overflow cut-off switch in each secondary drain pan to shut down the associated unit and provide an alarm prior to overflow.

END OF SECTION

SECTION 26 0000
ELECTRICAL

PART 1 – GENERAL

1.1 RELATED SECTIONS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.
B. This Contractor shall also include allowances for startup and for making the systems fully operational, and for scope and design contingencies. Future changes in price for items not shown on these drawings will not be allowed if the system itself is shown on these Drawings.
C. Give notices, file plans, obtain permits and licenses, pay fees and back charges, 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.
D. The drawings show the layout of the electrical systems and indicate the approximate locations of outlets, apparatus, and equipment. The runs of feeders and branches as shown on the drawings are schematic only. The exact routing of branch circuits and feeders shall be determined by the structural conditions and possible obstructions. This shall not be construed to mean that the design of the systems may be changed but refers only to exact runs between given points. The Engineer reserves the right to revise the drawings from time to time to indicate changes in the work.
E. The Contractor shall consult and review all contract and reference drawings which may affect the location of any outlets, apparatus and equipment to avoid any possible interference and permit full location of outlets, apparatus and equipment up to the time of rough-in is reserved by the Engineer and such change shall be made without additional expense to the Owner.
F. It shall be the responsibility of this Contractor to see that all electrical equipment such as junction and pull boxes, panelboards switches, controls and such other apparatus as may require maintenance and operation from time to time is made accessible. Although the equipment may be shown on the drawings in certain locations, the construction may disclose the fact that such locations do make its position accessible. In such cases this Contractor shall call the attention of the Engineer to the condition before advancing the construction to a state where a change will reflect additional expense to the Owner.

1.2 SUMMARY

A. This Section specifies the basic requirements for electrical installations and includes requirements common to more than one section of Division 26. It expands and supplements the requirements specified in sections of Division 1.
B. These documents have been prepared with the intention that they call for finished, tested work, in full operating condition and complete with necessary accessories.
C. The contract drawings are generally diagrammatic and convey the scope of work and general arrangement of apparatus and equipment. The locations of all items shown on the drawings or called for in the specifications that are not definitely fixed by dimensions are approximate only. The exact locations necessary to secure the best conditions and results must be determined at the project and shall have the approval of the Architect/Engineer before being installed. The Contractor shall follow the drawings in laying out work and shall check drawings of the other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. If directed by the General Contractor, Engineer and/or Architect, the Contractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work.
D. These contract documents are complementary. What is called for by one shall be as binding as if called for by all. Materials or work described in words, which have well-known technical, or trade meaning

shall be held to refer to such recognized standards. Incidental devices and accessories needed for complete, operational systems shall be provided even though they may not be indicated or identified in the documents.

E. If apparatus have been omitted, notify the Architects/Engineers of such belief. It is understood that bidder has included all required items and work in his bid, and will not if bid is successful, claim extra compensation for furnishing a complete and satisfactory system. If a particular item is called for or specified more than once in these contract documents, the higher grade shall be considered specified.
F. Should it appear that the character of the work is not sufficiently explained in these specifications or on the drawings, apply to the A/E for further information. Conform to the A/E's decision and directions as shall become part of these contract documents. The A/E reserves the right to be sole interpreter of the drawings and specifications, and all decisions shall be conclusive, final and binding on the parties.
G. Materials called for in these documents shall be new, unused equipment and of the latest recognized standards.
H. The work to be done under Division 16 is shown on the electrical drawings.

1.3 OUTLINE SCOPE OF WORK

A. The work under this contract, without limiting the generality thereof, includes all materials, labor, equipment, services, and transportation, unless otherwise specified, necessary to complete all systems of electrical wiring and equipment required by the drawings and/or as specified herein. It is the intent of this section and accompanying electrical drawings that these systems be furnished complete in every respect. The Electrical Contractor shall furnish all wiring, equipment and labor needed for a complete operating installation.
B. The Electrical Contractor shall fully indemnify the Owner against any damages, removals and alteration work. This is in addition to the requirements of the General Conditions of the Specifications.
C. The Electrical Contractor shall review architectural, interior design and all other trades plans, elevations and details prior to any work and identify any conflicts between furnishings, furniture, art-work, molding, casework, televisions, signage, awnings, canopies, diffusers, fixtures, etc.. and electrical, fire alarm, audio/visual and communications devices shown on the electrical plans and details. The Electrical Contractor shall prepare 8.5” x 11” sketches showing the conflicts and submit to the Architect for resolution prior to any work. Failure of the electrical contractor to coordinate, identify and obtain a field-directive on any conflict herein noted, that results in installed electrical work to be relocated to the Owner/Architects liking shall be the sole-responsibility of the Electrical Contractor. The Electrical Contractor shall assume and cover all costs associated with conflicts not coordinated, identified and submitted to the Architect, inclusive of material, labor, overtime pay, etc.. and shall not affect the project schedule.

1.4 ROUGH-IN

A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.
B. Refer to equipment specifications in Divisions 2 through 25 for rough-in requirements.

1.5 SURVEYS AND MEASUREMENTS

A. Base measurements, both horizontal and vertical, on established bench marks. Work shall agree with these established lines and levels. Verify measurements at site and check the corrections of same as related to the work.
B. Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the drawings and specifications, he shall notify the A/E.

1.6 EXAMINATION OF SITE

A. Prior to submitting bid, visit the site where the work is to be performed and the materials are to be delivered. Failure in this respect shall not excuse the Contractor from his obligation to supply and install the work in accordance with the plans and specifications and under all conditions, as they exist.
B. By submitting a bid, this Contractor warrants that all specification sections and drawings showing equipment for plumbing, heating, ventilation, air conditioning, electrical, and architectural, have been examined and is familiar with the conditions and extent of work affecting this contract.

1.7 EQUIPMENT AND MATERIALS

A. All equipment and materials for permanent installation shall be the products of recognized manufacturer's and shall be new, unless noted for re-use, without damaged, functional or aesthetic components.
B. New equipment and materials shall:
    1. Be Underwriters Laboratories, Inc. (UL) labeled and/or listed where specifically called for, or where normally subject to such UL labeling and/or listing services
    2. Be without blemish or defect.
    3. Be in accordance with the latest applicable NEMA standards.
    4. Be products, which will meet with the acceptance of the agency inspecting the electrical work. Where such acceptance is contingent upon having the products examined, tested and certified by UL or other recognized testing laboratory, the product shall be so examined, tested and certified.
C. For all equipment, which is to be installed but not purchased as part of the electrical work, the electrical work shall include:
    1. The coordination of their delivery.
    2. Their unloading from delivery trucks driven in to any point on the property line at grade level.
    3. Their safe handling and field storage up to the time of permanent placement in the project.
    4. The correction of any damage, defacement or corrosion to which they may have been subjected.
    5. Their field make-up and internal wiring as may be necessary for their proper operation.
    6. Their mounting in place, including the purchase and installation of all dunnage, supporting members and fastenings necessary to adapt them to architectural and structural conditions.
D. Equipment, which is to be installed but not purchased as part of the electrical work, shall be carefully examined upon delivery to the project. Claims that any of these items have been received in such condition that their installation will require procedures beyond the reasonable scope of the electric work will be considered only if presented in writing within one week of the date of delivery to the project of the items in question. The electric work includes all procedures, regardless of how extensive, necessary to put into satisfactory operation, all items for which no claims have been submitted as outlined above.

1.8 ELECTRICAL INSTALLATIONS

A. All materials and labor called for, specified in Division 16 of the specifications, and or shown on the electrical drawings furnished under this contract shall be provided under Division 16 unless called for otherwise in the Division 16 documents. The word “provide” as used in the Division 16 documents, shall mean to furnish, install, connect up, complete with all accessories ready for operation and warranted.
B. Coordinate electrical equipment and materials installation with other building components. Fully coordinate work with that of other trades. Furnish information in writing that is needed for the coordination of clearances, etc., with the work of others, and such information shall be given in a timely fashion so as not to impede the progress of two or more trades. Confer and resolve the conflict

immediately. If so directed by the A/E, prepare composite drawings to resolve any space or clearance conflict.

C. Verify all dimensions by field measurements.
D. Arrange for chases, slots, and openings in other building components to allow for electrical installations.
E. Coordinate the installation of required supporting devices and sleeves to be set in poured in place concrete and other structural components, as they are constructed.
F. Sequence, coordinate, and integrate installations of electrical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing-in the building.
G. Coordinate the cutting and patching of building components to accommodate the installation of electrical equipment and materials.
H. Where mounting heights are not detailed or dimensioned, the exact location shall be determined by the A/E, install electrical services and overhead equipment to provide the code and/or utility requirements.
I. Install electrical equipment to facilitate maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
J. Coordinate the installation of electrical materials and equipment above ceilings with suspension systems, mechanical equipment and systems, and structural components.
K. Coordinate connection of electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.
L. Attention is directed to areas and items indicated on the drawings by the notations "HOLD", "N.I.C.", "BY OTHERS" and words of similar intent. The work indicated in these areas is shown for information and continuity only. Work or items furnished and installed in these areas solely for the convenience of this Contractor or others, without prior written approval of the Owner, shall be removed at the option of the Owner and at the Contractor's expense.
M. Provide all required staging and scaffolding for all the work under this section.

1.9 ALTERATION WORK

A. Maintain continuity of service in areas where occupancy is to be maintained during alterations. If it becomes necessary to disconnect or interrupt service, obtain written consent of the Owner, and only disconnect service at the convenience of, and with the consent of the Owner. A copy of the written request for a shutdown shall be forwarded to the A/E.

1.10 CUTTING AND PATCHING

A. Cutting and patching of electrical equipment, components, and materials specified under Division 16 (conduit, sleeves, equipment, etc.) shall be performed by Electrical Contractor.
B. Refer to the Conditions of the Contract (General and Supplementary) and Division 1 Section: "Cutting and Patching" for definitions, requirements, and procedures.
C. Cutting and patching of existing structures (thru walls, floors, ceilings, etc.) to accommodate equipment, components, and materials of all Contractors, including Mechanical and Electrical Contractors, shall be performed by General Contractor and/or his designated Subcontractor.
D. Cutting and patching of new structures (thru walls, floors, ceilings, etc.) to accommodate installation of ill-timed work or removal and replacement of defective work or work not conforming to requirements of Contract Documents, shall be performed by General Contractor and/or his designated Subcontractor and costs shall be back charged to appropriate trade Contractor.
E. Do not endanger or damage installed work through procedures and processes of cutting and patching.
F. Arrange for repairs required to restore other work, because of damage caused as a result of electrical installations.

G. Arrange to have ducts, raceways, conduit, panelboards, boxes, and such other pertinent parts, set in place ahead of construction work so that they will be built-in with structures and eliminate need for cutting and patching. Failure to conform to this paragraph will require that this Contractor perform any cutting and patching required for his work at his expense. Cutting shall be neatly finished to match adjoining work in a manner acceptable to the A/E. Cutting and patching shall not affect the fire rating of walls or structural parts. Cutting and patching required to correct work, due to error or negligence of the Contractor, or to defects in his material or workmanship, shall be corrected at no additional cost to the Owner. Patching shall meet or exceed quality of adjacent surfaces. Cutting must be accomplished as not to weaken adjacent structural members and must be approved by the Structural Engineer before proceeding.
H. Perform cutting, fitting, and patching of electrical equipment and material required to:
    1. Uncover work to provide for installation of ill-timed work.
    2. Remove and replace defective work.
    3. Remove and replace work not conforming to requirements of the contract documents.
    4. Remove samples of installed work as specified for testing.
    5. Install equipment and materials in existing structures.
    6. Upon written instructions from the A/E, uncover and restore work to provide for A/E observation of concealed work.
I. Cut, remove and legally dispose of selected electrical equipment, components and materials as indicated, including, but not limited to, removal of electrical items indicated to be removed and items made obsolete by the work.
J. Protect the structure, furnishing, finishes, and adjacent materials not indicated or scheduled to be removed. Protect the electrical work and the work of others in a manner best suited to the particular case. Correct any damage done to any work at no additional cost.
K. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.
L. Locate, identify, and protect electrical services passing through areas that are to under-go remodeling or demolition. Electrical services serving other areas required to be maintained, and transit services must be interrupted, provide temporary services for the affected areas and notify the Owner prior to changeover.

