



Office of the Secretary of State
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Business Entity Search

Entity Information

Entity Name	MIDWEST SERVICES AND DEVELOPMENT CORP.		
File Number	67948955	Status	GOODSTANDING
Entity Type	CORPORATION	Type of Corp	DOMESTIC BCA
Incorporation Date (Domestic)	05-24-2011	State	ILLINOIS
Duration Date	PERPETUAL		
Annual Report Filing Date	05-01-2023	Annual Report Year	2023
Agent Information	NICOLETA MAN 5280 N LAWLER AVE CHICAGO ,IL 60630	Agent Change Date	10-21-2014

Services and More Information

Client: Village of Oak Park
Project Name: Public Works Center Locker Room Upgrades

Project No.: 23-120
Bid Due Date: Friday, June 28th, 2023
Project Manager: Vic Sabaliauskas
 Building Maintenance Superintendent

BID TAB WORKSHEET

Contractor	Base Bid Amount	Alternates						Total Bid Amount	EEO	Bid Bond
		Alt. No. 01A	Alt. No. 01B	Alt. No. 02A	Alt. No. 02B	Alt. No. 03	Alt. No. 04		M/W/DBE	
Midwest Services & Development midwestservices2010@gmail.com	\$119,000.00	\$12,000.00	\$7,000.00	\$6,000.00	\$3,000.00	\$16,000.00	\$6,000.00	\$169,000.00	No	X
D Kersey Construction doug@dkersey.com	\$199,900.00	\$11,675.00	\$6,400.00	\$4,345.00	\$4,800.00	\$3,000.00	\$8,365.00	\$238,485.00	No	X
Construction, Inc. Amanda@buildwithci.com	\$175,000.00	\$12,000.00	\$5,000.00	\$5,000.00	\$2,500.00	\$4,500.00	\$5,000.00	\$209,000.00	No	X

Base bid includes new lockers for both men's and women's locker rooms as well as new showers, washers and dryers in men's locker room.
 Alt. No. 01A: Remove and replace all existing ACT ceiling tiles as specified in the men's locker room
 Alt. No. 01B: Remove and replace all existing 2'X4' ceiling lights in the men's locker room with new LED light fixtures.
 Alt. No. 02A: Remove and replace all existing ACT ceiling tiles as specified in the women's locker room
 Alt. No. 02B: Remove and replace all existing 2'X4' ceiling lights in the women's locker room with new LED light fixtures.
 Alt. No. 03: Remove existing sink faucet and replace all internal mechanical, sensor parts and reinstall.
 Alt. No. 04: Provide in-line fan at each new dryer vent duct and extend general use 120V receptacle circuit for new exhaust fan.

Bid Bond

AIA® Document A310™ – 2010

CONTRACTOR:

(Name, legal status and address)

MIDWEST SERVICES AND DEVELOPMENT CORP.
5280 N. Lawler Ave
Chicago, IL 60630

Bid Bond No. **OS02340**

SURETY:

(Name, legal status and principal place of business)

Old Republic Surety Company
P.O. Box 1635
Milwaukee, WI 53201-1635

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

OWNER:

(Name, legal status and address)

Village of Oak Park
201 South Boulevard
Oak Park, IL 60302

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

BOND AMOUNT: Ten Percent of the Bid Amount (10.00% of Bid Amount)

PROJECT:

(Name, location or address, and Project number, if any)

Public Work Center Locker Room Renovation

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this 21st day of June, 2023

Bianca Rex
(Witness)
Karla K. Heffron
(Witness)

MIDWEST SERVICES AND DEVELOPMENT CORP.
(Principal) [Signature] *(Seal)*
(Title)
Old Republic Surety Company
(Surety) [Signature] *(Seal)*
(Title) Samuel Duchow, Attorney-in-Fact

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OLD REPUBLIC SURETY COMPANY

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That OLD REPUBLIC SURETY COMPANY, a Wisconsin stock insurance corporation, does make, constitute and appoint: MICHAEL J. DOUGLAS, CHRIS M. STEINAGEL, CHRISTOPHER MATHER KEMP, ROBERT S. DOWNEY, CONNIE SMITH, KORY C. MORTEL, ELIOT MOTU, SAMUEL DUCHOW of HUDSON, WI

its true and lawful Attorney(s)-in-Fact, with full power and authority for and on behalf of the company as surety, to execute and deliver and affix the seal of the company thereto (if a seal is required), bonds, undertakings, recognizances or other written obligations in the nature thereof, (other than bail bonds, bank depository bonds, mortgage deficiency bonds, mortgage guaranty bonds, guarantees of installment paper and note guaranty bonds, self-insurance workers compensation bonds guaranteeing payment of benefits, or black lung bonds), as follows:

ALL WRITTEN INSTRUMENTS

and to bind OLD REPUBLIC SURETY COMPANY thereby, and all of the acts of said Attorneys-in-Fact, pursuant to these presents, are ratified and confirmed. This appointment is made under and by authority of the board of directors at a special meeting held on February 18, 1982.

This Power of Attorney is signed and sealed by facsimile under and by the authority of the following resolutions adopted by the board of directors of the OLD REPUBLIC SURETY COMPANY on February 18, 1982.

RESOLVED that, the president, any vice-president or assistant vice president, in conjunction with the secretary or any assistant secretary, may appoint attorneys-in-fact or agents with authority as defined or limited in the instrument evidencing the appointment in each case, for and on behalf of the company to execute and deliver and affix the seal of the company to bonds, undertakings, recognizances, and suretyship obligations of all kinds; and said officers may remove any such attorney-in-fact or agent and revoke any Power of Attorney previously granted to such person.

RESOLVED FURTHER, that any bond, undertaking, recognizance, or suretyship obligation shall be valid and binding upon the Company

- (i) when signed by the president, any vice president or assistant vice president, and attested and sealed (if a seal be required) by any secretary or assistant secretary; or
- (ii) when signed by the president, any vice president or assistant vice president, secretary or assistant secretary, and countersigned and sealed (if a seal be required) by a duly authorized attorney-in-fact or agent; or
- (iii) when duly executed and sealed (if a seal be required) by one or more attorneys-in-fact or agents pursuant to and within the limits of the authority evidenced by the Power of Attorney issued by the company to such person or persons.

RESOLVED FURTHER that the signature of any authorized officer and the seal of the company may be affixed by facsimile to any Power of Attorney or certification thereof authorizing the execution and delivery of any bond, undertaking, recognizance, or other suretyship obligations of the company; and such signature and seal when so used shall have the same force and effect as though manually affixed.

IN WITNESS WHEREOF, OLD REPUBLIC SURETY COMPANY has caused these presents to be signed by its proper officer, and its corporate seal to be affixed this 22nd day of September, 2022.

Karen J. Haffner
Assistant Secretary



OLD REPUBLIC SURETY COMPANY

Alan Pavlic
President

STATE OF WISCONSIN, COUNTY OF WAUKESHA - SS

On this 22nd day of September, 2022, personally came before me, Alan Pavlic and Karen J. Haffner, to me known to be the individuals and officers of the OLD REPUBLIC SURETY COMPANY who executed the above instrument, and they each acknowledged the execution of the same, and being by me duly sworn, did severally depose and say: that they are the said officers of the corporation aforesaid, and that the seal affixed to the above instrument is the seal of the corporation, and that said corporate seal and their signatures as such officers were duly affixed and subscribed to the said instrument by the authority of the board of directors of said corporation.



Kathryn R. Pearson
Notary Public

My Commission Expires: September 28, 2026

(Expiration of notary's commission does not invalidate this instrument)

CERTIFICATE

I, the undersigned, assistant secretary of the OLD REPUBLIC SURETY COMPANY, a Wisconsin corporation, CERTIFY that the foregoing and attached Power of Attorney remains in full force and has not been revoked; and furthermore, that the Resolutions of the board of directors set forth in the Power of Attorney, are now in force.

24-5172



Signed and sealed at the City of Brookfield, WI this 21st day of June, 2023

Karen J. Haffner
Assistant Secretary

ORSC 22282 (3-08)

SECTION IV
PROPOSAL FORM (Pricing)

The undersigned proposes to furnish all labor and materials required to complete the Work in accordance with the attached specifications and at the price indicated below.

Total Lump Sum Cost Base Bid: \$ 119,000.00

Alternates:

Alternate Bid #01A: MENS LOCKER ROOM CEILING

Base Bid: Existing ceiling to remain.

Alternate Bid: Remove and replace all the existing ACT ceiling tile as specified in the Men's Locker Room, within dashed boundary. Existing ceiling grid to remain.

Alternate Bid #01B: MENS LOCKER ROOM LIGHTING

Base Bid: Existing lighting to remain.

Alternate Bid: Remove and replace all existing 2'x4' ceiling lights in the Men's Locker Room (within dashed boundary) with new LED light fixtures. Reuse existing lighting circuit and connect to existing panel LP-B for regular lights and EM-1 for emergency lights.

Alternate Bid #02A: WOMENS LOCKER ROOM CEILING

Base Bid: Existing ceiling to remain.

Alternate Bid: Remove and replace all the existing ACT ceiling tile as specified in the Women's Locker Room, within dashed boundary. Existing ceiling grid to remain.

Alternate Bid #02B: WOMENS LOCKER ROOM LIGHTING

Base Bid: Existing lighting to remain.

Alternate Bid: Remove and replace all existing 2'x4' ceiling lights in the Women's Locker Room (within dashed boundary) with new LED light fixtures. Reuse existing lighting circuit and connect to existing panel LP-B for regular lights and EM-1 for emergency lights.

Alternate Bid #03: MENS SINK AREA

Base Bid: Existing sink faucets and components to remain.

Alternate Bid: Remove existing sink faucet (2QTY) and replace all internal mechanical, sensor parts and reinstall. Existing sink to remain, protect as required to prevent any damage. See plumbing drawings for more information.

Alternate Bid #04: DRYER BOOSTER FAN

Base Bid: In-line booster fan not included.

Alternate Bid: Provide in-line fan at each new dryer vent duct. Refer to mechanical. Extend general use 120V receptacle circuit for new exhaust fan compliant connection. Minimum 2#12 & a#12 GRD, ¾ C" wiring. See mechanical plan and equipment schedule for more information.

Total for Alt. #01A:	\$ <u>12,000.00</u>
Total for Alt. #01B:	\$ <u>7,000.00</u>
Total for Alt. #02A:	\$ <u>6,000.00</u>
Total for Alt. #02B:	\$ <u>3,000.00</u>
Total for Alt. #03:	\$ <u>16,000.00</u>
Total for Alt. #04:	\$ <u>6,000.00</u>

24-Hour Emergency Call-back Number:

(773) 818-5204

Printed Name: Constantin Bontas

Proposal Signature: constantin bontas

State of Illinois) County of Cook)

Constantin Bontas- President
(Type Name of Individual Signing)

being first duly sworn on oath deposes and says that the contractor on the above proposal is organized as indicated below and that all statements herein made on behalf of such Contractor and that their deponent is authorized to make them, and also deposes and says that deponent has examined and carefully prepared their proposal from the agreement specifications and has checked the same in detail before submitting this proposal; that the statements contained herein are true and correct.