1.11 SUBMITTALS

A. Within fifteen (15) business days after the date of notice to proceed and before purchasing any materials or equipment, submit for approval a complete list, in six (6) copies, of all materials to be incorporated in the work.
B. Shop drawings/manufacturer's cuts are required for:
    1. Wire & Cable.
    2. Lighting Fixtures.
    3. Panelboards.
    4. Transformers.
    5. Disconnect Switches.
    6. Fire Alarm System.
    7. Wiring Devices and Plates.
    8. Fire Stopping Materials.
    9. Seismic Restraint Components.
C. After the list has been processed, submit complete shop drawings of all equipment. These shop drawings submittals shall be submitted within thirty days after the processing date of the original submittal.
D. All submittals shall be complete and submitted electronically to all applicable parties. No consideration will be given to partial submittals except with prior approval. No consideration will be given to faxed submittals.

E. Explanation of Shop Drawing Stamp:
    1. Approved: indicates that we have not found any reason why this item should not be acceptable within the intent of the documents.
    2. Approved with Comments: indicates that we have found questionable components which, if corrected or otherwise explained, make the product acceptable.
    3. Resubmit for Final Review: indicates that this item should be resubmitted for approval before further processing.
    4. Does Not Conform: indicates that the item will not meet the intent of the Contract.
F. No shop drawing stamp or note shall constitute an order to fabricate or ship. Such notification can only be performed by the Project Manager for construction, the Contractor scheduling his own work, or the Owner.
G. Submittal of shop drawings, product data, will be reviewed only when submitted by the Contractor. Data submitted from Sub-contractors and material suppliers directly to the A/E will not be processed.
H. If shop drawing is not in compliance after two submissions, a third submission for the same manufacturer will not be considered for review.
I. Check shop drawings and other submittals to assure compliance with contract documents before submittal to A/E.
J. Review of shop drawings is final and no further changes shall be considered without written application. Shop drawing review does not apply to quantities, dimensions, nor relieve this Contractor of his responsibility for furnishing materials or performing his work in full compliance with these contract drawings and specifications. Review of these shop drawings shall not be considered a guarantee of the measurements of this building or the conditions encountered.
K. General requirements for the substitution of equipment and submittal of shop drawings as follows. If apparatus, systems or materials are substituted for those specified, and such substitution necessitates changes in, or additional connections, wiring, supports, or construction, it shall be provided by this Contractor at no additional cost to the Owner. This Contractor shall assume all cost and entire responsibility thereof. The approval of substituted equipment does not relieve the contractor of his/her responsibility of shop drawing errors related to details, sizes, quantities, wiring diagram arrangements and dimensions which deviate from the Specifications, and/or job conditions as they exist. It is the contractor's responsibility to submit only those items that meet the specified apparatus, systems and material. Should any non-conformance code items be installed, they shall be replaced by this Contractor at no additional cost to the Owner. The construction means and methods used in the project shall be reviewed and approved through the local building department or a deputy inspector to insure compliance with the current codes, project specifications and general building practices.
L. Coordination drawings shall be submitted and shall show all HVAC, Electrical, Plumbing and Fire Protection systems superimposed in order to identify conflicts and ensure inter-coordination of all trades. Coordination drawings shall be initiated under this Section of the Specifications. It is this Contractors responsibility for preparation of project coordination drawings showing the installation of all electrical equipment, switchgear, motor control centers, panelboards, transformers, transfer switches, disconnect switches, enclosed circuit breakers, conduits, outlets, switches and accessories to be provided under this Section of the Specifications. These drawings shall be prepared at not less than 3/8 in. = 1 ft. scale, and shall show building room layouts, structural elements, ductwork and lighting layouts of function. A reproducible copy of each drawing prepared shall then be submitted to the Mechanical, Plumbing and Sprinkler Contractors, who shall be responsible to coordinate his equipment and systems and shall show these on the drawings submitted. After this Contractor has fulfilled his obligation, he shall notify all other Contractors. After each drawing has been coordinated between trades, each trade shall sign each drawing, indicating acceptance of the installation. This Contractor shall then print the coordination original and these prints submitted through the General Contractor to the architect for review and comment, similar to shop drawings. Comments made on these drawings shall result in a correction and re-submittal of the drawings. A Subcontractor who fails to promptly review and incorporate his work on the drawings shall assume full responsibility of any installation conflicts affecting his work and of any schedule ramifications. Review of coordination drawings shall not diminish responsibility under this Contract for final coordination of installation and maintenance

clearances of all systems and equipment with Architectural, Structural, Mechanical, and Electrical Contractors.

1.12 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Refer to the Conditions of the Contract (General and Supplementary) and Division 1 for definitions, requirements, and procedures.
B. If materials of equipment are substituted for specified items that alter the systems shown or its physical characteristics, or which have different operating characteristics, clearly note the alterations or differences and call it to the attention of the A/E. Under no circumstances shall substitutions be made unless identical material or equipment has been successfully operated for at least three consecutive years.
C. All substitution made by the Contractor shall require the Contractor to fully coordinate the substitution with other trades. The Contractor must make any modifications required by the substitution at no additional cost to the Owner. In addition the Contractor must notify the A/E of any changes required and obtain approval for the changes. The review of the shop drawings by the A/E shall not relieve the Contractor from his responsibility as set forth in this specification.

1.13 NAMEPLATE DATA

A. Provide permanent operational data nameplate on each item of power operated equipment, conduits with pull string, indicating manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances, and similar essential data. Locate nameplates in a readily accessible location.

1.14 DELIVERY STORAGE AND HANDLING

A. Deliver products to project properly identified with names, model numbers, types, grades, compliance labels, and similar information needed for distinct identifications; adequately packaged and protected to prevent damage during shipment, storage, and handling.
B. Store equipment and materials at the site, unless off-site storage is authorized in writing. Protect stored equipment and materials from damage. All devices shall be stored in a locked room. Assume responsibility for the devices until the date of final inspection.
C. Coordinate deliveries of electrical materials and equipment to minimize construction site congestion. Limit each shipment of materials and equipment to the items and quantities needed for the smooth and efficient flow of installations.

1.15 RECORD DOCUMENTS

A. As work progresses and for the duration of Contract, maintain a complete and separate set of prints of Contract Drawings at job site at all times. Record work completed and all changes from original Contract Drawings clearly and accurately including work installed as a modification or addition to the original design. Work shall be updated on a weekly basis and shall be made available for review by Architect. Failure to perform this work shall be reason for withholding requisition payments. In addition, take photographs of all concealed equipment in gypsum board ceilings, shafts, and other concealed, inaccessible work. At completion of work, make copies of photographs with written explanation on back. These shall become part of Record Documents.
B. At completion of work prepare a complete set of Record As-Built Drawings in AutoCAD, Computer Aided Drafting (CAD) software, showing all systems as actually installed, including all fire alarm and electrical circuitry. The Record As-Built Drawings computer files shall be made available to the Architect, Engineer and Owner prior to final payment.

C. The Architect will not certify the accuracy of the Record Drawings. This is the sole responsibility of the Electrical Contractor.
D. This trade shall submit the record set for approval by the Fire and Building Departments in a form acceptable to the departments, when required by the jurisdiction.
E. 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.

1.16 WARRANTIES

A. Refer to the Conditions of the Contract (General and Supplementary) and Division 1 for definitions, requirements, and procedures.
B. All work and equipment furnished under this Section shall be guaranteed free from defects in workmanship or materials for a period of one (1) year, unless specifically noted otherwise for a particular system, from the date of final acceptance of the systems as set forth in this Contract. The Subcontractor shall replace any defective work developing during this period, unless such defects are clearly the result of misuse of equipment by persons not under the control of the Subcontractor, without cost to the Owner. Where such defective work results in damage to work of other Sections, all such work shall be restored to its original condition by mechanics skilled in the affected trade, at the expense of the Subcontractor. The Subcontractor shall submit a separate written guarantee stipulating the aforesaid conditions.
C. Prior to or at the time of Substantial Completion for the work and during administrative close-out of the project, submit one (1) copy of all specified warranties and guarantees to the Architect for review, approval and subsequent transmittal to the Owner.
D. Warranties and guarantees, including those specified in excess of the general one (1) year guarantee, shall be complete for all specific materials, systems, sub-systems, equipment, appliances and products specified and required by the Contract Document.
E. Warranties and guarantees shall clearly define what is to be guaranteed; the extent, terms, conditions, time and effective dates.
F. Copies of the same warranties and guarantees shall be included in the “Operating and Maintenance Manual” as specified herein.

1.17 CLEANING

A. Refer to the Conditions of the Contract (General and Supplementary) and Division 1 for definitions, requirements, and procedures.
B. Upon completion of work, the Contractor shall clean, polish and leave bright, fixtures and lamps, and shall remove dust, dirt, debris and loose plaster from panelboards, controls, and switchboards. Unused openings in pull boxes, junction boxes, equipment and raceways shall be capped or closed by an approved means. Replace all inoperative lamps.

1.18 DEFINITION OF TERMS

A. "This Contractor" or "E.C." specifically means, the Electrical Contractor working under this section of the specifications.
B. "Concealed" means hidden, in chases, furred spaces, walls, above ceilings or enclosed in construction.
C. "Exposed" means visible in sight or not installed "concealed" as defined above.
D. "Approved Equal" means any equipment or material which is approved by the Engineer and equal in quality, durability, appearance, strength, design and performance to the equipment or material originally specified.
E. "Conduit" shall mean all conduit including fittings, joints, hangers and supports.

F. "Furnish" shall mean to purchase and deliver to the project site complete with every necessary appurtenance and support, all as part of the electrical work.
G. "Install" shall mean to perform every operation necessary to establish secure mounting and correct operation at the proper location in the project, all as part of the electrical work.
H. "Provide" shall mean to furnish and install.

1.19 QUALITY ASSURANCE

A. Obtain services of manufacturer's representatives of electrical equipment, during erection and construction of their respective equipment to insure proper installation of same.
B. A letter is required from each system manufacturer's representative certifying to the A/E that requirements have been checked and are properly installed and operating.

1.20 PERFORMANCE TESTS - ELECTRICAL

A. Test and adjust the electrical systems and equipment during the progress of the work.
B. Upon completion of work and after preliminary tests to assure that all systems are complete and in proper working order, arrange with the A/E to conduct performance tests of the electrical systems. These tests may be witnessed by the A/E prior to acceptance of systems and shall be arranged for the purpose of demonstrating compliance with contract documents. During this period, visually inspect all electrical equipment. Lighting fixtures shall be tested with specified lamps in place for not less than six (6) hours. Check voltages to assure that all transformer taps are properly set.
C. General operating tests shall be performed under as near design conditions as possible, for a period of not less than one (1) hour for each system, and shall demonstrate that all equipment is functioning in accordance with specifications. Furnish all instruments, ladders, test equipment and personnel required for tests. Any equipment or systems found by test to be deficient or unsatisfactory shall be replaced and tests repeated as often as necessary to assure compliance with contract documents.
D. Test all feeders, sub-feeders and all branch wiring for amperage, voltage, phase balance, phase sequence of A,B,C and insulation resistance, then submit the results of this test to the A/E neatly typed in triplicate for review. This test may be conducted at any time up to, through and including, the guarantee period if requested by the A/E, at no additional cost to the Owner.
E. Phase balance the complete electrical system, phase balance all panels as near as loads will permit under normal working conditions.
F. Test all ground conductors for current flow, as near design operating conditions as possible. If any measured current exceeds one (1) ampere, determine and correct the cause. Also, if measured resistance is greater than 5 ohms indoor or 10 ohms outdoor, determine and correct the cause.
G. During the progress or completion of the work it shall be subject to the inspection of the Owner and to such other inspectors, as may have jurisdiction, including those of the Electric Company, Fire Department and the Telephone Company.
H. The Contractor shall be responsible for correct voltages, tap settings, trip settings and correct phasing on all equipment. Secondary voltages shall be measured at the line side of the main breakers with the breakers in an open position, at panelboards, and at such other location on the distribution systems and branch circuits as directed by the Engineer.
I. At completion of the work, Contractor shall submit to the Owner's representative in writing a statement stating: (1) that the work is complete; (2) that the entire installation is in accordance with the drawings and specifications; (3) that preliminary tests have been made; and (4) that the work is ready for final inspection and test.
J. A final inspection of the installation to determine compliance with the drawings and specifications will be made by the Owner's representative. Work will be checked for quality of materials, quality of workmanship, proper installation and finished appearance. The electrical contractor shall provide the services of the project electrical foreman for inspection purposes. The foreman shall remove and reinstall wiring devices, junction box covers, panelboard trims, switchboard covers, terminal box covers,

ceiling tiles, lighting fixtures, etc. as required to facilitate any inspections required by the Owner's representative.