Signature of contractor authorizes the Village of Oak Park to verify references of business and credit at its option.

Signature of contractor shall also be acknowledged before a Notary Public or other person authorized by law to execute such acknowledgments.

Dated: _____/_____/2023 _____

Organization Name
(Seal - If Corporation)

By: Constantin Bontas

5280 N. Lawler Chicago, IL, 60630

Authorized Signature

Address

Telephone: 773 818-5204

Subscribed and sworn to before me this 29 day of June, 2023
in the State of _____ My

Commission
Notary Public

Bianca Rogers



Expires on _____/_____/_____

Complete Applicable Paragraph Below

(a) Corporation

The contractor is a corporation, which operates under the legal name of Midwest Services and is organized and existing under the laws of the State of Illinois. The full names of its Officers are:

President Constantin Bontas

Secretary Nicoleta Man

Treasurer Nicoleta Man

The corporation does have a corporate seal. (In the event that this proposal is executed by a person other than the President, attach hereto a certified copy of that section of Corporate By-Laws or other authorization by the Corporation that permits the person to execute the offer for the corporation.)

(b) Partnership

Names, Signatures, and Addresses of all Partners

The partnership does business under the legal name of _____, which name is

is registered with the office of _____ in the county of _____

(c) Sole Proprietor

The contractor is a Sole Proprietor whose full name is

_____ . If the contractor is operating under

a trade name, said trade name is _____,

which name is registered with the office of _____

in the county of _____.

Signed: _____

Sole Proprietor

In compliance with the above, the undersigned offers and agrees, if his/her proposal is accepted within ninety (90) calendar days from date of opening, to furnish any or all of the items upon which prices are quoted, at the price set opposite each item, delivered at the designated point within the time specified above.

MUNICIPAL QUALIFICATION REFERENCE SHEET
(or attach separate form)

MUNICIPALITY

ADDRESS

CONTACT

PHONE

E-mail:

WORK
PERFORMED

MUNICIPALITY

ADDRESS

CONTACT

PHONE

E-mail:

WORK
PERFORMED

MUNICIPALITY

ADDRESS

CONTACT

PHONE

E-mail:

WORK
PERFORMED

SECTION V
CONTRACTOR CERTIFICATION

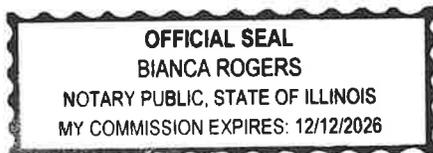
Midwest Service and Development, as part of its proposal on an agreement for construction Work
(Name of Contractor selected) for the Village of Oak Park, hereby certifies that said contractor selected
is not barred from proposing on the aforementioned agreement as a result of a violation to
either Section 33E-3 or 33E-4 of Article 33E of Chapter 38 of the Illinois Revised Statutes or
Section 2-6-12 of the Oak Park Village Code relating to "Proposing Requirement.

constantin bontas
(Authorized Agent of Contractor selected)

Subscribed and sworn to before me this 29 day of June, 2023.

Bianca ROGERS
Notary Public's Signature

- Notary Public Seal -



SECTION VI
TAX COMPLIANCE AFFIDAVIT

Constantin Bontas, being first duly sworn, deposes and says:

that he/she is President of
(partner, officer, owner, etc.)

Midwest Service and Development
(Contractor selected)

The individual or entity making the foregoing proposal or proposal certifies that he/she is not barred from entering into an agreement with the Village of Oak Park because of any delinquency in the payment of any tax administered by the Department of Revenue unless the individual or entity is contesting, in accordance with the procedures established by the appropriate revenue act, liability for the tax or the amount of the tax. The individual or entity making the proposal or proposal understands that making a false statement regarding delinquency in taxes is a Class A Misdemeanor and, in addition, voids the agreement and allows the municipality to recover all amounts paid to the individual or entity under the agreement in civil action.

constantin bontas

By:

Its:

Constantin Bontas- President

(name of contractor if the contractor is an individual)

(name of partner if the contractor is a partnership)

(name of officer if the contractor is a corporation)

The above statement must be subscribed and sworn to before a notary public.

Subscribed and sworn to before me this 29 day of June, 2023.

Bianca Rogers

Notary Public's Signature

- Notary Public Seal



Reporting Requirements

The following forms must be completed in their entirety, notarized and included as part of the proposal document. Failure to respond truthfully to any question on the list or failure to cooperate fully with further inquiry by the Village of Oak Park will result in disqualification of your proposal.

SECTION X
COMPLIANCE AFFIDAVIT

I, Constantin Bontas, (print name) being first duly sworn on oath depose and state:

1. I am the (title) President of the proposing company and am authorized to make the statements contained in this affidavit on behalf of the company;
2. I have examined and carefully prepared this Proposal based on the request and have verified the facts contained in the Proposal in detail before submitting it;
3. The proposing company is organized as indicated above on the form entitled "Organization of Proposing Company."
4. I authorize the Village of Oak Park to verify the company's business references and credit at its option;
5. Neither the proposing company nor its affiliates¹ are barred from proposing on this project as a result of a violation of 720 ILCS 5/33E-3 or 33E-4 relating to Proposal rigging and Proposal rotating, or section 2-6-12 of the Oak Park Village Code relating to "Proposing Requirements".
6. The proposing company has the M/W/DBE status indicated below on the form entitled "EEO Report."
7. Neither the proposing company nor its affiliates is barred from agreementing with the Village of Oak Park because of any delinquency in the payment of any debt or tax owed to the Village except for those taxes which the proposing company is contesting, in accordance with the procedures established by the appropriate revenue act, liability for the tax or the amount of the tax. I understand that making a false statement regarding delinquency in taxes is a Class A Misdemeanor and, in addition, voids the agreement and allows the Village of Oak Park to recover all amounts paid to the proposing company under the agreement in civil action.
8. I am familiar with Section 13-3-2 through 13-3-4 of the Oak Park Village Code relating to Fair Employment Practices and understand the contents thereof; and state that the proposing company is an "Equal Opportunity Employer" as defined by Section 2000(E) of Chapter 21, Title 42 of the United States Code Annotated and Federal Executive Orders #11246 and #11375 which are incorporated herein by reference. Also complete the attached EEO Report or Submit an EEO-1.
9. I certify that the contractor is in compliance with the Drug Free Workplace Act, 41 U.S.C.A. 702

Signature: constantin bontas

Name and address of Business: 5280 N. Lawler Chicago, IL, 60630

Telephone 773 818 5204 E-Mail midwestservices2010@gmail.com

Subscribed to and sworn before me this 29 day of June, 2023.

Bianca Rogers
Notary Public



¹ Affiliates means: (i) any subsidiary or parent of the agreementing business entity, (ii) any member of the same unitary business group; (iii) any person with any ownership interest or distributive share of the agreementing business entity in excess of 7.5%; (iv) any entity owned or controlled by an executive employee, his or her spouse or minor children of the agreementing business entity.

SECTION XI
M/W/DBE STATUS AND EEO REPORT

Failure to respond truthfully to any questions on this form, failure to complete the form or failure to cooperate fully with further inquiry by the Village of Oak Park will result in disqualification of this Proposal.

1. Contractor Name: Midwest Service and Development

2. Check here if your firm is:

- Minority Business Enterprise (MBE) (A firm that is at least 51% owned, managed and controlled by a Minority.)
- Women's Business Enterprise (WBE) (A firm that is at least 51% owned, managed and controlled by a Woman.)
- Owned by a person with a disability (DBE) (A firm that is at least 51% owned by a person with a disability)
- None of the above

[Submit copies of any W/W/DBE certifications]

3. What is the size of the firm's current stable work force?

4 Number of full-time employees

1 Number of part-time employees

4. Similar information will be requested of all sub-contractors working on this agreement. Forms will be furnished to the lowest responsible contractor with the notice of agreement award, and these forms must be completed and submitted to the Village before the execution of the agreement by the Village.

Signature: constantin bontas

Date: June 29 2023

EEO Report

Please fill out this form completely. Failure to respond truthfully to any questions on this form, or failure to cooperate fully with further inquiry by the Village of Oak Park will result in disqualification of this Proposal. An incomplete form will disqualify your Proposal.

An EEO-1 Report may be submitted in lieu of this report

Contractor Name Midwest Service and Develop
 Total Employees 4

Job Category	Total # of Empl.	Total Males	Total Females	Males					Females				Total Minorities
				Black	Hispanic	American Indian	Alaskan Native	Asian & Pacific Islander	Hispanic	American Indian	Alaskan Native	Asian & Pacific Islander	
Officials & Managers	3	2	1										
Professionals	1							1					
Technicians													
Sales Workers													
Office & Clerical													
Semi-Skilled Laborers													
Service Workers													
Management Trainees													
Apprentices													

This completed and notarized report must accompany your Proposal. It should be attached to your Affidavit of Compliance. Failure to include it with your Proposal will be disqualify you from consideration.

Constantin Bontas, being first duly sworn, deposes and says that he/she is the _____
 (Name of Person Making Affidavit)
 (Title or Officer)
 of President and that the above EEO Report information is true and accurate and is submitted with the intent that it

be relied upon. Subscribed and sworn to before me this 29 day of June, 2023.

Bianca Rogers
 (Signature)

June 29 2023
 (Date)



As Midwest Services President

In 2022

1. CSSD 89 Arbor View Bathrooms Remodeling

Tel: 630-710-3540 Paul Pessetti _Legat Arc.

Value: 412,000.00

2. Oak Park Fire Station 3 Remodeling

Tel: **312.253.3400** Darren Schretter- Studio GC

Value 540,000.00

1. In 2016 and 2014

Avoca School District 37

Tel:847-251-3587 Beth Dever

Classrooms Renovations: Flooring and Millwork
Installation, Painting, Electrical, Fire Alarm, HVAC,
Plumbing, Masonry

2016 Project Value 550,000.00

2014 Project Value 350,000.00

2. City of Highland Park Train Arcade

Tel:847-926-1152 Joe O'Neil Value \$ 80,000.00

Renovation of Train Arcade: Roofing and Flashing

3. In 2014 and 2017

Du Page County Masonry Tuck Pointing,
Caulking and Concrete Restorations.

Tel: 630-675-1054 Tom Kuhn

2014 Project Value \$ 190,000.00

2017 Project Value \$ 153,000.00

4. 2019 Elmhurst Public Work Garage

Tel:630530-3019 Larry Paruskiewicz

Value 148,000.00

Tuck pointing, Caulking and Sealant Work

5. 2020 Pennoyer SD 79 Office Remodeling
Tel:708-456-9094 Dr. Kristin Kopta
Value: 754,000.00
Demo, Masonry, Millwork, Division 10, HVAC,
Plumbing, Electrical, Carpentry.