K. The Contractor shall arrange and conduct operating tests on all equipment in the presence of the Owner's representative. The components parts of systems and the various systems shall be demonstrated to operate in accordance with the requirements and intent of this specification. Any non-complying or defective materials or workmanship disclosed as a result of the inspection and tests shall be corrected promptly by the Contractor, and the tests repeated as often as necessary until approved and accepted by the Owner's representative.
L. The Contractor shall visit the site to acquaint himself with existing conditions. No extra compensation will be paid for failure to comply with this paragraph.
M. The Electrical Contractor shall provide supervision, labor, materials, tools, test equipment, and all other equipment or services and expenses required to test, adjust, set, calibrate, and operationally check work and components of the electrical systems and circuitry throughout this section.
N. The electrical contractor shall pay for all tests including expences incident to retests occasioned by defects and failures of equipment to meet specifications at no additional cost to the owner.
O. Any defects or deficiencies discovered in any of the electrical work shall be corrected at no cost to the owner.
P. All testing shall be compatible with the manufacturer’s installation instructions.

1.21 SEISMIC RESTRAINT

A. It is the intent of this seismic specification to keep all electrical building system components in place during a seismic event.
B. All electrical systems must be installed in strict accordance with seismic codes, component manufacturer's and building construction standards. Whenever a Conflict occurs between the manufacturer's or construction standards, the most stringent shall apply.
C. This contractor shall engage a professional structural engineer registered in the jurisdiction of this project to review the entire installation to determine all seismic restraint requirements and methods. Contractor shall submit a report outlining the structural engineer’s review as well as seismic restraint shop drawings and supporting calculations prepared by the professional structural engineer for review by the Architect.
D. Seismic restraints shall be designed in accordance with seismic force levels as detailed in the applicable building code.

1.22 TEMPORARY LIGHT AND POWER

A. Under this Section of the specifications, this Contractor shall provide temporary electric service, sized suitable for construction for each trade. This contractor shall provide all material and labor for temporary electrical service per the local power company’s requirements and standards with all necessary panelboards, disconnect switches, transformers, conduit, wiring, etc. as required. This contractor shall pay all associated costs, up front.
B. Where temporary electrical service cannot be obtained from the local power company, this contractor shall provide a temporary, on-site, electric generator with all necessary panelboards, disconnect switches, transformers, conduit, wiring, etc. as required. The fuel used for the generator shall be provided and paid for by this Contractor.
C. This contractor shall provide a distribution system with circuits for receptacles and lighting as required for construction. This contractor shall maintain the temporary electrical system during construction and remove the system when construction is complete.
D. Under this section of the specifications, this Contractor shall provide and maintain temporary lighting based on using not less than one 100-watt lamp for each 100 square feet of building floor area and one duplex GFCI receptacle for each 200 square feet of building floor area. Where higher lighting intensities

are required by Federal or State laws or otherwise specified, the above specified wattage shall be increased to provide the increase intensities.

E. This contactor shall provide temporary power and telephone services from the local telephone company for site trailers, fax machines, computers, etc., per the general contractor's direction.
F. The service shall incorporate ground fault protection and comply with NEC Article 527 and OSHA requirements.

1.23 PERMITS

A. Obtain all required electrical permits and pay all fees for same.
B. Provide to Engineer, in duplicate, a certificate of final inspection from the authority having jurisdiction for the electrical and systems.

1.24 OPERATING, INSTRUCTION, AND MAINTAINANCE MANUALS

A. Refer to Section 01700 – CONTRACT CLOSEOUT for submittal procedures pertaining to operating and maintenance manuals.
B. Each copy of the approved operating and maintenance manual shall contain copies of approved shop drawings, equipment literature, cuts, bulletins, details, equipment and engineering data sheets and typewritten instructions relative to the care and maintenance for the operation of the equipment, all properly indexed.

1.25 BIDDERS REPRESENTATION

A. By the act of submitting a bid for the proposed contract, the Bidder represents that:
    1. The Bidder and all subcontractors the Bidder intends to use have carefully and thoroughly reviewed the drawings, specifications and other construction contract documents and have found them complete and free from ambiguities and sufficient for the purpose intended; further that,
    2. The Bidder and workmen, employees and subcontractors the Bidder intends to use are skilled and experienced in the type of construction represented by the construction contract documents bid upon; further that,
    3. Neither the Bidder nor any of the Bidder's employees, agents, intended suppliers or subcontractors have relied upon any verbal representations, allegedly authorized or unauthorized from the Owner, or the Owner's employees or agents including architects, engineers or consultants, in assembling the bid figure; and further that,
    4. The bid figure is based solely upon the construction contract documents and properly issued written addenda and not upon any other written representation.

1.26 UTILITY COMPANY & AGENCY COORDINATION

A. This section includes, but is not limited to coordination with the following utilities, agencies and authorities having jurisdiction:
    1. Local Fire Marshal: This contractor shall verify with the local fire alarm official, the type of master-box or municipal connection required for this project. This contractor shall provide all material & labor to comply with the local municipality. Notify Engineer of discrepancies between the plans and the municipality's standards. No extra compensation will be given for corrections required for failure to coordinate with the municipality, but corrections shall be made.
    2. Electrical Inspector: Review plans and specifications with the local electrical and/or wiring inspector(s). Obtain and pay for all permits.

3. Building Inspector: Review plans and specifications with the local building inspector, if not done so by the General Contractor.
4. OSHA Representative: Review plans and specifications with the local OSHA representative, if not done so by the General Contractor.
5. Dig Safe: This contractor shall notify and coordinate with Dig Safe prior to any excavation; digging; trenching; grading; tunneling; augering; boring; drilling; pile driving; plowing-in or pulling-in pipe, cable, wire, conduit, or other sub-structure; backfilling; demolition; and blasting related to this Contractor.

B. The Electrical Contractor shall pay for all permits, inspections, labor, material and fees associated with the various Utility Companies coordination requirements mentioned in this section and for this Contractor's work under this project.
C. 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 structural and other trades and to meet Architectural requirements.
D. 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 Architect. Where the electrical work shall interfere with the work of other trades, assist in working out the space conditions to make satisfactory adjustments before installation. Without extra cost to the Owners, make reasonable modifications to the work as required by normal structural interferences. Pay the General Contractor for additional openings, or relocating and/or enlarging existing openings through concrete floors, walls, beams and roof required for any work which was not properly coordinated. Maintain maximum headroom at all locations. All piping, duct, conduit, and associated components to be as tight to underside of structure as possible.
E. If any electrical work has been installed before coordination with other trades so as to cause interference with the work of such trades, all necessary adjustments and corrections shall be made by the trades involved without extra cost to the Owners.
F. Where conflicts or potential conflicts exist and engineering guidance is desired, submit sketch of proposed resolution to Architect and Engineer for review and approval.

PART 2 – PRODUCTS

2.1 CONDUIT

A. Minimum Size: ¾-inch, unless otherwise specified.
B. Underground Installations:
   1. More than Five Feet from Foundation Wall: Use thick wall nonmetallic conduit concrete encased.
   2. Within Five Feet from Foundation Wall: Use rigid steel conduit concrete encased.
   3. In or Under Slab on Grade: Use plastic coated conduit.
   4. Minimum Size: 1-inch.
C. Outdoor Locations, Above Grade: Use rigid steel conduit.
D. In Slab Above Grade:
   1. Use rigid steel conduit.
   2. Maximum Size Conduit in Slab: ¾ inch (19 mm); ½ inch (13 mm) for conduits crossing each other.
E. Wet and Damp Locations: Use rigid aluminum conduit.
F. Dry Locations:
   1. Concealed and in Cable-Tray: Use metal clad (MC) cable (see Division 1)
   2. Exposed: (Unfinished or utility spaces) Use electrical metallic tubing.
G. Metal conduit: Rigid Steel Conduit shall comply with ANSI C80.1 and be heavy wall zinc coated steel. Rigid Aluminum Conduit shall comply with ANSI C80.5. Intermediate Metal Conduit (IMC) shall be rigid steel. Fittings and Conduit Bodies shall comply with ANSI/NEMA FB 1 and material to match conduit.

Acceptable manufacturers are Western Tube and Conduit Company, Allied Tube and Conduit Company and Triangle Wire and Cable, Inc.

H. Flexible metal conduit shall be interlocked aluminum contruction. Fittings shall comply with ANSI/NEMA FB 1. Acceptable manufacturers are AFC Cable Systems, Electri-Flex Company and Eastern Flexible Conduit Technologies. All flexible conduits shall include a grounding conductor.
I. Electrical metallic tubing (EMT) shall comply with ANSI C80.3; galvanized zinc coated steel tubing. Fittings and Conduit Bodies shall comply with ANSI/NEMA FB 1; steel, compression or set screw type. Acceptable manufacturers are Western Tube and Conduit Company, Allied Tube and Conduit Company and Triangle Wire and Cable, Inc.
J. Nonmetal conduit shall comply with NEMA TC 2; Schedule 40 PVC, or as indicated on plans. Fittings and Conduit Bodies shall comply with NEMA TC 3. Acceptable manufacturers are Carlon or approved equal.
K. Flexible nonmetallic conduit (Sealtite) shall be UL and CSA listed for purpose specified and shown. Acceptable manufacturers are Carlon or approved equal.
L. Install conduit in accordance with NECA "Standard of Installation." Install nonmetallic conduit in accordance with manufacturer's instructions.
M. Arrange supports to prevent misalignment during wiring installation. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits. Fasten conduit supports to building structure and surfaces under provisions of Division 1. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports. Do not attach conduit to ceiling support wires.
N. Arrange conduit to maintain headroom and present neat appearance. Route exposed conduit parallel and perpendicular to walls. Route conduit installed above accessible ceilings parallel and perpendicular to walls. Route conduit in and under slab from point-to-point. Do not cross conduits in slab.
O. Maintain adequate clearance between conduit and piping. Maintain 12-inch (300 mm) clearance between conduit and surfaces with temperatures exceeding 104 degrees F (40 degrees C).
P. Cut conduit square using saw or pipe cutter; de-burr cut ends. Bring conduit to shoulder of fittings; fasten securely. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.
Q. Install no more than equivalent of three 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one-shot bender to fabricate or factory elbows for bends in metal conduit larger than 2 inch (50 mm) size.
R. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system. Provide suitable fittings to accommodate expansion and deflection where conduit crosses seismic, control and expansion joints. All expansion and deflection fittings shall have a ground strap. Provide suitable pull string in each empty conduit except sleeves and nipples. Use suitable caps to protect installed conduit against entrance of dirt and moisture.
S. Ground and bond conduit under provisions of NEC 250.

2.2 BUILDING WIRE & CABLE

A. Building Wire and Cable shall be copper with 600V insulation rated at 75°C minimum, Type XHHW insulation for feeders and branch circuits larger than #3 AWG; Type THHN/THWN insulation for feeders and branch circuits #4 AWG and smaller.
B. Conductors shall be of soft drawn 98% minimum conductivity properly refined copper, solid construction where No. 10 AWG and smaller, stranded construction where No. 8 AWG and larger.
C. Exterior of wires shall bear repetitive markings along their entire length indicating conductor size, insulation type and voltage rating.