6. School District 200 Capital Improvements Tuck
Pointing
Tel: 630-710-3540 Paul Pessetti
Value: \$ 267,000.00
Tuck pointing at Wiesbrook, Boller, Emerson
Schools

7. Summit School District 104, Masonry Repairs
Tel: 630.495.1900 x216 V.P. Trinh
Value: 316,000.00

As ATP Enterprise Group CEO

8. River Trails The Zone Remodeling 2019
Tel: 847-255-1200 Tom Pope
Value 910,000.00

Interior Renovation

9. Waubonsee Community College Wiegel Hall
Chemistry Lab Renovation 2015

Tel: 630-896-4678 Cordogan Clark Office.

Contact Person for the College retired.

Value: 1,100,000

10. Naperville Park District Office Remodeling
2014

Tel:630-848-5000 Eric Shute

Value 400,000.00

REQUEST FOR PROPOSALS
INSTRUCTIONS AND SPECIFICATIONS FOR:

Village of Oak Park Public Works Center Locker Room Upgrades
Bid Number: 23-120
Issuance Date: 6/7/2023

The Village of Oak Park will receive proposals from qualified contractors to furnish and install new metal lockers for the men's and women's locker rooms at the Public Works Center, located at 201 South Blvd., Oak Park, IL 60302. Proposals will be accepted at the Public Works Center Monday through Friday, 7:30 a.m. to 4:00 p.m. local time until **11:00 a.m. on Friday, June 30th, 2023**. Proposals may also be sent via e-mail to vics@oak-park.us. Proposals will be reviewed and the results of the review will be presented to the Village of Oak Park Board of Trustees.

There will be a pre-bid meeting at the Public Works Center on Wednesday, June 14th, 2023 at 10:30 a.m. Prospective bidders are encouraged to attend the pre-bid meeting to inspect site conditions and obtain other pertinent information about the scope of work.

Specifications and bid forms may be obtained by sending a request to Building Maintenance Superintendent, Vic Sabaliauskas at vics@oak-park.us or by stopping by the Public Works Center at the address listed above or by calling 708-358-5710.

The Board of Trustees reserves the right to accept or reject any and all proposals or to waive technicalities, or to accept any item of any proposal.

Do not detach any portion of this document. Upon formal award to the successful contractor, a written agreement will be executed in substantially the form attached.

In responding to this Request for Proposals, the official logo of the Village of Oak Park is not to be used in any form. Use of the Village logo is strictly prohibited by law and such use could subject the proposer to disqualification.

Submission of Proposals

The bid shall be submitted on the bid form included herewith. If bid is hand delivered or mailed to the Public Works Center, the bid shall be submitted in a sealed envelope marked "**BID: 23-120 Village of Oak Park Public Works Center Locker Room Upgrades**", shall bear the return address of the bidder, and shall be addressed as follows:

TO: Vic Sabaliauskas, Building Maintenance Superintendent
Department of Public Works
201 South Blvd.
Oak Park, IL 60302

SECTION I
PROPOSAL INSTRUCTIONS, TERMS AND CONDITIONS

Preparation and Submission of Proposal

All proposals must be delivered to the Public Works Center by the specific time indicated on the cover page. Proposals arriving after the specified time will not be accepted. Mailed proposals that are received by the Village after the specified hour will not be accepted regardless of the post-marked time on the envelope. Proposals must be signed by an officer of the company who is authorized to enter into agreements on behalf of the company. Proposals shall be sealed in an envelope and marked as stated on the cover page.

Proposal Bond

The contractor shall provide a proposal bond in the amount of ten percent (10%) of the total proposal price. The attached form may be used or the contractor may provide cash or a certified check in the amount specified. The proposal bonds, cash or checks will be returned once the selected contractor has entered into an agreement for this work and provided the Contract bond in an amount of one hundred percent (100%) of the total approved proposal price.

Contract Bond

The successful contractor shall, within ten (10) calendar days after award of the Proposal, furnish a contract bond in the amount of one hundred percent (100%) of the contract price. The bond shall ensure faithful performance of the work, and the payment for materials, labor and of the subcontractors. The bond shall be with a surety or sureties with a rating of "A" or better by A.M. Best and Company and such sureties shall be approved by the Village. Bonds in the form of certified or cashier's check shall be made payable to the Village of Oak Park, Illinois. The contract bond shall be furnished in the same number of copies as the number of copies of the agreement to be executed.

Award of Agreement

The agreement will be awarded in whole or in part to the responsible contractor whose proposal, conforming to the request for proposals, will be most advantageous to the Village; price and other factors considered.

Costs of Preparation

The Village will not be responsible for any expenses incurred in preparing and submitting a proposal or entering into the applicable agreement.

Taxes not Applicable

The Village of Oak Park as an Illinois municipality pays neither Illinois Sales Tax nor Federal Excise Tax (State Tax Exemption Identification Number E9998-1823-06). Contractors should exclude these taxes from their prices.

Withdrawal of Proposals

Any contractor may withdraw its proposal at any time prior to the time specified in the advertisement as the closing time for the receipt of proposals, by signing a request therefore. No contractor may withdraw or cancel its proposal for a period of sixty (60) calendar days after

the advertised closing time for the receipt of proposals. The successful contractor may not withdraw or cancel its proposal after having been notified that the proposal was accepted by the Village Board of Trustees.

Investigation of Contractors

The Village will make such investigations as are necessary to determine the ability of the contractor to fulfill proposal requirements. If requested, the contractor should be prepared to present evidence to the Village of Oak Park of ability and possession of necessary facilities and financial resources to comply with the terms of the attached specifications and proposals. In addition, the contractor shall furnish the Village with any information the Village may request, and shall be prepared to show completed work of a similar nature to that included in its proposal. The Village reserves the right to visit and inspect the premises and operation of any contractor.

Rejection of Contractor

The Village will reject any proposal from any person, firm or corporation that appears to be in default or arrears on any debt, agreement or the payment of any taxes. The Village will reject any proposal from a contractor that failed to satisfactorily complete work for the Village under any previous agreement.

Conditions

Contractors are advised to become familiar with all conditions, instructions and specifications governing the work. Contractors shall be presumed to have investigated the work site, conditions and scope of the work before submitting a proposal.

Compliance with Applicable Laws

The contractor will strictly comply with all ordinances of the Village of Oak Park and Village Code and laws of the State of Illinois.

Governing Law

All agreements entered into by the Village of Oak Park are governed by the laws of the State of Illinois without regard to conflicts of law. Any action brought to enforce an agreement with the Village of Oak Park must be brought in the state and federal courts located in Cook County, Illinois.

Subletting of Agreement

No agreement awarded by the Village of Oak Park shall be assigned or any part sub-agreement without the written consent of the Village of Oak Park or as noted in the contractor's proposal. In no case shall such consent relieve the contractor from its obligations or change the terms of the agreement.

Interpretation of Agreement Documents

Any contractor with a question about this proposal may request an interpretation thereof from the Village. If the Village changes the proposal, either by clarifying it or by changing the specifications, the Village will issue a written addendum, and will mail a copy of the addendum to all prospective contractors. The Village will not assume responsibility for receipt of such addendum. In all cases, it will be the contractor's responsibility to obtain all addenda issued.

Contractors will provide written acknowledgment of receipt of each addendum issued with the proposal submission.

Minority Business and Women Business Enterprise Requirements

The Village of Oak Park, in an effort to reaffirm its policy of non-discrimination, encourages the efforts of contractors and subcontractors to take affirmative action in providing for Equal Employment Opportunity without regard to race, religion, creed, color, sex, national origin, age, handicap unrelated to ability to perform the job or protected veteran's status.

Licenses and Permits

The contractor shall be responsible for becoming a licensed contractor in the Village. The contractor shall also be responsible for obtaining any and all required permits from the Village's Development Customer Services Department (Building Permits Division). The Village shall waive all permit fees.

Agreement

The selected contractor shall enter into an Independent Contractor Agreement with the Village to complete the work in a form substantially similar to the agreement attached hereto. The agreement shall be executed by the contractor and returned, together with the contract bond within ten (10) calendar days after the agreement has been mailed to the contractor. The contractor shall execute three copies of the agreement. One fully executed copy will be returned to the contractor.

Notice to Proceed

Work shall begin within fourteen (14) days from the Notice to Proceed from the Village's Building Maintenance Superintendent. All work shall be completed in accordance with the detailed specifications set forth herein, unless the Building Maintenance Superintendent grants an extension.

Fees and Cost

In the event any action is brought to enforce any agreement entered into by the Village of Oak Park, or to collect any unpaid amount from the Village of Oak Park, each party bears the responsibility of paying its own attorneys' fees and costs.

Dispute Resolution

The Village of Oak Park does not agree to the mandatory arbitration of any dispute.

SECTION II
DETAILED SPECIFICATIONS

See attached detailed specs and design documents as submitted by the design firm of Cordogan Clark & Associates, Inc.

The selected contractor shall furnish all labor, supervision, supplies, tools, equipment, vehicles and other means necessary or proper for performing and completing the work. The selected contractor shall be responsible for the cleaning up of the job site and shall repair or restore all structures and property that may be damaged or disturbed during performance of the work to the satisfaction of the Village of Oak Park.

The agreement and work shall be carried out in conformance with the laws and regulations of the Village of Oak Park and these specifications. All work will be performed according to the standards set forth in the applicable building codes and standards, including mechanical, fire, plumbing, electric, accessibility, or any other applicable codes in force in the Village of Oak Park and State of Illinois.

Alterations, Omissions and Extra Work

The Village of Oak Park reserves the right to increase or decrease the quantity of any item or portion of the work, or to omit portions of the work as may be deemed necessary.

Job Site Conditions

To the fullest extent possible, the contractor will not allow its work to interfere with the critical operations of the Fire Department. Contractor will take all necessary actions as directed by the Village in that regard.

Material Storage: The contractor shall be responsible for the storage and safety of his own materials. The Village assumes no liability whatever for any material damaged or stolen on the premises. Any damage to, or loss by theft or vandalism of any material, appurtenance, or appliance, after such has been applied, connected or installed on Village property, shall be the sole responsibility of the contractor until the project is completed and accepted by the Village.

Safety Precautions: The contractor is solely responsible for implementing effective safety precautions on and around the work site to protect workers and other persons who might be affected and shall exercise every precaution at all times for the protection of the property. The contractor shall not leave any combustible materials or other fire hazards overnight or allowed them to accumulate. The contractor shall abide by all applicable laws, standards, and regulations that apply to the completion of the work, including EPA and OSHA safety standards and regulations.

Damage to Property: Contractor shall repair, at no additional cost to the Village, all damage to Village property caused by the contractor resulting from his work. Where repair of existing work is called for, such patching and replacement shall be made to blend with existing work so that the patch or replacement will be inconspicuous after finishing.