D. Exterior of wires shall be color coded, so as to indicate a clear differentiation between each phase and between each phase and neutral. In all cases, grounded neutral wires and cables shall be identified by the colors “white” or “gray”. In sizes and insulation types where factory applied colors are not available, wires and cables shall be color coded by the application of colored plastic tapes in overlapping turns at all terminal points, and in all boxes in which splices are made. Colored tape shall be applied for a distance of 6 inches along the wires and cables, or along their entire extensions beyond raceway ends, whichever is less.
E. Final connections to motors shall be made with 18” of neoprene sheathed flexible conduit.
F. Minimum branch circuit conductor size shall be No. 12 AWG installed in conduit. Motor control circuit wiring shall be minimum No. 14 AWG installed in conduit.
G. Fire alarm and security system wiring shall be No. 16 twisted non-shielded pairs for alarm and trouble circuits and a minimum of #14 AWG for device power, control and alarm annunciation circuits. Fire alarm system riser circuits shall be 2-hour rated, CI type (circuit integrity) cable per NFPA 72 and NEC 760.
H. Other wires and cables required for the various systems described elsewhere in this section of the Specifications shall be as specified herein, as shown on the Contract Drawings, or as recommended by the manufacturer of the specific equipment for which they are used, all installed in conduit.
I. Metal clad sheathed cable NFPA 70, type MC may be used for branch circuitry where shown and where run concealed and not subject to physical damage. All branch circuits shall be run in conduit from the panelboard to the first outlet. All type MC cable used shall contain a full size insulated ground conductor. All conductors shall be copper. All type MC cable insulation used shall have voltage rating of 600 volts, shall have a temperature rating of 75° C, and shall be thermoplastic material. Armor material shall be steel and armor design shall be interlocked metal tape. Fire alarm rated MC cable may be used for fire alarm work where concealed and approved by the Authority Having Jurisdiction.
J. Metal-Clad cable (Type MC) for circuits supplying computer equipment, electronic discharge lighting and other sensitive electronic equipment shall consist of 90°C THHN copper conductors with insulated ground and oversized neutral conductor (or one full size neutral conductor for each phase conductor). Cable shall be U.L. listed/labeled, and shall meet the requirements of NEC Art. 334 and 675.
K. Wiring materials except MI cable shall be manufactured by Triangle, Essex, General Cable, AFC, Southwire or equal.
L. Concealed Dry Interior Locations: Use only building wire Type THHN/THWN or XHHW insulation in raceway, or metal clad cable where concealed and code acceptable.
M. Exposed Dry Interior Locations: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway.
N. Above Accessible Ceilings: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway or metal clad cable where code acceptable.
O. Wet or Damp Interior Locations: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway.
P. Exterior Locations: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway.
Q. Underground Installations: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway.
R. Wiring methods, in general, are as follows:
    1. Galvanized rigid steel conduit shall be used for telephone system sleeves for main cable runs between floors, closets, etc. and for sweeps, bends, etc. in ductbanks and as specifically noted on the plans. EMT shall be used generally for exposed circuiting in unfinished spaces. Metal clad cable (type MC) may be used for branch circuiting and fire alarm rated MC cable for fire alarm circuiting where run concealed and where code acceptable.
    2. To prevent transmittal of vibration to conduit, connections to any vibration producing equipment (i.e. transformers, motors, etc.) shall be terminated by 18 inches of flexible metal conduit. Where flexible connections are exposed to grease and oil, liquid-tight flexible metal conduit shall be used.
    3. In general, no splices or joints shall be permitted in either feeders or branches except at outlets or accessible junction boxes. Splices in wire #8 AWG and smaller shall be pigtail type, made mechanically tight. All conduit systems shall be complete.

4. Raceway, boxes, etc., run on walls in wet areas which are subject to being washed down, shall be mounted on the walls with 1/4" stand-offs. All boxes shall be cast type.

S. Route wire and cable as required to meet the Project Conditions. Install cable in accordance with the NECA "Standard of Installation." Use solid conductor for feeders and branch circuits 10 AWG and smaller. Use stranded conductors for control circuits. Use conductor not smaller than 12 AWG for power and lighting circuits. Use conductor not smaller than 16 AWG for control circuits. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 75 feet (25 m). Use 10 AWG conductors for 20 ampere, 277 volt branch circuits longer than 200 feet (160 m). Pull all conductors into raceway at same time. Use suitable wire pulling lubricant for building wire 4 AWG and larger. Protect exposed cable from damage.

T. Support cables above accessible ceiling, using spring metal clips or metal cable ties to support cables from structure or ceiling suspension system, cables that are not part of the ceiling system cannot be supported from ceiling supports. Do not rest cable on ceiling panels. Use suitable cable fittings and connectors. Neatly train and lace wiring inside boxes, equipment, and panelboards.

U. Clean conductor surfaces before installing lugs and connectors. Make splices, taps, and terminations to carry full ampacities of conductors with no perceptible temperature rise. Use suitable reducing connectors or mechanical connector adapters for connecting aluminum conductors to copper conductors. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape un-insulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller. Identify and color code wire and cable. Identify each conductor with its circuit number or other designation indicated.

2.3 BOXES

A. Outlet Boxes:
   1. Each outlet in wiring or raceway systems shall be provided with an outlet box to suit conditions encountered. Boxes installed in normally wet locations shall be of cast-metal type having hubs. Concealed boxes shall be cadmium plated or zinc coated sheet metal type. Old work boxes with Madison clamps are not allowed in new construction.
   2. Each box shall have sufficient volume to accommodate number of conductors in accordance with requirements of NFPA 70. Boxes shall not be less than 1-1/2” deep unless shallower boxes are required by structural conditions and are specifically approved by Architect. Ceiling and bracket outlet boxes shall not be less than 4” octagonal except that smaller boxes may be used where required by particular fixture to be installed. Flush or recessed fixtures shall be provided with separate junction boxes when required by fixture terminal temperature requirements. Switch and receptacle boxes shall be 4” square or of comparable volume. Luminaire and equipment supporting boxes shall be rated for weight of equipment supported; include 1/2 inch (13 mm) male fixture studs where required.
   3. Provide metallic boxes rated for 2-hour, fire-rated walls with gasket to reduce noise-transmission in all fire-rated walls. A minimum horizontal distance of 24-inches shall separate metallic boxes located on opposite sides of walls. This minimum horizontal spacing may be reduced using UL classified wall opening protective materials, commonly known as “putty pads” or “insert pads” pending written approval from the local authority having jurisdiction (AHJ). Refer to Architect's plans for all wall types prior to bid and any related work.
   4. All boxes installed in demising walls separating tenants, electrical room walls, mechanical room walls, conference room walls, nurse’s office walls, and other room walls deemed private by the Owner shall be provided with gasket to reduce noise-transmission.
   5. All boxes installed in exterior walls shall be provided with appropriate caulking and gaskets to seal off and prevent air leakage. Follow caulking and gasket manufacturer’s installation guidelines to ensure correct and effective installation.

6. Acceptable Manufacturers:
    a. Appleton
    b. Crouse Hinds
    c. Steel City
    d. RACO

B. Pull and Junction Boxes: Where necessary to terminate, tap off, or redirect multiple raceway runs or to facilitate conductor installation, furnish and install appropriately designed boxes. Boxes shall be fabricated from code gauge steel assembled with corrosion resistant machine screws. Box size shall be as required by Code. Where intermediate cable supports are necessary because of box dimensions, provide insulated removable core brackets to support conductors. Junction boxes are to be equipped with barriers to separate circuits. Where splices are to be made, boxes shall be large enough to provide ample work space. All conductors in boxes are to be clearly tagged to indicate characteristics. Boxes shall be supported independently of raceways. Junction boxes in moist or wet areas shall be galvanized type. Boxes larger than 4-inches square shall have hinged covers. Boxes larger than 12-inches in one dimension will be allowed to have screw fastened covers, if a hinged cover would not be capable of being opened a full 90 degrees due to installation location.

C. Fiberglass Handholes shall be die molded glass fiber. Cable Entrance shall be pre-cut 6-inch x 6-inch (150 mm x 150 mm) cable entrance at center bottom of each side. Cover shall be glass fiber weatherproof cover with nonskid finish.

D. Install boxes in accordance with NECA "Standard of Installation." Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.

E. Set wall mounted boxes at elevations to accommodate mounting heights indicated or specified in section for outlet device. Electrical boxes are shown on drawings in approximate locations unless dimensioned. Adjust box location up to 10-feet (3m) if required to accommodate intended purpose. Orient boxes to accommodate wiring devices. Maintain headroom and present neat mechanical appearance.

F. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches (150 mm) from ceiling access panel or from removable recessed luminaire. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Division 7.

G. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

H. Use flush mounting outlet box in finished areas. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening. Do not install flush mounting box back-to-back in walls; provide minimum 6-inches (150 mm) separation. Provide minimum 24 inches (600 mm) separation in acoustic rated walls. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness. Use stamped steel bridges to fasten flush mounting outlet box between studs. Install flush mounting box without damaging wall insulation or reducing its effectiveness.

I. Use adjustable steel channel fasteners for hung ceiling outlet box. Do not fasten boxes to ceiling support wires. Support boxes independently of conduit. Use gang box where more than one device is mounted together. Do not use sectional box. Use gang box with plaster ring for single device outlets. Use cast outlet box in exterior locations exposed to the weather and wet locations. Use cast floor boxes for installations in slab on grade; formed steel boxes are acceptable for other installations. Set floor boxes level.

J. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

K. Adjust floor box flush with finish flooring material. Adjust flush-mounting outlets to make front flush with finished wall material. Install knockout closures in unused box openings.

2.4 WIRING DEVICES

A. Provide wiring device type plates for all wall-mounted devices. All wall plates shall be either brushed aluminum or smooth high impact nylon for all public areas as directed by the Architect. Provide galvanized steel for all Utility, Electric and Mechanical Rooms. Colors of wall plates as directed by the Architect.
B. Wiring devices standard for the project (i.e., with no specific type indicated) shall conform to the following:
    1. Visible part colors of wiring devices shall be as directed by the Architect for all public areas. Provide Ivory colored devices for all Utility, Electrical and Mechanical rooms.
    2. Exclude compact type devices.
C. Wiring device switches shall be toggle type, A.C. quiet design, specification grade, 20 amps on 120 volt circuits. Switches shall be mounted 48-inches to center line above finished floor unless noted otherwise. Equivalent 277volt, 20 amp switches shall be used where required.
D. Standard duplex convenience receptacles shall be 125volt, 20 amps, three wire (two circuit wires plus ground), “U-slot” ground NEMA configuration 5-20R, specification grade. Receptacles shall be mounted 18” to center line above finished floor unless noted otherwise. Where indicated on plans provide receptacles with ground fault current interrupters, UL Class A; 20A, 125V.
E. Non-standard convenience receptacles and special purpose power supply receptacles shall be as listed on plans.
F. Use “Hospital-Grade” receptacles in areas of patient care for all healthcare facilities as defined in the National Electrical Code and in nurses’ office areas of schools. Day-care facilities, Preschool and Kindergarten rooms & other areas indicated on the plans shall be tamper resistant type receptacles. When connected to an Essential Electrical System, all “Hospital Grade” receptacles shall be illuminated.
G. Provide ground fault circuit interrupter (GFCI), weather-resistant type receptacles in all wet and damp locations as defined by the National Electrical Code. All outdoor receptacles and where indicated on the plans shall be installed in a weatherproof while-in-use enclosures.
H. Weatherproof Receptacle Enclosures shall be NEMA 3R rated for rain-tight while-in-use, gasketed, impact resistant thermoplastic with hinged gasketed device cover.
I. Provide extension rings to bring outlet boxes flush with finished surface. Clean debris from outlet boxes. Install devices plumb and level. Install receptacles with grounding pole on top. Connect wiring device grounding terminal to branch circuit equipment grounding conductor. Use jumbo size plates for outlets installed in masonry walls. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.
J. Install wall switch 48 inches above finished floor to top of handle. On position, shall be up. Install convenience receptacles 18-inches above finished floor. Install convenience receptacle 6-inches above backsplash of counter. Install dimmer switches 48 inches above finished floor to top.
K. Verify that each receptacle device is energized. Test each receptacle device for proper polarity. Test each GFCI receptacle device for proper operation.

2.5 GROUNDING & BONDING

A. Ground all systems and equipment in accordance with best industry practice, the requirements of NFPA 70 and the following:
    1. Provide grounding bonds between all metallic conduits of the light and power system which enter and leave cable chambers or other non-metallic cable pulling and splicing boxes. Accomplish this by equipping the conduits with bushings of the grounding type individually cross connected.
    2. Bond metallic conduits containing grounding electrode conductors and main bonding conductors to the ground bus service enclosure and/or grounding electrode at both ends of each run utilizing grounding bushings and jumpers.
    3. Provide grounding bonds for all metallic conduits of the light and power system which terminate in pits below equipment for which a ground bus is specified. Accomplish this by equipping the conduits with bushings of the grounding type connected individually to the ground bus.