Daily Clean-up: The contractor shall keep the premises clean and orderly during the course of the work and all debris shall be removed on a continuous basis.

Method of Payment

The Village of Oak Park will pay monthly all undisputed invoices billed at the rates set forth in the contractor's proposal within 30 days of approval as provided in the Local Government Prompt Payment Act, 50 ILCS505/4. The maximum interest rate for any payment not made within 30 days of approval is 1%.

Change Orders

Change Orders: Changes in the Work may be agreed to after execution of the agreement, and without invalidating the agreement, if the change order is in writing and signed. Any changes to the scope of work which result in an increase in the agreement price will be subject to an agreement addendum which must be signed by both parties. Any such change order will be prepared by the Village. The contractor may only proceed with the change upon receipt of the written change order signed by the Village.

Emergency Changes: Contractor may perform work not included in the scope of work if necessary to remedy a condition that poses an immediate threat to persons or property. Work of this nature shall be carried out only to the extent of bringing the condition under control. The Village shall be notified immediately. A change order will then be negotiated and executed for the work performed, and for work remaining, if any.

Minor Changes (Field Orders): The Village may verbally authorize minor changes in the scope of work in order to prevent a delay in the progression of the work. These field orders may not involve a change in the agreement price or be inconsistent with the scope of work.

Changes Due to Unknown Conditions: The contractor is not responsible for changes in the work that are due to conditions that were not reasonably observable or conditions that have changed. In such cases, the contractor shall notify the Village and a change order will be negotiated.

Any change which results in a total agreement price in excess of \$10,000 must be approved by the Village of Oak Park Board of Trustees.

Correction of Work Prior To Final Payment

The Village has the right to stop work if the contractor fails to carry out the work in a manner acceptable to the Village. If the Village deems the contractor's work unacceptable, at the Village's election, the contractor shall do one of the following:

1. Promptly repair or replace the defective work, without expense to the Village, including costs associated with repairing any damage to property caused by the replacement work; or;
2. If the Village deems it unacceptable to have the contractor correct work which has been incorrectly done, a deduction from the agreement price shall be made based on the costs to the Village to have the work repaired. Such a deduction from the agreement price shall in no way affect the Village's other remedies or relieve the

contractor from responsibility for defects and related damage occurring as a result of defective or unacceptable work.

Contractor's Representative

The contractor shall have at all times a competent foreman or superintendent on the job that shall have full authority to act for the contractor, and to receive and execute orders from the Director of Public Works or appointed representative. Any instructions given to such superintendent or person executing work for the contractor shall be binding on the contractor as though given to him personally. Contractor's representative must be proficient in the use and interpretation of the English language.

Workers

The contractors shall employ competent laborers and shall replace, at the request of the Building Maintenance Superintendent any incompetent, unfaithful, abusive or disorderly workers in their employ. Only workers expert in their respective branches of work shall be employed where special skill is required. Inappropriate behavior or examples of unproductive work effort will not be tolerated. The Village has the right to require a contractor's employee to be immediately removed from the work crew if the above behavior is exhibited.

Dispute Resolution

All disputes, including collection disputes, shall be brought in the Circuit Court of Cook County, Illinois. This agreement shall be interpreted in accordance with the laws of the State of Illinois. In any dispute resolution process, each party shall bear its own costs, including attorney's fees. Any purported agreement between the parties that states terms contrary to this paragraph M will be deemed per se invalid.

Mandatory Qualifications for Contractor's Personnel

Crews shall include at least one (1) supervisor during any given shift.

1. No more than 50% of the crew may be trainees at any one time.
2. Supervisors must be fluent in the English language and capable of reading and writing English.
3. Technicians employed by the contractor selected shall be fully trained and skilled in safe and proper techniques. Specific training required must follow the OSHA standards (see *below*).
4. The contractor selected shall provide sufficient documentation, if requested by the Village, to demonstrate adequate training has been provided upon commencement of the agreement. Contractor selected shall submit statement outlining training program and method of verifying employee competency. Failure to do so may be ample cause for rejection of proposal. The use of technicians who are not adequately trained may be sufficient grounds for termination of the agreement.
5. The Village reserves the right to require immediate removal of any employee of the contractor selected deemed unfit for service for any reason. This right is non-negotiable and the

contractor selected agrees to this condition by accepting this agreement. The contractor selected shall have enough qualified personnel to replace a terminated employee within 24 hours. Failure to do so can result in the termination of the agreement.

OSHA Requirements

1. Material Safety Data Sheets – Contractor selected shall furnish the Village of Oak Park copies of Material Safety Data Sheets (MSDS), for all products used, prior to beginning service at Village facilities. In addition, each time a new chemical is introduced, a copy of that product's MSDS must be provided to the Building Maintenance Superintendent prior to the product being used. The Material Safety Data Sheets must be in compliance with OSHA Regulation 1910.1200, paragraph g.
2. Labeling of Hazardous Materials – Contractor selected shall comply with OSHA regulation 1919.1200, paragraph f, concerning labeling of all chemical containers.
3. Caution Signs – Contractor selected shall use “caution signs” as required by OSHA Regulation 1910.44 and 1910.145 at no cost to the Village. Caution signs shall be on-site upon commencement of agreement.

Proof of compliance with OSHA regulation 1920.1200, Hazard Communication, shall be provided to the Building Maintenance Superintendent upon commencement of this agreement, if requested.

Failure of the contractor selected or his/her employees to comply with all applicable laws, regulations and rules shall permit the Village to immediately terminate this agreement without liability.

Prevailing Wages

Contractor and any applicable subcontractor shall pay prevailing wages as established by the Illinois Department of Labor and determined by the Village for each craft or type of work needed to execute the contract in accordance with the Illinois Prevailing Wage Act, 820 ILCS 130/0.01 *et seq.* (“Act”). Contractor shall prominently post the current schedule of prevailing wages at the Project site(s) and shall notify immediately in writing all of its subcontractors of all changes in the schedule of prevailing wages. Any increases in costs to Contractor due to changes in the prevailing rate of wage during the terms of any Contract shall be at the sole expense of Contractor and not at the expense of the Village, and shall not result in an increase to the Contract Price. Contractor shall be solely responsible to maintain accurate records as required by the Act and shall submit certified payroll records to the Village evidencing its compliance with the Act on no less than a monthly basis as required by the Act. Contractor shall be solely liable for paying the difference between prevailing wages and any wages actually received by laborers, workmen and/or mechanics engaged in the Work for the Project.

Contractor shall indemnify, hold harmless, and defend the Village, its officers, officials, employees, agents and volunteers (“Indemnified Parties”) against all regulatory actions, complaints, damages, claims, suits, liabilities, liens, judgments, costs and expenses, including reasonable attorney’s fees, which may in any way arise from or accrue against the Indemnified

Parties as a consequence of noncompliance with the Act or which may in any way result therefrom, including a complaint by the Illinois Department of Labor under Section 4(a-3) of the Act, 820 ILCS 130/4(a-3) that any or all of the Indemnified Parties violated the Act by failing to give proper notice to the Grantee or any other party performing work on the Public Improvements that not less than the prevailing rate of wages shall be paid to all laborers, workers and mechanics performing Work on the Project, including interest, penalties or fines under Section 4(a-3). The indemnification obligations of this section on the part of Contractor shall survive the termination or expiration of this Agreement. In any such claim, complaint or action against the Indemnified Parties, Contractor shall, at its own expense, appear, defend and pay all charges of reasonable attorney's fees and all reasonable costs and other reasonable expenses arising therefrom or incurred in connection therewith, and, if any judgment or award shall be rendered against the Indemnified Parties in any such action, Contractor shall at its own expense, satisfy and discharge such judgment or award.

SECTION III
SCOPE OF WORK

See attached detailed specs and design documents as submitted by the design firm of Cordogan Clark & Associates, Inc.

SECTION IV
PROPOSAL FORM (Pricing)

The undersigned proposes to furnish all labor and materials required to complete the Work in accordance with the attached specifications and at the price indicated below.

Total Lump Sum Cost Base Bid: \$ _____

Alternates:

Alternate Bid #01A: MENS LOCKER ROOM CEILING

Base Bid: Existing ceiling to remain.

Alternate Bid: Remove and replace all the existing ACT ceiling tile as specified in the Men's Locker Room, within dashed boundary. Existing ceiling grid to remain.

Alternate Bid #01B: MENS LOCKER ROOM LIGHTING

Base Bid: Existing lighting to remain.

Alternate Bid: Remove and replace all existing 2'x4' ceiling lights in the Men's Locker Room (within dashed boundary) with new LED light fixtures. Reuse existing lighting circuit and connect to existing panel LP-B for regular lights and EM-1 for emergency lights.

Alternate Bid #02A: WOMENS LOCKER ROOM CEILING

Base Bid: Existing ceiling to remain.

Alternate Bid: Remove and replace all the existing ACT ceiling tile as specified in the Women's Locker Room, within dashed boundary. Existing ceiling grid to remain.

Alternate Bid #02B: WOMENS LOCKER ROOM LIGHTING

Base Bid: Existing lighting to remain.

Alternate Bid: Remove and replace all existing 2'x4' ceiling lights in the Women's Locker Room (within dashed boundary) with new LED light fixtures. Reuse existing lighting circuit and connect to existing panel LP-B for regular lights and EM-1 for emergency lights.

Alternate Bid #03: MENS SINK AREA

Base Bid: Existing sink faucets and components to remain.

Alternate Bid: Remove existing sink faucet (2QTY) and replace all internal mechanical, sensor parts and reinstall. Existing sink to remain, protect as required to prevent any damage. See plumbing drawings for more information.

Alternate Bid #04: DRYER BOOSTER FAN

Base Bid: In-line booster fan not included.

Alternate Bid: Provide in-line fan at each new dryer vent duct. Refer to mechanical. Extend general use 120V receptacle circuit for new exhaust fan compliant connection. Minimum 2#12 & a#12 GRD, 3/4 C" wiring. See mechanical plan and equipment schedule for more information.

Total for Alt. #01A:	\$ _____
Total for Alt. #01B:	\$ _____
Total for Alt. #02A:	\$ _____
Total for Alt. #02B:	\$ _____
Total for Alt. #03:	\$ _____
Total for Alt. #04:	\$ _____

24-Hour Emergency Call-back Number:

(____) _____

Printed Name: _____

Proposal Signature: _____

State of _____) County of _____)

(Type Name of Individual Signing)

being first duly sworn on oath deposes and says that the contractor on the above proposal is organized as indicated below and that all statements herein made on behalf of such Contractor and that their deponent is authorized to make them, and also deposes and says that deponent has examined and carefully prepared their proposal from the agreement specifications and has checked the same in detail before submitting this proposal; that the statements contained herein are true and correct.

Signature of contractor authorizes the Village of Oak Park to verify references of business and credit at its option.

Signature of contractor shall also be acknowledged before a Notary Public or other person authorized by law to execute such acknowledgments.

Dated: _____/_____/2023 _____

Organization Name
(Seal - If Corporation)

By:

Authorized Signature

Address

Telephone: _____

Subscribed and sworn to before me this _____ day of _____, 2023
_____ in the State of _____ My

Commission
Notary Public

Expires on ____/____/_____

Complete Applicable Paragraph Below

(a) Corporation

The contractor is a corporation, which operates under the legal name of _____ and is organized and existing under the laws of the State of _____. The full names of its Officers are:

President _____

Secretary _____

Treasurer _____

The corporation does have a corporate seal. (In the event that this proposal is executed by a person other than the President, attach hereto a certified copy of that section of Corporate By-Laws or other authorization by the Corporation that permits the person to execute the offer for the corporation.)

(b) Partnership

Names, Signatures, and Addresses of all Partners

The partnership does business under the legal name of _____, which name is

is registered with the office of _____ in the county of

_____.

(c) Sole Proprietor

The contractor is a Sole Proprietor whose full name is _____ . If the contractor is operating under a trade name, said trade name is _____ , which name is registered with the office of _____ in the county of _____ .

Signed: _____
Sole Proprietor

In compliance with the above, the undersigned offers and agrees, if his/her proposal is accepted within ninety (90) calendar days from date of opening, to furnish any or all of the items upon which prices are quoted, at the price set opposite each item, delivered at the designated point within the time specified above.

MUNICIPAL QUALIFICATION REFERENCE SHEET
(or attach separate form)

MUNICIPALITY

ADDRESS

CONTACT

PHONE

E-mail:

WORK
PERFORMED

MUNICIPALITY

ADDRESS

CONTACT

PHONE

E-mail:

WORK
PERFORMED

MUNICIPALITY

ADDRESS

CONTACT

PHONE

E-mail:

WORK
PERFORMED

SECTION V
CONTRACTOR CERTIFICATION

_____, as part of its proposal on an agreement for construction Work
(Name of Contractor selected) for the Village of Oak Park, hereby certifies that said contractor selected
is not barred from proposing on the aforementioned agreement as a result of a violation to
either Section 33E-3 or 33E-4 of Article 33E of Chapter 38 of the Illinois Revised Statutes or
Section 2-6-12 of the Oak Park Village Code relating to "Proposing Requirement.

(Authorized Agent of Contractor selected)

Subscribed and sworn to before me this _____ day of _____, 2023.

Notary Public's Signature

- Notary Public Seal -

SECTION VI
TAX COMPLIANCE AFFIDAVIT

_____, being first duly sworn, deposes and says:

that he/she is _____ of
(partner, officer, owner, etc.)

(Contractor selected)

The individual or entity making the foregoing proposal or proposal certifies that he/she is not barred from entering into an agreement with the Village of Oak Park because of any delinquency in the payment of any tax administered by the Department of Revenue unless the individual or entity is contesting, in accordance with the procedures established by the appropriate revenue act, liability for the tax or the amount of the tax. The individual or entity making the proposal or proposal understands that making a false statement regarding delinquency in taxes is a Class A Misdemeanor and, in addition, voids the agreement and allows the municipality to recover all amounts paid to the individual or entity under the agreement in civil action.

By:
Its:

(name of contractor if the contractor is an individual)
(name of partner if the contractor is a partnership)
(name of officer if the contractor is a corporation)

The above statement must be subscribed and sworn to before a notary public.

Subscribed and sworn to before me this _____ day of _____, 2023.

Notary Public's Signature

- Notary Public Seal -

Reporting Requirements

The following forms must be completed in their entirety, notarized and included as part of the proposal document. Failure to respond truthfully to any question on the list or failure to cooperate fully with further inquiry by the Village of Oak Park will result in disqualification of your proposal.

SECTION VII
ORGANIZATION OF PROPOSING FIRM

Please fill out the applicable section:

A. Corporation:

The contractor is a corporation, legally named _____ and is organized and existing in good standing under the laws of the State of _____. The full names of its officers are:

President _____

Secretary _____

Treasurer _____

Registered Agent Name and Address: _____

The corporation has a corporate seal. (In the event that this proposal is executed by a person other than the President, attach hereto a certified copy of that section of Corporate By-Laws or other authorization by the Corporation that permits the person to execute the offer for the corporation.)

B. Sole Proprietor:

The contractor is a Sole Proprietor. If the contractor does business under an assumed name, the

assumed name is _____, which is registered with the Cook County Clerk. The contractor is otherwise in compliance with the Assumed Business Name Act, 805 ILCS 405/0.01, et. seq.

C. Partnership:

The contractor is a partnership which operates under the name _____

The following are the names, addresses and signatures of all partners:

Signature

Signature

(Attach additional sheets if necessary.) If so, check here _____.

If the partnership does business under an assumed name, the assumed name must be registered with the Cook County Clerk and the partnership is otherwise in compliance with the Assumed Business Name Act, 805 ILCS 405/0.01, et. seq.

D. Affiliates: The name and address of any affiliated entity of the business, including a description of the affiliation: _____

Signature of Owner

Subscribed to and sworn before me on the

_____ day of _____, 2023.

Notary Public

NAME OF SURETY

By: _____

Signature of Attorney-in-Fact

subscribed to and sworn before me on the

_____ day of _____, 2023.

Notary Public

SECTION IX
CONTRACT BOND



Contract Bond

_____, as PRINCIPAL, and _____ as SURETY, are held and firmly bound unto the Village of Oak Park (hereafter referred to as "Village") in the penal sum of _____, well and truly to be paid to the Village, for the payment of which its heirs, executors, administrators, successors and assigns, are bound jointly to pay to the Village under the conditions of this instrument.

WHEREAS, THE CONDITION OF THE FOREGOING OBLIGATION IS SUCH that, the Principal has entered into a written contract with the Village, acting through its President and Board of Trustees, for the construction of work, which contract is hereby referred to and made a part hereof as if written herein at length, and whereby the Principal has promised and agreed to perform the work in accordance with the terms of the contract, and has promised to pay all sums of money due for any labor, materials, apparatus, fixtures or machinery furnished to such Principal for the purpose of performing such work, including paying not less than the prevailing rate of wages in Cook County, where the work is for the construction of any public work subject to the Prevailing Wage Act, and has further agreed to save and indemnify and keep harmless the Village against all liabilities, judgments, costs and expenses which may in any manner accrue against the Village in consequence of granting such contract or which may in any manner result from the carelessness or neglect of the Principal, his agents, employees or workmen in any respect whatever; and has further agreed that this bond will inure to the benefit of any person, firm, company, or corporation, to whom any money may be due from the Principal, subcontractor or otherwise, for any such labor, materials, apparatus, fixtures or machinery so furnished and that suit may be maintained on such bond by any such person, firm, company, or corporation, for the recovery of any such money.

NOW THEREFORE, if the Principal shall well and truly perform the work in accordance with the terms of the contract, and shall pay all sums of money due or to become due for any labor, materials, apparatus, fixtures or machinery furnished to it for the purpose of constructing such work, and shall commence and complete the work within the time prescribed in the contract, and shall pay and discharge all damages, direct and indirect, that may be suffered or sustained on account of such work during the time of performance thereof and until the work shall have been accepted, and shall save and indemnify and keep harmless the Village against all liabilities, judgments, costs and expenses which may in any manner accrue against the Village in consequence of granting such contract or which may in any manner result from the carelessness or neglect of the Principal, his agents, employees or workmen in any respect whatever; and shall in all respects fully and faithfully comply with all the provisions, conditions, and requirements of the contract, then this obligation will be void; otherwise it will remain in full force and effect.

IN WITNESS WHEREOF, the PRINCIPAL and the SURETY have caused this instrument to be signed by their respective officers this _____ day of _____, 2023.

NAME OF PRINCIPAL

By: _____
Signature

By: _____
Printed Name

Its: _____
Title

Subscribed to and Sworn before me on the
_____ day of _____, 2023.

Notary Public

NAME OF SURETY

By: _____
Signature of Attorney-in-Fact

Subscribed to and Sworn before me on the
_____ day of _____, 2023.

Notary Public

SECTION X
COMPLIANCE AFFIDAVIT

I, _____, (print name) being first duly sworn on oath depose and state:

1. I am the (title) _____ of the proposing company and am authorized to make the statements contained in this affidavit on behalf of the company;
2. I have examined and carefully prepared this Proposal based on the request and have verified the facts contained in the Proposal in detail before submitting it;
3. The proposing company is organized as indicated above on the form entitled "Organization of Proposing Company."
4. I authorize the Village of Oak Park to verify the company's business references and credit at its option;
5. Neither the proposing company nor its affiliates¹ are barred from proposing on this project as a result of a violation of 720 ILCS 5/33E-3 or 33E-4 relating to Proposal rigging and Proposal rotating, or section 2-6-12 of the Oak Park Village Code relating to "Proposing Requirements".
6. The proposing company has the M/W/DBE status indicated below on the form entitled "EEO Report."
7. Neither the proposing company nor its affiliates is barred from agreementing with the Village of Oak Park because of any delinquency in the payment of any debt or tax owed to the Village except for those taxes which the proposing company is contesting, in accordance with the procedures established by the appropriate revenue act, liability for the tax or the amount of the tax. I understand that making a false statement regarding delinquency in taxes is a Class A Misdemeanor and, in addition, voids the agreement and allows the Village of Oak Park to recover all amounts paid to the proposing company under the agreement in civil action.
8. I am familiar with Section 13-3-2 through 13-3-4 of the Oak Park Village Code relating to Fair Employment Practices and understand the contents thereof; and state that the proposing company is an "Equal Opportunity Employer" as defined by Section 2000(E) of Chapter 21, Title 42 of the United States Code Annotated and Federal Executive Orders #11246 and #11375 which are incorporated herein by reference. **Also complete the attached EEO Report or Submit an EEO-1.**
9. I certify that the contractor is in compliance with the Drug Free Workplace Act, 41 U.S.C.A, 702

Signature: _____

Name and address of Business: _____

Telephone _____ E-Mail _____

Subscribed to and sworn before me this _____ day of _____, 2023.

Notary Public

- Notary Public Seal -

¹ Affiliates means: (i) any subsidiary or parent of the agreementing business entity, (ii) any member of the same unitary business group; (iii) any person with any ownership interest or distributive share of the agreementing business entity in excess of 7.5%; (iv) any entity owned or controlled by an executive employee, his or her spouse or minor children of the agreementing business entity.

SECTION XI
M/W/DBE STATUS AND EEO REPORT

Failure to respond truthfully to any questions on this form, failure to complete the form or failure to cooperate fully with further inquiry by the Village of Oak Park will result in disqualification of this Proposal.