4. Provide supplementary ground bonding where metallic conduits terminate at metal clad equipment (or at the metal pull box of equipment) for which a ground bus is specified. Accomplish this be equipping the conduits with bushings of the grounding type connected individually by means of jumpers to the ground bus. Exclude the jumpers where directed. This exclusion will be required where an isolated ground for electronic equipment is to be maintained.
5. Each grounding type bushing shall have the maximum ground wire accommodation available in standard manufacture for the particular conduit size. Connection to bushing shall be with wire of this maximum size.
6. Bonding conductors on the load size of the service device and equipment grounding conductors shall be sized in relation to the fuses or trip size of the overcurrent device supplying the circuit.
7. The central equipment for the fire protective alarm system and telephone system shall have its grounding terminal connected to the grounding electrode by means of a No. 6 green coded insulated conductor, run in 3/4" conduit. Utilize a ground clamp of a type specifically manufactured for the purpose.
8. Perform inspections and tests listed in NETA ATS, Section 7.13. Document test results in Record Documents.
9. Grounding means shall never exceed 10 ohms when located outdoors, or 5 ohms when located indoors.
10. An acceptable means of grounding is to provide an underground 2” thick, concrete-encased electrode of either ½” diameter, electrically conductive reinforcing bar of #4/0 bare copper conductor (minimum of 20-feet in length) per NEC 250.52(A)(3).

2.6 EQUIPMENT WIRING SYSTEMS

A. Cords & Caps: Manufacturers: Hubbel, Pass & Seymour or Arrow Hart. Attachment Plug Construction: Conform to NEMA WD 1. Configuration: NEMA WD 6; match receptacle configuration at outlet provided for equipment. Cord Construction: ANSI/NFPA 70, Type SO multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.
B. Motor Control Equipment: Each motor shall have a starter furnished under this Section where it is not being supplied by other sections. Wire and installed under this Section, unless otherwise noted herein or on the drawings.
   1. Connect the motor starting devices for all motors, except where otherwise specifically provided for under other sections, furnish all necessary connections between controllers and motors, in conduit and leave motors ready to start. Change connections, if necessary, to secure proper rotation of motors.
   2. Perform all the necessary wiring in connection with the motor starting and remote control equipment, where so designated, furnished under other sections. Where control or starting equipment is sent to the job as individual units, they shall be installed, wired up complete and left ready for operation under work of this section.
   3. Wiring to motor shall be in rigid conduit with watertight flexible conduit from wall to motor only.
C. Included in the general requirements for motor control equipment wiring and connections, the following specified items shall be performed:
   1. Installation and connection of motor controls which will be furnished under the heating, ventilating and air conditioning section and the plumbing section.
D. Starters by This Contractor: Where starters are not provided under other sections, this Contractor shall furnish starters for motors 1/2 HP and larger and where required by the control sequence for smaller motors and shall be magnetic across the line starters with adjustable overload protection in each phase line, all in NEMA 1 enclosures. Starters shall be solid state or acceptable substitute. Combination starters shall be with fused or non-fusible disconnect as required.

1. Magnetic starters shall have 120 volt holding circuits, integral transformers, auxiliary contacts as required by the control sequence and integral selector switches with push-to-test pilot lights. One side of each pilot light shall be connected on the load side of the motor starter.
2. Integral transformers shall have overload protection on the secondary section and, also, the secondary neutral shall be grounded.
3. Starters shall be as manufactured by Square D Company or General Electric.

E. Temperature control wiring shall be by others as indicated under the heating, ventilating and air conditioning section.
F. Provide a suitable plywood backboard on a wall and/or angle iron or unistrut framework with plywood for all starters. Starters will be installed and wired under this section.
G. All starters shall be located next to the panel feeding same, if panel is in a closet or utility space, unless noted otherwise on the drawings. If panel is located in a finished space (i.e. corridor, gymnasium, etc.) starters shall be located in nearby utility closet or space acceptable to the Engineer.
H. Nameplates: Each starter shall have a 1.0" x 2.5" hot stamped nameplate identifying the unit and panel it is fed from. The lettering shall be white 1/2" high in a black background.
I. Connections to systems: Make electrical connections in accordance with equipment manufacturer's instructions. Make conduit connections to equipment using flexible conduit. Use liquid-tight flexible conduit with watertight connectors in damp or wet locations. Make wiring connections using wire and cable with insulation suitable for temperatures encountered in heat producing equipment. Provide receptacle outlet where connection with attachment plug is indicated. Provide cord and cap where field-supplied attachment plug is indicated. Provide suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes. Install disconnect switches, controllers, control stations, and control devices as indicated. Modify equipment control wiring with terminal block jumpers as indicated. Provide interconnecting conduit and wiring between devices and equipment where indicated.
J. Building and Energy Management Systems (BMS/EMS): This contractor shall provide a price to the Mechanical Contractor to provide power and data wiring to all BMS/EMS components requiring same. Coordinate with Mechanical Contractor prior to bid and prior to any work the exact wiring requirements, connections requirements and exact locations for all BMS/EMS components. Such components shall include, but may not be limited to:
   1. Control transformers
   2. Central equipment controllers
   3. BMS controllers
   4. BMS Head-end equipment
   5. Line-voltage thermostats

2.7 SUPPORTING DEVICES

A. Materials and Finishes: Provide adequate corrosion resistance. Provide materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduit. Consider weight of wire in conduit when selecting products. Steel channel shall be galvanized.
B. Anchors and Fasteners:
   1. Concrete Structural Elements: Use precast insert system, expansion anchors.
   2. Steel Structural Elements: Use beam clamps, or welded fasteners.
   3. Concrete Surfaces: Use self-drilling anchors or expansion anchors.
   4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts or hollow wall fasteners.
   5. Solid Masonry Walls: Use expansion anchors or preset inserts.
   6. Sheet Metal: Use sheet metal screws.
   7. Wood Elements: Use wood screws.
C. Installation: Install products in accordance with manufacturer's instructions. Provide anchors, fasteners, and supports in accordance with NECA "Standard of Installation". Do not fasten supports to pipes, ducts, mechanical equipment, and conduit. Do not use spring steel clips and clamps. Do not use

powder-actuated anchors. Do no drill or cut structural members. Fabricate supports from structural steel or steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts. Install surface-mounted cabinets and panelboards with minimum of four anchors. In wet and damp locations use steel channel supports to stand cabinets and panelboards one inch off wall. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

2.8 ELECTRICAL IDENTIFICATION

A. Nameplates: Engraved three-layer laminated plastic, black letters on white background. Locations: Each electrical distribution and control equipment enclosure, communication cabinets. Letter Size: Use 1/8 inch letters for identifying individual equipment and loads. Use 1/4 inch letters for identifying grouped equipment and loads.
B. Labels: Embossed adhesive tape, with 3/16 inch white letters on black background. Use for identification of individual power receptacle faceplates indicating panel & circuit number the outlet is fed from and control device stations. In addition to nameplates as described above, use labels on all panelboards, disconnect switches and enclosed circuit breakers to identify where the equipment is fed from, voltage & phase.
C. Wire markers: Tape, or tubing type wire markers. Locations: Each conductor at panelboard gutters, pull boxes, outlet and junction boxes, and each load connection. Power and Lighting Circuits shall be marked with panel and branch circuit or feeder number as indicated on drawings. Control Circuits shall be marked with control wire number indicated on schematic and interconnection diagrams on drawings
D. Conduit markers: Corrosion and abrasion resistant. Location: Furnish markers for each conduit longer than 6 feet (2 m). Spacing: 20 foot on center. Indicate voltage and phase.
E. All panelboards shall be provided with a typed (hand written is not allowed) circuit directory indicating the load fed by each circuit breaker and it's location in the building.

2.9 TWO-WINDING TRANSFORMERS

A. Division 1 - Material and Equipment: Product Options and Substitutions.
B. Manufacturers:
   1. Square D Company.
   2. Cutler Hammer
   3. Siemens
   4. Substitutions: Under the provisions of Division 1.
C. Description: NEMA ST 20, factory-assembled, air cooled dry type transformers, ratings as indicated in schedule on plans. Transformers shall comply with NEMA TP-1, Energy Star Requirements and Department of Energy Efficiency Standards.
D. Primary Voltage: 480 volts, 3 phase unless otherwise noted on plans.
E. Secondary Voltage: 208Y/120 volts, 3 phase unless otherwise noted on plans.
F. Insulation system and average winding temperature rise for rated kVA as follows:
   1. 1-15 kVA: Class 185 with 115 degrees C rise.
   2. 16-500 kVA: Class 220 with 115 degrees C rise.
G. Case temperature: Do not exceed 35 degrees C rise above ambient at warmest point at full load.
H. Winding Taps:
   1. Transformers Less than 15 kVA: Two 5 percent below rated voltage, full capacity taps on primary winding.
   2. Transformers 15 kVA and Larger: NEMA ST 20.
I. Sound Levels: NEMA ST 20.
J. Basic Impulse Level: 10 kV for transformers less than 300 kVA, 30 kV for transformers 300 kVA and larger.
K. Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap.

L. Mounting:
   1. 1-15 kVA: Suitable for wall mounting.
   2. 16-75 kVA: Suitable for wall, floor, or trapeze mounting.
   3. Larger than 75 kVA: Suitable for floor or trapeze mounting.
M. Coil Conductors: Continuous windings with terminations brazed or welded.
N. Enclosure: NEMA ST 20, Type 1. Provide lifting eyes or brackets.
O. Isolate core and coil from enclosure using vibration-absorbing mounts.
P. Nameplate: Include transformer connection data and overload capacity based on rated allowable temperature rise.
Q. Set transformer plumb and level.
R. Use flexible metal conduit, 2-feet minimum length, for connections to transformer case. Make conduit connections to side panel of enclosure.
S. Mount wall-mounted transformers using integral flanges or accessory brackets furnished by the manufacturer.
T. Mount floor-mounted transformers on vibration isolating pads suitable for isolating the transformer noise from the building structure. Provide 4” high concrete housekeeping pad for transformers.
U. Mount trapeze-mounted transformers as indicated.
V. Provide seismic restraints.
W. Provide grounding and bonding per Code.

2.10 ENCLOSED SWITCHES

A. Fusible Switch Assemblies shall be provided in accordance with the following. Description: NEMA KS 1, Type GD with externally operable handle interlocked to prevent opening front cover with switch in ON position, enclosed load interrupter knife switch. Handle lockable in OFF position. Fuse clips: Designed to accommodate NEMA FU1, Class R fuses. Provide NEMA 3R where located outdoors, kitchens or other interior wet areas.
B. Non-fusible switch assemblies shall be provided in accordance with following. Description: NEMA KS 1, Type GD with externally operable handle interlocked to prevent opening front cover with switch in ON position enclosed load interrupter knife switch. Handle lockable in OFF position. Provide NEMA 3R where located outdoors, kitchens or other interior wet areas.
C. Install in accordance with NECA "Standard of Installation”. Install fuses in fusible disconnect switches. Apply adhesive tag on inside door of each fused switch indicating NEMA fuse class and size installed.

2.11 PANELBOARDS

A. Description: NEMA PB1, circuit breaker type, lighting and appliance branch circuit panelboard.
B. Panelboard Bussing: Bus bars shall be copper. Provide copper ground bus bar in all panelboards.
C. Minimum Integrated Short Circuit Rating: 10,000 amperes RMS symmetrical for 240 volt panelboards; 65,000 amperes RMS symmetrical for 480 volt panelboards, or as indicated.
D. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles, listed as Type SWD for lighting circuits, Type HACR for air conditioning equipment circuits, Class A ground fault interrupter circuit breakers where scheduled. Do not use tandem circuit breakers.
E. Enclosure: NEMA PB 1, Type 1.
F. Cabinet Box: 6 inches deep, 20 inches wide for 240 volt and less panelboards, 20 inches wide for 480 volt panelboards.
G. Cabinet Front: Flush or Surface cabinet front as scheduled with concealed trim clamps, concealed hinge, metal directory frame, and flush lock all keyed alike. Finish in manufacturer's standard ANSI 49 enamel.