1. Contractor Name: _____

2. Check here if your firm is:

- Minority Business Enterprise (MBE) (A firm that is at least 51% owned, managed and controlled by a Minority.)
- Women's Business Enterprise (WBE) (A firm that is at least 51% owned, managed and controlled by a Woman.)
- Owned by a person with a disability (DBE) (A firm that is at least 51% owned by a person with a disability)
- None of the above

[Submit copies of any W/W/DBE certifications]

3. What is the size of the firm's current stable work force?

_____ Number of full-time employees

_____ Number of part-time employees

4. Similar information will be requested of all sub-contractors working on this agreement. Forms will be furnished to the lowest responsible contractor with the notice of agreement award, and these forms must be completed and submitted to the Village before the execution of the agreement by the Village.

Signature: _____

Date: _____

EEO Report

Please fill out this form completely. Failure to respond truthfully to any questions on this form, or failure to cooperate fully with further inquiry by the Village of Oak Park will result in disqualification of this Proposal. An incomplete form will disqualify your Proposal.

An EEO-1 Report may be submitted in lieu of this report

Contractor Name _____
 Total Employees _____

Job Category	Total # of Empl.	Total Males	Total Females	Black	Males				Females				Total Minorities
					Hispanic	American Indian	Alaskan Native	Asian & Pacific Islander	Hispanic	American Indian	Alaskan Native	Asian & Pacific Islander	
Officials & Managers													
Professionals													
Technicians													
Sales Workers													
Office & Clerical													
Semi-Skilled													
Laborers													
Service Workers													
Management Trainees													
Apprentices													

This completed and notarized report must accompany your Proposal. It should be attached to your Affidavit of Compliance. Failure to include it with your Proposal will be disqualify you from consideration.

_____, being first duly sworn, deposes and says that he/she is
 the _____
 (Name of Person Making Affidavit)
 (Title or Officer)
 of _____ and that the above EEO Report information is true and accurate and is submitted
 with the intent that it

be relied upon. Subscribed and sworn to before me this _____ day of _____, 2023.

 (Signature)

 (Date

SECTION XII
NO PROPOSAL EXPLANATION

If your company does not wish to propose on the attached specifications, the Village of Oak Park would be interested in any explanation or comment you may have as to what prevented your firm from submitting a Proposal.

Thank you.

Proposal Name:

Village of Oak Park Public Works Center Locker Room Upgrades
Bid Number: 23-120
Issuance Date: 6/7/23

Comments:

Signed: _____

Phone: _____



SAMPLE ONLY – DO NOT SIGN
INDEPENDENT CONTRACTOR AGREEMENT

THIS INDEPENDENT CONTRACTOR AGREEMENT (“Contract”) is entered into on the ____ day of _____ 2023, by and between the Village of Oak Park, an Illinois home rule municipal corporation (hereinafter the “Village”), and _____, a _____ (hereafter the “Contractor”).

WHEREAS, the Contractor submitted a Proposal to renovate the bunk room, locker room and restroom at the south fire station (hereinafter referred to as the “Work”), pursuant to the Village’s Request for Proposals, attached hereto and incorporated herein by reference; and

WHEREAS, the Contractor represented in said Proposal that it has the necessary personnel, experience, and competence to promptly complete the Work and the work required hereunder; and

WHEREAS, the Contractor’s Proposal is attached hereto and incorporated herein by reference into this Agreement; and

WHEREAS, the Contractor shall perform the Work pursuant to the terms and conditions of this Contract..

NOW, THEREFORE, in consideration of the premises and the mutual promises contained in this Contract,, and other good and valuable consideration received and to be received, it is mutually agreed by and between the parties as follows:

1. RECITALS INCORPORATED

The above recitals are incorporated herein as though fully set forth.

2. SCOPE OF WORK

The Contractor shall perform the Work in accordance with its Proposal for a total cost not to exceed \$_____ (“Contract Price”). The Contractor shall complete the Work in accordance with any applicable manufacturers’ warranties and in accordance with the Village’s Request for Proposals, the Contractor’s Proposal and this Contract, all of which, together shall constitute the Contract Documents. The Contractor acknowledges that it has inspected the sites where the work is to be performed and that it is fully familiar with all of the conditions at the sites, and further that its Proposal has adequately taken into consideration all of the conditions at the sites. The Contractor hereby represents and warrants that it has the skill and experience necessary to complete this Work in a good and workmanlike manner. The Contractor further represents and warrants that the Work will be completed in a good and workmanlike manner in accordance with the Contract Documents, and that the Work will be free from defects.

The Contractor shall achieve completion of all work required pursuant to the Contract

Documents by December 31, 2022 ("Contract Time"). The Contract Time is of the essence. In the event the Contractor fails to complete the Project on or before said date, the Village shall be entitled to liquidated damages in the amount of \$500.00 per day for each day the work remains uncompleted beyond the completion date set forth above. This amount is not a penalty, and the parties agree to said amount given the difficulties associated with determining or calculating damages to the Village in the event the Project is not completed on time. The Contractor shall have no claim for damages, for compensation in excess of the Contract Price, or for a delay or extension of the Contract Time based upon conditions found at, or in the vicinity of, the site(s).

3. DESIGNATED REPRESENTATIVES

The Contractor shall designate in writing a person to act as its designated representative with respect to the Work to be performed under this Agreement. Such person shall have complete authority to transmit and receive instructions and information, interpret and define the Contractor's policies and decisions with respect to the Work governed by this Contract. The Village's Building Maintenance Superintendent shall have complete authority to transmit and receive instructions and information, interpret and define the Village's policies and decisions with respect to the Work governed by this Contract, or such other person as designated in writing by the Village Manager.

4. TERM OF CONTRACT

The Contractor shall perform the Work pursuant to this Contract beginning on the effective date as defined herein and ending on December 31st, 2022 or on the date that the Work is completed as determined by the Village. The Contractor shall invoice the Village for the Work provided pursuant to this Contract the rates set forth in its Proposal.

5. PAYMENT SCHEDULE

The Contractor shall, as a condition precedent to its right to receive any payment, submit to the Village an application for payment and such receipts, vouchers, and other documents as may be necessary to establish the Contractor's payment for all labor and material and the absence of any interest whether in the nature of a lien or otherwise of any party in any property, work, or fund with respect to the Work performed hereunder. Such documents shall include, where relevant, the following forms, copies of which are attached hereto:

- (i) Contractor's sworn statement;
- (ii) Contractor's partial or final waiver of lien;
- (iii) Subcontractor's sworn statement(s); and
- (iv) Subcontractor's partial or final waiver of lien.

Payment by the Village shall be conditioned upon an inspection by the Village of the

work completed and submission of required waivers by the Contractor. Payment by the Village shall in no way constitute a waiver of, or relieve the Contractor from, any defects in the work. All payments shall be made in accordance with the Illinois Local Government Prompt Payment Act, 50 ILCS 505/1 *et seq.* Final payment for any Work performed by the Contractor pursuant to an invoice by the Contractor shall be made by the Village to the Contractor when the Contractor has fully performed the work and the work has been approved by the Village and submission of required waivers and paperwork by Contractor. Approval of the work and issuance of the final payment by the Village shall not constitute a waiver of, or release the Contractor from, any defects in the work.

The Village shall have the right to withhold from any payment due hereunder such amount as may reasonably appear necessary to compensate the Village for any actual or prospective loss due to Work which is defective or does not conform to the Contract Documents; damage for which the Contractor is liable hereunder; liens or claims of liens; claims of third parties, subcontractors, or material men; or any failure of the Contractor to perform any of its obligations under this Contract. The Village may apply any money withheld or due Contractor hereunder to reimburse itself for any and all costs, expenses, losses, damages, liabilities, suits, judgments, awards, and attorney's fees incurred, suffered, or sustained by the Village and chargeable to the Contractor.

6. TERMINATION

The Village may terminate this Contract for cause, which includes but is not necessarily limited to, the Contractor's failure to perform the work pursuant to this Contract. The Village shall provide the Contractor with five (5) days' written notice of a termination for cause pursuant to the provisions of Section 12 below. The Village may also terminate this Contract when it determines the same to be in its best interests by giving fourteen (14) days' written notice to the Contractor pursuant to the provisions of Section 12 below. In such event, the Village shall pay to the Contractor all amounts due for the work performed up to the date of termination.

7. COMPLIANCE WITH APPLICABLE LAWS

The Contractor shall comply with all applicable laws, regulations, and rules promulgated by any federal, state, county, municipal and/or other governmental unit or regulatory body now in effect during the performance of the work. By way of example only and not as a limitation, the following are included within the scope of the laws, regulations and rules with which the Contractor must comply: all forms of Workers Compensation Laws, all terms of the equal employment opportunity rules and regulations of the Illinois Department of Human Rights, statutes relating to contracts let by units of government, and all applicable civil rights and anti-discrimination laws and regulations.

8. INDEMNIFICATION

To the fullest extent permitted by law, the Contractor shall waive any right of

contribution against the Village and shall indemnify and hold harmless the Village and its officers, officials, employees, volunteers and agents from and against all claims, damages, losses and expenses, including, but not limited to, legal fees (attorney's and paralegal's fees, expert fees and court costs) arising out of or resulting from the performance of the Contractor's work, provided that any such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or injury to or destruction of property, other than the work itself, including the loss of use resulting therefrom, or is attributable to misuse or improper use of trademark or copyright-protected material or otherwise protected intellectual property, to the extent it is caused in whole or in part by any wrongful or negligent act or omission of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable. Such obligation shall not be construed to negate, abridge or otherwise reduce any other right to indemnity which the Village would otherwise have. The Contractor shall similarly protect, indemnify and hold and save harmless, the Village, its officers, officials, employees, volunteers and agents against and from any and all claims, costs, causes, actions and expenses, including, but not limited to, legal fees incurred by reason of the Contractor's breach of any of its obligations under, or the Contractor's default of, any provisions of this Contract. The indemnification obligations under this Section shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Contractor or any subcontractor under Workers' Compensation or Disability Benefit Acts or Employee Benefit Acts.

9. INSURANCE

The Contractor shall, at the Contractor's expense, secure and maintain in effect throughout the duration of this Contract, insurance of the following kinds and limits set forth in this Section. The Contractor shall furnish "Certificates of Insurance" to the Village before beginning Work on the Project pursuant to this Contract. All insurance policies shall be written with insurance companies licensed to do business in the State of Illinois and having a rating of at least A:VII according to the latest edition of the Best's Key Rating Guide; and shall include a provision preventing cancellation of the insurance policy unless thirty (30) days prior written notice is given to the Village. This provision shall also be stated on each Certificate of Insurance: "Should any of the above described policies be canceled before the expiration date, the issuing company shall mail fifteen thirty (30) days written notice to the certificate holder named to the left."