2.12 ENCLOSED CIRCUIT BREAKERS

A. Enclosed Molded Case Circuit Breaker: Comply with NEMA AB 1. Include provisions for padlocking. Provide insulated grounding lug in each enclosure. Provide Products suitable for use as service entrance equipment where so applied. Fabricate enclosure from steel.
B. Install enclosed circuit breakers where indicated, in accordance with manufacturer's instructions. Install enclosed circuit breakers plumb. Provide supports in accordance with these specifications. Height: 5 ft (1.6 M) to operating handle. Provide engraved plastic nameplates.
C. Inspect each circuit breaker visually. Perform several mechanical ON-OFF operations on each circuit breaker. Verify circuit continuity on each pole in closed position. Determine that circuit breaker will trip on overcurrent condition, with tripping time to NEMA AB 1 requirements. Include description of testing and results in test report.

2.13 FUSES

A. All fuses shall be rated for proper voltage in which they are applied. Interrupting ratings shall be greater than the short circuit current available at the terminals of the switch.
B. Fuse types:
   1. Fuses for branch circuits shall be time delay class J.
   2. Fuses for equipment other than motor loads shall be general fast acting RK-5 or Class J.
   3. Control power transformers for motor controller circuits shall be as recommended by motor starter and motor control center manufacturer.
   4. Fuses for motors shall be sized at 250% of the motor FLA.
   5. Fuses for non-motor loads shall be sized at 125% of the rated FLA of equipment served.
   6. Fuses for elevator lifts shall be dual element type and sized in accordance with the elevator manufacturer’s recommendations.
C. Spare Fuses
   1. Provide spare fuses in the amount of 20% (not less than three (3) nor more than nine (9) of all sizes and types).
   2. Spare fuses shall include general purpose fuses, motor fuses, and control fuses used in motor control centers, starters etc.
   3. A complete list and quantity of spare fuses shall be submitted with record drawings for review.

2.14 ENCLOSED MOTOR CONTROLLERS

A. The Electrical Contractor shall review the mechanical drawings and coordinate with the Mechanical Contractor for electrical components of the mechanical equipment and systems such as motors, factory mounted motor starters, factory mounted disconnect switches, variable frequency drives and controls to be provided under Division 15 (by the Mechanical Contractor).
B. The Electrical Contractor shall provide motor starters, variable frequency drives and disconnect switches for equipment shown on the drawings where the Mechanical Contractor is not providing such equipment.
C. The electrical contractor shall provide all power wiring for all HVAC equipment.
D. Manual Motor Controller: NEMA ICS 2, AC general-purpose Class A manually operated, full-voltage controller with thermal overload elements on each phase, red pilot light, NO, NC auxiliary contact, and push button or toggle operator.
E. Fractional Horsepower Manual Controller: NEMA ICS 2, AC general-purpose Class A manually operated, full-voltage controller for fractional horsepower induction motors, with thermal overload elements on each phase, red pilot light, and toggle operator.
F. Motor Starting Switch: NEMA ICS 2, AC general-purpose Class A manually operated, full-voltage controller for fractional horsepower induction motors, without thermal overload elements on each phase, with red pilot light and toggle operator.
G. Enclosures: NEMA ICS 6; Type 1 for indoors and Type 3R for outdoors and wet/damp locations (kitchens, mechanical rooms, pool equipment rooms, etc...).

H. Automatic Magnetic Motor Controllers: NEMA ICS 2, AC general-purpose Class A magnetic controller for induction motors rated in horsepower. Reversing Controllers: Include electrical interlock and integral time delay transition between FORWARD and REVERSE rotation. Two Speed Controllers: Include integral time delay transition between FAST and SLOW speeds. Coil operating voltage: 120volts, 60 Hertz. Overload Relay: NEMA ICS; bimetal or melting alloy. Enclosure: NEMA ICS 6, Type 1 for indoors or Type 3R for outdoors and wet/damp locations (kitchens, mechanical rooms, pool equipment rooms, etc...).
I. Product Options and Features as follows. Auxiliary Contacts: NEMA ICS 2, 2 each normally open and closed contacts in addition to seal-in contact. Cover Mounted Pilot Devices: NEMA ICS 2, standard duty type. Pilot Device Contacts: NEMA ICS 2, Form Z, rated A150. Pushbuttons: Recessed type. Indicating Lights: LED type. Selector Switches: Rotary type. Relays: NEMA ICS 2. Control Power Transformers: 120 volt secondary, in each motor starter. Provide fused primary and secondary, and bond un-fused leg of secondary to enclosure.
J. Installation Requirements: Install enclosed controllers where indicated, in accordance with manufacturer's instructions. Install enclosed controllers plumb. Provide supports in accordance with these specifications. Height: 5 feet to operating handle. Install fuses in fusible switches. Select and install overload heater elements in motor controllers to match installed motor characteristics. Provide engraved plastic nameplates under these specifications. Provide neatly typed label inside each motor controller door identifying motor served, nameplate horsepower, full load amperes, code letter, service factor, and voltage/phase rating.

2.15 ENCLOSED CONTACTORS

A. General purpose contactors: NEMA ICS 2, AC general purpose magnetic contactor. Coil Voltage as indicated. Poles as indicated. Size as indicated. Enclosure per ANSI/NEMA ICS 6, Type as scheduled.
B. Lighting contactors: NEMA ICS 2, magnetic lighting contactor. Coil Voltage as indicated. Poles as indicated. Size as indicated. Contact Rating shall match branch circuit overcurrent protection, considering de-rating for continuous loads.
C. Accessories: Provide Pushbuttons and Selector Switches per NEMA ICS 2, heavy duty type. Provide indicating lights per NEMA ICS 2, push-to-test type. Provide auxiliary contacts per NEMA ICS 2, Class A300 or A600 as required per equipment served.

2.16 INTERIOR LUMINAIRES

A. Lighting fixtures shall be in accordance with identifications as follows:
B. All lamping shall be of the highest quality available.
C. Finishes shall be as selected by the Architect or as indicated on the plans.
D. Any additional appurtenances required for installation and operation, where same are not covered by the identification used on the drawings, shall be included. Lighting fixtures and equipment shall be furnished complete, wired and assembled, including canopies, lamps and other incidental items. Install specified lamps in each luminaire.
E. Recessed fixtures shall be coordinated with ceiling construction by the Electrical Contractor prior to Bid. Refer to the Architect’s plans, details and elevations for ceiling types by area. Provide plaster trim kits as required by ceiling construction.
F. Exact location of all fixtures shall be confirmed with Architect prior to rough-in. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.
G. Recessed fixtures throughout shall have their components, wiring and external connections coordinated for use in ceilings utilized as air handling plenums. Install recessed luminaires to permit removal from below. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating. Install clips to secure recessed grid-supported luminaires in place

H. Fixtures for use outdoors or in areas designated as damp locations, shall be suitably gasketed and UL listed for such applications.
I. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire
J. Emergency batteries for exterior fixtures shall be remote mounted within the building. Verify maximum distances for remote mounting the emergency batteries with the manufacturer prior to installation. Locate remote emergency batteries above accessible ceilings or utility rooms as required. Provide test switches for all emergency batteries as required.
K. Unless noted otherwise, all fixtures shall be 3500K and have a minimum CRI of 85.
L. The Contractor shall obtain all information relative to the exact type of hung ceilings and suspension systems to be installed before ordering any recessed fixtures. This Contractor shall furnish the proper type fixtures applicable to the ceiling framing system. If, other than the type of fixtures specified are required for installation due to the type of ceiling construction, this Contractor shall furnish and install the proper type fixtures and mounting appurtenances required at no extra charge.
M. The Contractor shall coordinate the exact locations of all lighting fixtures with the ceiling pattern during the construction period and before installation of the fixtures. Interferences between lighting fixtures, and other equipment, shall be brought to the attention of the General Contractor.
N. Include the aiming and/or adjustments of all lighting fixtures requiring same in accordance with instructions issued by the Architect in the field. Aim and adjust luminaries as indicated or as directed by the Owner, Architect or Engineer. Position exit sign directional arrows as indicated. Operate each luminaire after installation and connection. Ensure proper connection and operation.
O. Lighting fixtures shall be supported from building structure only, not from hung or suspended ceiling, by means of chains or threaded rods. The use of tie wire will not be allowed. All fixtures shall include seismic clips and shall be supported to comply with seismic regulations. Install suspended luminaires using pendants supported from swivel hangers or other suitable leveling means. All rows of fixtures shall be level, aligned with building lines and run parallel to each other. Provide pendant length required to suspend luminaires at indicated height. Support luminaires to building structure, independent of ceiling framing.

2.17 FIRE ALARM SYSTEM

A. GENERAL
1. The contractor shall submit complete documentation for the Fire Alarm/Life Safety System Data Sheets for all items to ensure compliance with these specifications. Copies of this information shall be submitted as required to the Architect award of this work and shall be subject to the approval of the architect.
2. The contractor shall submit, as part of the complete bid documentation package, certification that the engineered system distributor is a fully authorized factory trained and certified distributor of the system detailed within this specification.
3. All equipment and material shall be new and unused, and listed by Underwriter's Laboratories for the specific intended purpose. All control panel components, field peripherals and interactive computer peripherals shall be designed for continuous duty operation without degradation of function or performance.
4. All equipment covered by this specification or noted on installation drawings shall be the best equipment suited for the application and shall be provided by a single manufacturer.
5. Provide all equipment and accessories and compatible devices for a complete and fully functioning addressable fire alarm system. The fire alarm system shall be coordinated with and inspected by the local fire department, and any inconsistency mentioned during any inspection shall be corrected by contractor at no additional cost to owner.
6. The control panel shall contain a microprocessor with 10/100 ethernet media access controller (MAC). The system shall be designed specifically for fire detection, and notification applications.

7. The installing contractor shall coordinate master-box, radio-box, and/or dialer requirements with local fire department.

B. FIRE ALARM LIFE SAFETY SYSTEM SEQUENCE OF OPERATION
1. The operation of a manual station or activation of any automatic alarm initiating device (system smoke, heat, waterflow) shall automatically:
   a. Initiate the transmission of the alarm to the Municipal Fire Station or approved Central Station via the Local Energy or Radio Master-box.
   b. Sound a code 3 temporal evacuation signal over all audio (notification) circuits, except in designated areas of assembly. In designated areas of assembly (sound a pre-recorded voice message) and/or conduct manual voice evacuation from the system microphone(s) located at the FACP or remote location(s) in accordance with the local requirements.
   c. Flash all visual signals throughout the building in a synchronized manner.
   d. Flash an alarm LED and sound an audible signal at the FACP. Upon acknowledgement, the alarm LED shall light steadily and the audible shall silence. Subsequent alarms shall re-initiate this sequence.
   e. Upon alarm initiation by an elevator lobby smoke detector or other designated recall device, recall all elevators that serve the floor of initialization to the main egress level. If the alarm initiates on the main egress level, return the elevator to the alternate floor as directed by the local authority having jurisdiction.
   f. Visually indicate the alarm initiating device type and location via the LCD display located at the FACP (and at any remote annunciators) and (illuminate the appropriate alarm zone LED at the remote annunciator).
   g. Automatically shut down or control HVAC equipment to initiate smoke control functions as required. Manual override controls and programmable relay interface shall serve as an interface to the Building Automation System.
   h. Operate prioritized outputs to release all magnetically held smoke doors and magnetically locked doors throughout the building.
   i. Activate the exterior weatherproof beacon.

C. WIRING
1. Provide in accordance with manufacturer's instructions all wiring, conduit and outlet boxes required for the installation of complete system as described herein and as shown on the drawings. Wiring shall be Class A.
2. Installation and fire alarm system wiring shall be installed in metal raceway. An equipment bonding conductor shall be provided in all flexible metallic raceways.
3. Color code for fire alarm systems shall be per the State Fire Alarm code.
4. DC supply to the main fire alarm panel shall be white and black. Fire alarm primary power source shall be on dedicated branch circuit. Circuit breaker locks shall be used. If a separate feed is required for the battery charger it shall be black and white unless the main fire alarm panel required only AC feed. In this case the conductors to the battery charger shall be red and white and shall be on a circuit breaker of fits own.
5. Conductors shall be minimum #14-gauge solid copper type THHN/THWN. Conductor's size shall be increased as required to maintain voltage drop to a maximum of 3%. All AC and DC portions of the system shall be installed in separate raceway. Addressable loop wiring may be #16 providing manufacturer's recommended distance is observed. Systems requiring shielded wiring for addressable loops shall not be acceptable.
6. Red painted terminal cabinets with hinged local covers shall be provided at all junction points. All conductor splices shall be made on screw type terminal blocks, wire nuts shall not be used. All terminals within terminal cabinet shall be properly labeled. Provide terminal cabinet at each building cable entrance and at other locations as required.
7. All fire alarm initiating zone and signal wiring shall be wired Class A.
8. Final connections between the equipment and the wiring system shall be made under the direct supervision of a representative of the manufacturer.