The limits of liability for the insurance required shall provide coverage for not less than the following amounts, or greater where required by law:

(A) **Commercial General Liability:**

- i. Coverage to include Broad Form Property Damage, Contractual and Personal Injury.
- ii. Limits:

General Aggregate	\$ 2,000,000.00
Each Occurrence	\$ 1,000,000.00

Personal Injury \$ 1,000,000.00
iii. Coverage for all claims arising out of the Contractor's operations or premises and anyone directly or indirectly employed by the Contractor.

(B) Workers' Compensation:

i. Workers' Compensation insurance shall be provided in accordance with the provisions of the laws of the State of Illinois, including occupational disease provisions, for all employees who perform the Work pursuant to this Contract, and if work is subcontracted pursuant to the provisions of this Contract, the Contractor shall require each subcontractor similarly to provide workers' compensation insurance. In case employees engaged in hazardous work under this Contract are not protected under the Workers' Compensation Act, the Contractor shall provide, and shall cause each subcontractor to provide, adequate and suitable insurance for the protection of employees not otherwise provided.

(C) Comprehensive Automobile Liability:

i. Comprehensive Automobile Liability coverage shall include all owned, hired, non-owned vehicles, and/or trailers and other equipment required to be licensed, covering personal injury, bodily injury and property damage.

ii. Limits:
Combined Single Limit \$1,000,000.00

(D) Umbrella:

i. Limits:
Each Occurrence/Aggregate \$ 5,000,000.00

(E) The Village, its officers, employees, agents and volunteers shall be named as additional insureds on all insurance policies set forth herein except Workers' Compensation. The Contractor shall be responsible for the payment of any deductibles for said insurance policies. The coverage shall contain no special limitations on the scope of protection afforded to the Village, its officers, employees, agents, and volunteers.

(F) The Contractor understands and agrees that any insurance protection required by this Contract or otherwise provided by the Contractor, shall in no way limit the responsibility to indemnify, keep and save harmless, and defend the Village, its officers, employees, agents and volunteers as herein provided.

10. GUARANTY

The Contractor warrants and guarantees that its Work provided for the Project to be performed under this Agreement, and all workmanship, materials, equipment, and supplies performed, furnished, used, or installed under this Contract, shall be free from

defects and flaws in workmanship or design; shall strictly conform to the requirements of this Contract; and shall be fit and sufficient for the purposes expressed in, or reasonably inferred from, this Contract. The Contractor further warrants and guarantees that the strength of all parts of all manufactured materials, equipment, and supplies shall be adequate and as specified and that the performance requirements of this Contract shall be fulfilled.

The Contractor shall, at no expense to the Village, correct any failure to fulfill the above guaranty that may appear at any time. In any event, the guaranty herein expressed shall not be sole and exclusive, and is additional to any other guaranty or warranty expressed or implied.

11. AFFIDAVIT OR CERTIFICATE

The Contractor shall furnish any affidavit or certificate in connection with the work covered by this Contract as required by law.

12. NOTICES

Any notice required to be given by this Contract shall be deemed sufficient if made in writing and sent by certified mail, return receipt requested, or personal service, or by facsimile transmission to the persons and addresses indicated below or to such addresses and persons as either party hereto shall notify the other party of in writing pursuant to the provisions of this Section:

To the Village:

Village Manager
Village of Oak Park
123 Madison Street
Oak Park, Illinois 60302-4272
Email: villagemanger@oak-park.us
Facsimile: (708) 358-5101

To the Contractor:

Email: _____
Facsimile: _____

Mailing of such notice as and when above provided shall be equivalent to personal notice and shall be deemed to have been given at the time of mailing.

Notice of facsimile transmission shall be effective as of date and time of facsimile transmission, provided that the notice transmitted shall be sent on business days during business hours (9:00 a.m. to 5:00 p.m. Chicago time). In the event facsimile notice transmitted during non-business hours, the effective date and time of notice is the first hour of the first business day after transmission.

13. AUTHORITY TO EXECUTE

The individuals executing this Contract on behalf of the Contractor and the Village represent that they have the legal power, right, and actual authority to bind their respective parties to the terms and conditions of this Contract.

14. EFFECTIVE DATE

The effective date of this Contract reflected above and below shall be the date that the Village Manager executes this Contract behalf of the Village.

15. ENTIRE CONTRACT; APPROVAL OF SUBCONTRACTORS

This Contract, including the documents incorporated by reference herein, sets forth the entire Contract of the parties with respect to the accomplishment of the Work. No right or interest in this Contract shall be assigned, in whole or in part, by either party without the prior written consent of the other party. The Village reserves the right to approve the use of subcontractors to complete any portion of the Work and to approve any applicable contract between the Contractor and a proposed subcontractor to perform any of the Work. This Contract shall be binding upon the parties and upon their respective heirs, executors, administrators, personal representatives, successors, and assigns, except as herein provided.

16. INDEPENDENT CONTRACTOR

The Contractor shall have the full control of the ways and means of performing the work referred to above and that the Contractor and its employees, representatives or subcontractors are not employees of the Village, it being specifically agreed that the Contractor bears the relationship of an independent contractor to the Village. The Contractor shall solely be responsible for the payment of all salaries, benefits and costs of supplying personnel for the Work.

17. CONTRACT BOND

The Contractor, before commencing the work on the Project, shall furnish a Contract Bond. The Contract Bond shall be in an amount equal to 100% of the full amount of the Contract Sum as security for the faithful performance of its obligations pursuant to the Contract Documents and as security for the payment of all persons performing labor and furnishing materials in connection with the Contract Documents. Such bond shall be on standard AIA Documents, shall be issued by a surety satisfactory to the Village, and shall name the Village as a primary co-obligee. The Contract Bond shall become a part of the Contract Documents. The failure of Contractor to supply the required Contract Bond within ten (10) days after the Notice of Award or within such extended period as the Village may grant if the Contract Bond does not meet its approval shall constitute a default, and the Village may either award the Contract to the next lowest responsible proposer or re-advertise for proposals. A charge against the defaulting Contractor may be made for the difference between the amount of the

Contractor's Proposal and the amount for which a contract for the work is subsequently executed, irrespective of whether the amount thus due exceeds the amount of the proposal guarantee.

18. GOVERNING LAW AND VENUE

This Contract shall be governed by the laws of the State of Illinois both as to interpretation and performance. Venue for any action pursuant to this Contract shall be in the Circuit Court of Cook County, Illinois.

19. AMENDMENTS AND MODIFICATIONS

This Contract may be modified or amended from time-to-time provided, however, that no such amendment or modification shall be effective unless reduced to writing and duly authorized and signed by the authorized representative of the Village and the authorized representative of the Contractor.

20. NON-WAIVER OF RIGHTS

No failure of either party to exercise any power given to it hereunder or to insist upon strict compliance by the other party with its obligations hereunder, and no custom or practice of the parties at variance with the terms hereof, nor any payment under this Contract shall constitute a waiver of either party's right to demand exact compliance with the terms hereof.

21. CONFLICT

In case of a conflict between any provision(s) of the Village's Request for Proposals or the Contractor's Proposal and this Contract, this Contract and the Village's Request for Proposals shall control to the extent of such conflict.

22. HEADINGS AND TITLES

The headings and titles provided in this Contract are for convenience only and shall not be deemed a part of this Contract.

23. COOPERATION OF THE PARTIES

The Village and the Contractor shall cooperate in the provision of the Work to be provided by Contractor pursuant to this Contract and in compliance with applicable laws, including, but not limited to, the Illinois Freedom of Information Act, 5 ILCS 140/1 et seq. ("FOIA"), and the provision of any documents and information pursuant to a FOIA request. The Contractor shall provide any and all documents to the Village pursuant to a FOIA request at no cost to the Village.

24. COUNTERPARTS; FACSIMILE OR PDF SIGNATURES

This Contract may be executed in counterparts, each of which shall be considered an original and together shall be one and the same Contract. A facsimile or pdf copy of this Agreement and any signature(s) thereon will be considered for all purposes as an original.

25. CERTIFIED PAYROLL

Contractor shall be solely responsible to maintain accurate records reflecting its payroll for its employees who perform any of the Work for the Village pursuant to this Contract and shall submit certified payroll records to the Village's Director of Public Works at any time during the term of this Contract. Contractor shall provide said certified payroll records within seven (7) days upon the request of the Director of Public Works.

26. PREVAILING WAGE

Contractor and any applicable subcontractor shall pay prevailing wages as established by the Illinois Department of Labor and determined by the Village for each craft or type of work needed to execute the contract in accordance with the Illinois Prevailing Wage Act, 820 ILCS 130/0.01 *et seq.* ("Act"). Contractor shall prominently post the current schedule of prevailing wages at the Project site(s) and shall notify immediately in writing all of its subcontractors of all changes in the schedule of prevailing wages. Any increases in costs to Contractor due to changes in the prevailing rate of wage during the terms of any Contract shall be at the sole expense of Contractor and not at the expense of the Village, and shall not result in an increase to the Contract Price. Contractor shall be solely responsible to maintain accurate records as required by the Act and shall submit certified payroll records to the Village evidencing its compliance with the Act on no less than a monthly basis as required by the Act. Contractor shall be solely liable for paying the difference between prevailing wages and any wages actually received by laborers, workmen and/or mechanics engaged in the Work for the Project.

Contractor shall indemnify, hold harmless, and defend the Village, its officers, officials, employees, agents and volunteers ("Indemnified Parties") against all regulatory actions, complaints, damages, claims, suits, liabilities, liens, judgments, costs and expenses, including reasonable attorney's fees, which may in any way arise from or accrue against the Indemnified Parties as a consequence of noncompliance with the Act or which may in any way result therefrom, including a complaint by the Illinois Department of Labor under Section 4(a-3) of the Act, 820 ILCS 130/4(a-3) that any or all of the Indemnified Parties violated the Act by failing to give proper notice to the Grantee or any other party performing work on the Public Improvements that not less than the prevailing rate of wages shall be paid to all laborers, workers and mechanics performing Work on the Project, including interest, penalties or fines under Section 4(a-3). The indemnification obligations of this section on the part of Contractor shall survive the termination or expiration of this Agreement. In any such claim, complaint or action against the Indemnified Parties, Contractor shall, at its own expense, appear, defend and pay all

charges of reasonable attorney's fees and all reasonable costs and other reasonable expenses arising therefrom or incurred in connection therewith, and, if any judgment or award shall be rendered against the Indemnified Parties in any such action, Contractor shall at its own expense, satisfy and discharge such judgment or award.

**[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK -
SIGNATURE PAGE FOLLOWS]**

IN WITNESS WHEREOF, the parties hereto have caused this Contract to be signed by their duly authorized representatives on the days and dates set forth below.