9. Upon completion of the installation of fire alarm equipment, the electrical contractor shall provide to the engineer a signed statement substantially in the form as follows:
    a. The undersigned having been engaged as the electrical contractor on this project confirms the fire alarm equipment was installed in accordance with the specifications and in accordance with wiring diagrams, instructions, and directions provided to us by the manufacturer.

D. GUARANTEE AND FINAL TEST
1. All testing (pre-testing, final testing, quarterly testing and program change testing) to be coordinated with the owner and scheduled in advance so that owners and personnel can be present during testing. Contractor to certify that all tests comply with the "State Fire Code", latest edition.
2. Before this installation shall be considered complete and acceptable to the awarding authorities, a complete test on the system shall be performed as follows:
    a. A pre-test will be held by the electrical contractor with the manufacturer's authorized representative present. After certification of a complete pre-test, the installing contractor shall inform the authority having jurisdiction of the outcome of the test and will re-inspect in the presence of the authority having jurisdiction and the manufacturer's authorized representative.
    b. Final test: The electrical contractor in the presence of authorized representative of the manufacturer and the fire department shall operate every manual station, smoke detector, and thermodetector. Each station/detector circuit and horn circuit shall be opened in at least two locations to check for the presence of correct supervisory circuitry. When this testing ahs been completed to the satisfaction of both the electrical contractor's job foreman and the representative of the manufacturer, a letter from the contractor cosigned by the manufacturer attesting t the satisfactory completion of said testing, shall be forwarded to the owner.
3. The electrical contractor shall guarantee all equipment and wiring to be free from inherent mechanical and electrical defects for a period of one year from the date of final acceptance.
4. The contractor shall provide the Owner with a formal written equipment guarantee upon completion of the installation and testing of the system. The guarantee period shall begin on the day of acceptance of the system by the Owner and shall provide for a period of one year. This guarantee shall be indicated in the manufacturer's submission prior to approval. This guarantee shall be as normal policy by the equipment manufacturer.
5. The manufacturer shall maintain a full-time service and parts facility, with seven days per week, 24 hour per day service available.
6. All service technicians shall be licensed by the State Fire Code covering service and maintenance of systems.
7. Include as part of the contract, the four quarterly tests following the final acceptance test. Provide quarterly testing in conformance with the State Fire Code latest addition.

2.18 DATA

A. The Electrical Contractor shall provide and install data outlet backbox per the Owner's specifications and direction. Install ¾" EMT conduit with pull string from backbox to above accessible ceiling. Provide bushed endcap on conduit (above ceiling end of conduit).

B. Provide a copper ground bar (1/4" thick x 4" high x 36" long) with wall mounting brackets, insulators and a #6AWG copper exothermically welded pigtail in each telephone / data closet, server room and/or IDF closet. Connect pig tail to building steel or electrical service grounding system.

2.19 TELEPHONE

A. Provide incoming telephone service raceways and cable as indicated on Drawings or as required by the serving telephone company. Provide 8' x 8' x ¾" plywood board (and one double duplex outlet) on

wall for telephone equipment. Provide 3/4-inch thick plywood board, fire-retardant-treated and stamped FRT, securely anchored to the wall.

B. The Electrical Contractor shall provide and install telephone outlet backboxes per the Owner's specifications and direction as shown on the plans. Install ¾" EMT conduit with pull string from backbox to above accessible ceiling. Provide bushed endcap on conduit (above ceiling end of conduit).
C. Provide a copper ground bar (1/4" thick x 4" high x 36" long) with wall mounting brackets, insulators and a #6AWG copper exothermically welded pigtail in each telephone room and telephone terminal board. Connect pig tail to building steel or electrical service grounding system per the telephone company's requirements.
D. PBX (private branch exchange) equipment by Owner.

PART 3 – EXECUTION

3.1 BASIC REQUIREMENTS

A. Adhere to best industry practice and the following:
   1. All work shall be concealed.
   2. Route circuitry runs embedded in concrete to coordinate with structural requirements.
   3. Equip each raceway intended for the future installation of wire or cable with a nylon pulling cord 3/16" in diameter and clearly identify both ends of the raceway.
   4. Provide all outlet boxes, junction boxes, and pull boxes for proper wire pulling and device installation. Include those omitted from the drawings due to symbolic methods of notation.
   5. Utilize lugs of the limited type to make connections at both ends of cables installed on the line side of main service overcurrent and switching devices. Provide cable limiters for each end of each service entrance cable.
   6. Beyond the termination of raceways, fireproof the following:
      a. All wires and cables within pad-mounted transformer enclosure.
      b. All service feeder cables ahead of main service overcurrent protection devices, and elsewhere where not in raceways.
   7. Fireproofing of wires and cables shall be by means of a half-lapped layer of arcproof or by means of sleeving of a type specifically manufactured for the purpose. Ends of tape or sleeving shall be severed with twine. Fireproofing shall be extended up into raceways. After conductors have been finally shaped into their permanent configuration, fireproofing tape or sleeving shall be coated with silicate of soda (water glass). Fireproofing shall be applied in an overall manner to raceway groupings of conductors.
   8. Provide all sleeves through fireproof and waterproof slabs, walls, etc., required for electric work.
   9. Provide waterproof sealing for the sleeves through waterproof slabs, walls, etc.
   10. Provide fireproof sealing for the sleeves through fireproof walls, slabs, etc.
   11. Provide fireproof sealing for the openings in fireproof walls, slabs, etc., resulting from removal of existing electrical sleeves, conduits, poke-thru's etc.
   12. No splicing of wires will be permitted in the Fire Alarm System.
   13. Bundle wiring passing through pull boxes and panelboards in a neat and orderly manner with plastic cable ties. Cable ties shall be by Ty-Raps as manufactured by Thomas & Betts, Holub Industries Inc., Quick Wrap, Bundy Unirap, or equal.
   14. Turn branch circuits and auxiliary system wiring out of wiring gutters at 90 degrees to circuit breakers and terminal lugs.

3.2 TESTING REQUIREMENTS & INSTRUCTIONS

A. Where any repairs, modifications, adjustments, tests or checks are to be made, the Contractor shall contact the Engineer to determine if the work should be performed by or with the Manufacturer's Representative.
B. Tests are to:
   1. Provide initial equipment/system acceptance.
   2. Provide recorded data for future routine maintenance and trouble-shooting.
   3. Provide assurance that each system component is installed satisfactorily and can be expected to perform, and continue to perform its specified function with reasonable reliability throughout the life of the facility.
C. At any stage of construction and when observed, any electrical equipment or system determined to be damaged, or faulty, is to be reported to the Engineer. Corrective action by the Contractor requires prior Engineer approval, retesting, and inspection.
D. When the electrical tests and inspections specified or required within Division 16 are completed and results reported, reviewed, and approved by the Engineer, the Contractor may consider that portion of the electrical equipment system or installation electrically complete. The Contractor will then affix appropriate, approved, and dated completion or calibration labels to the tested equipment and notify the Engineer of electrical completion. If the Engineer finds completed work unacceptable, he will notify the Contractor in writing of the unfinished or deficient work, with the reason for his rejection, to be corrected by the Contractor. The Contractor will notify the Engineer in writing when exceptions have been corrected. The Contractor will prepare a "Notification or Substantial Electrical Completion" for approval by the Engineer following Engineer's acceptance of electrical completion. If later in-service operation or further testing identified problems attributable to the Contractor, these will be corrected by the Contractor, at no additional cost to the Authority.
E. Grounding Systems:
   1. Test main building loops and major equipment grounds to remote earth, directly referenced to an extremely low resistance (approximately 1 ohm) reference ground benchmark. Perform a visual inspection of the systems, raceway and equipment grounds to determine the adequacy and integrity of the grounding. Ground testing results shall be recorded, witnesses, and submitted to the Engineer.
   2. Perform ground tests using a low resistance, null-balance type ground testing ohmmeter, with test lead resistance compensated for. Use the type of test instrument which compensates for potential and current rod resistances.
   3. Test each ground rod and measure ground resistance. If resistance is not 10 ohms or less, drive additional rods to obtain a resistance of 10 ohms or less. Submit tabulation of results to Engineer. Include identification of electrode, date of reading and ground resistance valve in the test reports.
   4. Test each building and major equipment grounding system for continuity of connections and for resistance. Ground resistance of conduits, equipment cases, and supporting frames, shall not exceed 5 ohms to ground. Submit all readings to the Engineer.
   5. Where ground test results identify the need for additional grounding conductors or rods that are not indicated or specified, design changes will be initiated to obtain the acceptable values. The Contractor is responsible for the proper installation of the grounding indicated and specified.
   6. Operating Instructions: Furnish operating instructions to Owner's designated representative with respect to operations, functions and maintenance procedures for equipment and systems installed. Cost of such instruction up to a full five (5) days of Electrical Subcontractor's time shall be included in contract. Cost of providing a Manufacturer's Representative at site for instructional purposes shall also be included.

3.3 BRANCH CIRCUITRY

A. For all lighting and appliance branch circuitry, raceway sizes shall conform to industry standard maximum permissible occupancy requirements except where these are exceeded by other requirements specified elsewhere.
B. Circuits shall be balanced on phases at their supply as evenly as possible.
C. Feeder connections shall be in the phase rotation which establishes proper operation for all equipment supplied.
D. Reduced size conductors indicated for any feeders shall be taken as their grounding conductors.
E. Feeders consisting of multiple cables and raceways shall be arranged such that each raceway of the feeder contains one (1) cable for each leg and one (1) neutral cable, if any.
F. For circuitry indicated as being protected at 20 Amps or less, abide by the following:
   1. All 20 amp, 120/208 volt, 3-phase, 4-wire combined branch circuit homeruns shall be provided with a #8 AWG neutral conductor.
   2. Minimum conductor size shall be No. 12 AWG cooper.
   3. Conductors operating at 120 volts extending in excess of 100 ft. or at 277 volts extending in excess of 200 ft., or the last outlet or fixture tap shall be No. 10 AWG cooper throughout.
   4. Lighting fixtures and receptacles shall not be connected to the same circuit.
G. Type MC Cable Installation:
   1. Where cable is permitted under the products section, the installation of same shall be done in accordance with code and the following:
      a. Cable shall be supported in accordance with code. Tie wire is not an acceptable means of support. Cable supports such as Caddy WMX-6, MX-3, and clamps such as Caddy 449 shall be used. Where cables are supported by the structure and only need securing in place, then ty-raps will be acceptable. Ty-raps are not acceptable as a means of support. All fittings, hangers, and clamps for support and termination of cables shall be of type specifically designed for use with cable, i.e., romex connectors not acceptable.
      b. Armor of cable shall be removed with rotary cutter device equal to roto-split by Seatek Co.; not with a hacksaw.
      c. Use split “Insuliner” sleeves at terminations.

3.4 REQUIREMENTS GOVERNING ELECTRICAL WORK IN DAMP OR WET LOCATIONS

A. Outlets and outlet size boxes shall be of galvanized cast ferrous metal only.
B. The finish of threaded steel conduit shall be galvanized only.
C. Wires for pulling into raceways for lighting and appliance branch circuitry shall be limited to “THWN”.
D. Wires for pulling into raceways for feeders shall be limited to “THWN”.
E. Plates for toggle switches and receptacles shall have gasketed snap shut covers suitable for wet locations while in use.
F. Final connections of flexible conduit shall be neoprene sheathed.
G. Apply one (1) layer of half looped plastic electric insulating tape over wire nuts used for joining the conductors of wires.
H. Enclosures, junction boxes, pull boxes, cabinets, cabinet trims, wiring troughs and the like, shall be fabricated of galvanized sheet metal, shall conform to the following:
   1. They shall be constructed with continuously welded joints and seams.
   2. Their edges and weld spots shall be factory treated with cold galvanizing compound.
   3. Their connection to circuitry shall be by means of watertight hub connectors with sealing rings.
I. Enclosures for individually mounted switching and overcurrent devices shall be NEMA Class IV weatherproof construction.
J. The covers, doors and plates and trims used in conjunction with all enclosures, pull boxes, outlet boxes, junction boxes, cabinets and the like shall be equipped with gaskets.
K. Panels shall be equipped with doors without exception.
L. The following shall be interpreted as damp or wet locations within building confines:
   1. Spaces where any designations indicating weatherproof (WP) or vapor proof appear on the drawings.

2. Below waterproofing in slabs applied directly on grade.
3. Spaces defined as wet or damp locations by Article 100 of the National Electric Code.
4. Parking garage.

3.5 LIMITING NOISE PRODUCED BY ELECTRICAL INSTALLATION

A. Perform the following work, in accordance with field instructions issued by the Architect to assure that minimal noise is produced by electrical installations due to equipment furnished as part of the electrical work.
B. Check and tighten the fastenings of sheet metal plates, covers, doors and trims used in the enclosures of electrical equipment.
C. Remove and replace any individual device containing one or more magnetic flux path metallic cores (e.g., discharge lamp ballast, transformer, reactor, dimmer, and solenoid) which is found to have a noise output exceeding that of other identical devices installed at the project.

3.6 SUPPORTS AND FASTENINGS

A. Support work in accordance with best industry standards, and Local Electric Code.
B. Include supporting frames or racks for equipment, intended for vertical surface mounting, which is required in a free standing position.
C. Supporting frames or racks shall be of standard angle, standard channel or specialty support system steel members. They shall be rigidly bolted or welded together and adequately braces to form a substantial structure. Racks shall be of ample size to assure a workmanlike arrangement of all equipment mounted on them.
D. No work intended for exposed installation shall be mounted directly on any building surface. In such locations, flat bar members or spaces shall be used to create a minimum of ¼" air space between the building surfaces and the work. Provide ¾" thick exterior grade plywood painted with two (2) coats of fire-retardant gray paint for mounting of panelboards.
E. Nothing (including outlet, pull and junction boxes and fittings) shall depend on electric conduits, raceways or cables for support.
F. Nothing shall rest on, or depend for support on, suspended ceiling media.
G. Support less than 2" trade size, vertically run, conduits at intervals no greater than 8'. Support such conduits, 2-1/2" trade size or larger, at intervals no greater than they story height, or 15', whichever is smaller.
H. Where they are not embedded in concrete, support less than 1" trade size, horizontally run, conduits at intervals no greater than 7'. Support such conduits, 1" trade size or larger, at intervals no greater than 10'.
I. Support all lighting fixtures directly from structural slab, deck or framing member.
J. Where fixtures and ceilings are such as to require fixture support from ceiling openings frames, include in the electric work the members necessary to tie back the ceiling opening frames to ceiling suspension members or slabs so as to provide actual support for the fixtures noted above.
K. As a minimum procedure, in suspended ceilings support smalls runs of circuitry (e.g., conduit not in excess of 1" trade size) from ceiling suspension members as defined above. Support larger runs of circuitry directly from structural slabs, decks or framing members.
L. Fasten electric work to building structure in accordance with the best industry practice.
M. Floor mounted equipment shall not be held in place solely by its own dead weight. Include floor anchor fastenings in all cases.
N. For items which are shown as being ceiling mounted at locations where fastenings to the building construction element above is not possible, provide suitably auxiliary channel or angle iron bridging tying to building structural elements.
O. As a minimum procedure, where weight applied to the attachment points is 100 lbs. or less, fasten to concrete and solid masonry with bolts and expansion shields.

P. As a minimum procedure, where weight applied to building attachment points exceed 100 lbs., but is 300 lbs. or less, conform to the following:
   1. At field poured concrete slabs, utilize inserts with 20' minimum length slip-through steel rods, set transverse to reinforcing steel.

3.7 SPLICING AND TERMINATING WIRES AND CABLES

A. Maintain all splices and joints in removable cover boxes or cabinets where they may be easily inspected.
B. Locate each completed conductor splice or joint in the outlet box, junction box, or pull box containing it, so that it is accessible from the removal cover side of the box.
C. Join solid conductors No. 8 AWG and smaller by securely twisting them together and soldering, or by using insulated coiled steel spring "wire nut" type connectors. Exclude "wire nuts" employing non-expandable springs. Terminate conductors No. 8 AWG and smaller by means of a neat and fast holding application of the conductors directly to the binding screws or terminals of the equipment or devices to be connected.
D. Join, tap and terminate standard conductors No. 6 AWG and larger by means of solder sleeves, taps, and lugs with applied solder or by means of bolted saddle type or pressure indent type connectors, taps and lugs. Exclude connectors and lugs of the types which apply set screws directly to conductors. Where equipment or devices are equipped with set screw type terminals which are impossible to change, replace the factory supplied set screws with a type having a ball bearing tip. Apply pressure indent type connectors, taps and lugs utilizing tools manufactured specifically for the purpose and having features preventing their release until the full pressure has been exerted on the lug or connector.
E. Except where wire nuts are used, build up insulation over conductor joints to a value, equal both in thickness and dielectric strength, to that of the factory applied conductor insulation. Insulation of conductor taps and joints shall be by means of half-lapped layers of rubber tape, with an outer layer of friction tape; by means of half-lapped layers of approved plastic electric insulating tape; or by a means of split insulating casings manufactured specifically to insulate the particular connector and conductor, and fastened with stainless steel or non-metallic snaps or clips.

3.8 PULLING WIRES INTO CONDUITS AND RACEWAYS

A. Delay pulling wires or cables in until the project has progressed to a point when general construction procedures are not liable to injure wires and cables, and when moisture is excluded from raceways.
B. Utilize nylon snakes or metallic fish tapes with ball type heads to set up for pulling. In raceways 2" trade size and larger, utilize a pulling assembly ahead of wires consisting of a suitable brush followed by a 3-1/2" diameter ball mandrel.
C. Leave sufficient slack on all runs of wire and cable to permit the secure connection of devices and equipment.
D. Include circular wedge-type cable supports for wires and cables at the top of any vertical raceway longer than 20 feet. Also include additional supports spaced at intervals which are no greater than 10'. Supports shall be located in accessible pull boxes. Supports shall be of a non-deteriorating insulating material manufactured specifically for the purpose.
E. Pulling lubricants shall be used. They shall be products manufactured specifically for the purpose.

3.9 REQUIREMENTS FOR THE INSTALLATION OF JUNCTION BOXES, OUTLET BOXES AND PULL BOXES

A. Flush wall-mounted outlet boxes shall not be set back to back but shall be offset at least 12" horizontally regardless of any indication on the drawings.

B. Locate all boxes so that their removable covers are accessible without necessitating the removal of parts of permanent building structure, including piping, ductwork, and other permanent mechanical elements.
C. In conjunction with concealed circuitry, abide by one of the following instructions (as may be applicable to the conditions) in order to assure the aforementioned accessibility. (Not required for circuitry concealed by removable suspended ceiling tiles.)
D. For a small (outlet size) box on circuitry concealed in a partition or wall, locate box or fitting so that its removable cover side, (or the face of any applied raised cover) penetrates through to within 1/8” of the exposed surface of the building materials concealing the circuitry and apply a blank or device plate to suit the functional requirements.
E. For a large box on circuitry concealed in a partition, suspended ceiling, or wall, locate box totally hidden but with its removable cover directly behind an architectural access door or panel (included for the purpose, separate from the electric work) in the building construction which conceals the circuitry.
F. Include all required junction and pull boxes regardless of indications on the drawings (which, due to symbolic methods of notation, may omit to show some of them).
G. Unless noted below or otherwise specifically indicated, include a separate outlet box for each individual wiring device, lighting fixture and signal or communication system outlet component. Outlet boxes supplied attached to lighting fixtures shall not be used as replacements for the boxes specified herein.
H. Utilize an outlet box no smaller than 5” square by 2-1/2” deep.
I. Allow no fixture to be supplied from an outlet box in another room.
J. Multiple local switches indicated at a single location shall be gang-mounted in a single outlet box.
K. Install junction boxes, pull boxes and outlet boxes in conjunction with concealed circuitry.
L. Close up all unused circuitry openings in outlet boxes. Unused openings in cast boxes shall be closed with approved cast metal threaded plugs. Unused openings in sheet metal boxes shall be closed with sheet metal knock-out plugs.
M. Outlet boxes for switches shall be located at the strike side of doors. Indicate door swings are subject to field change. Outlet boxes shall be located on the basis of final door swing arrangements.
N. Boxes and plaster covers for duplex receptacles shall be arranged for vertical mounting of the receptacle.
O. Equip outlet boxes used for devices which are connected to wires of systems supplied by more than one set of voltage characteristics with barriers to separate the different systems.
P. Barriers in junction and pull boxes of outlet size shall be of the same metal as the box.
Q. Barriers in junction and pull boxes which are larger than outlet size shall be of the polyester resin fiberglass of adequate thickness for mechanical strength, but in no case less than 1/4" thick. Each barrier shall be mounted, without fastenings, between angle iron guides so that they may be readily removed.

3.10 LOCATING AND ROUTING OF CIRCUITRY

A. In general, all circuitry shall be run concealed except that it shall be run exposed where the following conditions occur:
   1. Horizontally at the ceiling of permanently unfinished spaces which are not assigned to mechanical or electrical equipment.
   2. Horizontally and vertically in mechanical equipment spaces.
   3. Horizontally and vertically in electric equipment rooms.
B. Concealed circuitry shall be so located that building construction materials can be applied over its thickest elements without being subject to spalling or cracking.
C. All circuitry and raceways shall not be run within slabs. If field conditions requires raceways to be embedded in field-poured structural building construction concrete fill or slab shall conform to the following:
   1. Where turned up or down into a wall or partition they shall, before entering same, be routed parallel for a long enough distance to assure that no relocation of the wall or partition will be necessary to conceal the required bend.

2. They shall be routed in such a manner as to coordinate with the structural requirements of the building.
3. They shall be routed in accordance with field instructions issued by the Architect where such instructions differ from specifications set forth herein.

D. Circuitry run exposed shall be routed parallel to building walls and column lines.
E. Circuitry shall be routed so as to prevent electric conductors from being subject to high ambient temperature. Minimum clearances from heated lines or surfaces shall be maintained as follows:
1. Crossing where uninsulated: 3".
2. Crossing where insulated: 1"
3. Running parallel where uninsulated: 36".
4. Running parallel where insulated: 6".

F. Circuitry shall not be run in elevator shafts, hoistways, and the like. Where outlets for trail cables, pit lights, run be level lights, and the like, are involved, only the "final connection" outlet boxes themselves shall be located within or open into, the confines of the shaft.

3.11 INSTALLING CIRCUITRY

A. The outside surface of circuitry, which is to be embedded in cinder concrete, shall be coated with asphaltum paint.
B. In runs of conduit or raceway including flexible limit the number of bends between cable access points to a total which does not exceed the maximum specified for the particular system. Where no such maximum is specified, limit the number to four (4) right angle bends or the equivalent thereof.
C. In each conduit or raceway assigned for the future pulling in of wires, include a nylon drag cord. In raceways 2" trade size and larger, the cord shall be pulled in utilizing a suitable brush, followed by an 85% diameter ball mandrel ahead of the cord in the pulling assembly. In the event that obstructions are encountered, which will not permit the drag cord to be installed, the blocked section of raceway shall be replaced and any cutting and patching of the structure involved in such replacement shall be included as part of the electric work.
D. Circuitry shall be arranged such that conductors of one feeder or circuitry carrying "going" current are not separated from conductors of the same feeder or circuitry carrying "return" current by any ferrous or other metal. Where not within raceways, all "going" and "return" current conductors of one feeder or circuit shall be laced together so as to minimize induction heating of adjacent metal components.
E. Sleeves used where circuitry is to penetrate waterproof slabs, decks and walls, shall be of a type selected to suit the water condition encountered in the field.

END OF SECTION