VILLAGE OF OAK PARK

CONTRACTOR

By:
Its: Village Manager

By:
Its:

Date: _____, 2023

Date: _____, 2023

ATTEST

ATTEST

By:
Its: Village Clerk

By:
Its:

Date: _____, 2023

Date: _____, 2023

OAK PARK LOCKER ROOM REMODEL

201 SOUTH BLVD

VILLAGE OF OAK PARK

OAK PARK, IL 60302



PROJECT INFORMATION: VICINITY MAP:

PROJECT ADDRESS: 201 SOUTH BLVD
OAK PARK, IL 60302

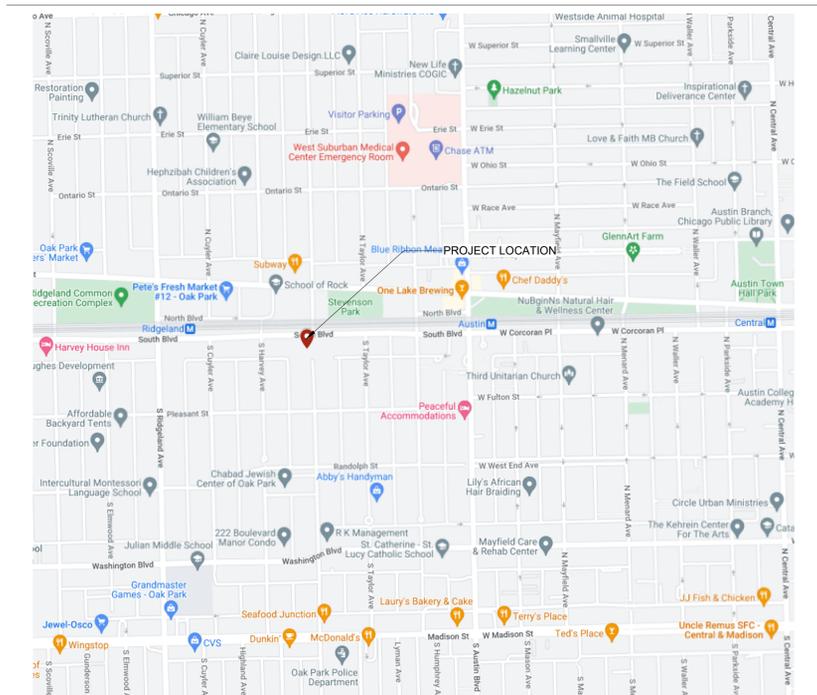
PROJECT DESCRIPTION: RENOVATION OF EXISTING LOCKER ROOM

CODE REQUIREMENTS:

- INTERNATIONAL BUILDING CODE 2018
- INTERNATIONAL FIRE CODE 2018
- INTERNATIONAL MECHANICAL CODE 2018
- INTERNATIONAL RESIDENTIAL CODE 2018
- EXISTING BUILDING CODE 2017
- ILLINOIS PLUMBING CODE 2014
- ILLINOIS ACCESSIBILITY CODE 2018
- INTERNATIONAL FUEL GAS CODE 2018

VILLAGE OF OAK PARK ORDINANCES

TOTAL EXISTING BUILDING AREA OF REMODEL: MENS LOCKER ROOM 647 S.F.
TOTAL 647 S.F.



SHEET LIST:

1 - GENERAL	COVER SHEET
2 - ARCHITECTURAL	OAK PARK PUBLIC WORK PARTIAL FLOOR PLAN
3 - MECHANICAL	MECHANICAL AND PLUMBING PLANS



CERTIFICATION

STATEMENT OF COMPLIANCE

"I have prepared, or caused to be prepared under my direct supervision, the attached plans and specifications and state that, to the best of my knowledge and belief and to the extent of my contractual obligation, they are in compliance with the Environmental Barriers Act (410 ILCS 25) and the Illinois Accessibility Code (71 Ill. Adm. Code 400)."

ILLINOIS DESIGN FIRM'S REGISTRATION NO.: 184.000 595-0007

INDIANA DESIGN FIRM'S REGISTRATION NO.:

MISSOURI DESIGN FIRM'S REGISTRATION NO.:

Signed:

ILLINOIS REGISTRATION NO.: 001.010114

Date:

SEAL

"I hereby certify these drawings have been prepared under my direct supervision and to the best of my knowledge comply with all applicable codes of Aurora, IL."

GENERAL NOTES:

GENERAL CONDITIONS:

- ALL CONTRACTORS SHALL BE RESPONSIBLE TO INSTALL ALL ITEMS SPECIFIED USING CONSTRUCTION THAT WILL PROTECT AT ALL TIMES, PROPERTY AND PREVENT BODILY INJURY AND/OR DEATH. SPECIAL ATTENTION AND PRECAUTION SHALL BE PAID BY THE CONTRACTORS IN SELECTING THE SAFEST METHODS OR MEANS FOR THE INSTALLATION.
- THE ARCHITECT/ENGINEER HAS NO CONTRACTUAL DUTY TO CONTROL THE SAFEST METHODS OR MEANS OF THE WORK. JOB SITE RESPONSIBILITIES, SUPERVISION OR TO SUPERVISE SAFETY AND SHALL NOT VOLUNTARILY ASSUME ANY SUCH DUTY OR RESPONSIBILITY.
- ALL WORK SHALL BE EXECUTED IN A WORKMAN LIKE MANNER AND IN STRICT ACCORDANCE WITH FEDERAL, STATE AND LOCAL CODES AND ORDINANCES AND ALL AUTHORITIES HAVING JURISDICTION AND ACCEPTED BY THE ARCHITECT AND LEFT IN PERFECT OPERATING CONDITION.
- ALL CONTRACTORS SHALL VISIT THE SITE AND BECOME FAMILIAR WITH ALL EXISTING CONDITIONS PRIOR TO SUBMITTING THE FINAL BID. IF THERE ARE ANY DISCREPANCIES, NOTIFY THE ARCHITECT AT ONCE.
- ALL CONTRACTORS SHALL CAREFULLY REVIEW THE DRAWINGS AND OTHER CONTRACT DOCUMENTS PRIOR TO SUBMITTING THE FINAL BID. IF THERE ARE ANY DISCREPANCIES, EACH CONTRACTOR SHALL NOTIFY THE ARCHITECT AT ONCE.
- ALL WORK SHALL BE PERFORMED IN A WORKMAN LIKE MANNER. EACH CONTRACTOR SHALL INCLUDE LABOR, MATERIALS, TOOLS, EQUIPMENT, ETC., FOR THE COMPLETE CONSTRUCTION OF WORK INDICATED AND SPECIFIED BY THE DRAWINGS AND SPECIFICATION. MATERIALS AS SPECIFIED ON DRAWINGS SHALL BE USED. SUBSTITUTIONS OF MATERIALS WILL NOT BE ALLOWED WITHOUT THE WRITTEN CONSENT OF THE OWNER. CONTRACTOR SHALL AMEND AND MAKE GOOD AT THEIR OWN COST, ANY DEFECTS OR OTHER FAILURES IN THEIR WORKMANSHIP AND/OR MATERIAL. CONTRACTOR IS TO CLEAN UP DEBRIS INSIDE AND OUTSIDE THE BUILDING SITE WHICH HAS BEEN CAUSED BY THEIR WORK.
- NON-BEARING PARTITIONS ARE TO BE LAID OUT SO THAT STOCK COMPONENTS WILL FIT EXACTLY WITHIN INDICATED DIMENSIONS. THE GENERAL TRADES CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS BEFORE PROCEEDING WITH WORK AND NOTIFY ARCHITECT AT ONCE OF ANY DISCREPANCIES PRIOR TO COMMENCING WORK.
- DO NOT SCALE DRAWINGS.

GENERAL CONSTRUCTION NOTES:

- PROJECT COORDINATOR SHALL PROVIDE A LOGISTICS PLAN TO THE ARCHITECT AND OWNER FOR REVIEW AND APPROVAL PRIOR TO COMMENCING WORK. THE LOGISTICS PLAN IS TO INCLUDE ALL ROUTING OF VEHICLES, EQUIPMENT, DELIVERY LOCATIONS, FENCING, SECURITY MEASURES, ETC. ANY EXISTING CONDITIONS TO REMAIN THAT ARE DAMAGED DUE TO CONSTRUCTION ARE TO BE RESTORED TO THEIR ORIGINAL CONDITION. THIS INCLUDES, BUT IS NOT LIMITED TO, SIDEWALKS, LANDSCAPING, IRRIGATION, ROADS, PARKING LOTS, BUILDING CONSTRUCTION, ETC.
- EACH CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS AT THE BUILDING SITE AND REPORT ANY DISCREPANCIES TO THE ARCHITECT IN WRITING PRIOR TO PROCEEDING WITH THE WORK. WRITTEN DIMENSIONS ON DRAWINGS SHALL HAVE PRECEDENCE OVER SCALED DIMENSIONS.
- EACH CONTRACTOR SHALL BE RESPONSIBLE FOR UNLOADING, STORING, INSPECTION FOR DAMAGE WHEN RECEIVED AND LOSS FROM SITE AND/OR DAMAGE AFTER RECEIPT FOR ALL MATERIALS FURNISHED BY OWNER.
- NO PRODUCT SUBSTITUTION WILL BE ALLOWED WITHOUT THE WRITTEN APPROVAL OF THE OWNER OR OWNER'S REPRESENTATIVE.
- ALL WORK TO BE NEW EXCEPT WHERE INDICATED AS EXISTING.
- EACH CONTRACTOR SHALL INSURE THAT ALL BUILDING WORK WILL COMPLY WITH APPLICABLE NATIONAL, STATE AND LOCAL CODES GOVERNING AUTHORITIES AND UNDERWRITER REGULATIONS.
- ALL OPENINGS AND OTHER PROVISIONS NECESSARY FOR INSTALLATION OF ARCHITECTURAL, PLUMBING, MECHANICAL, FIRE PROTECTION, ELECTRICAL OR OWNER'S APPARATUS AND EQUIPMENT, MUST BE VERIFIED WITH THE SPECIFIC TRADES REQUIRED AND WITH OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION AND MUST BE OF SIZE, LOCATION, CONFIGURATION, ETC., REQUIRED.
- ALL CONTRACTORS MUST EXERCISE EXTREME CARE SO AS NOT TO DAMAGE EXISTING CONSTRUCTION ITEMS AND SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK.

GENERAL CONSTRUCTION NOTES- CONTINUED:

- NEW PARTITIONS WHICH ARE TO EXTEND TIGHT UP TO THE FLOOR OR ROOF CONSTRUCTION ABOVE, ARE TO BE CUT TO FIT AROUND BEAMS, JOISTS, DUCTS, CONDUITS, PIPES, HANGERS, ETC. ALL SUCH CUTS SHALL BE ACCURATE AND STRAIGHT AND BE SEALED WITH MORTAR OR TAPE AND COMPOUND AND MADE AIRTIGHT.
- AT ALL LOCATIONS WHERE FLOOR SLAB IS TO BE CUT TO PROVIDE FOR NEW FLOOR POWER OR PLUMBING, SLAB IS TO BE REPAIRED FLUSH WITH AND TO MATCH EXISTING ADJACENT FLOOR SLAB CONSTRUCTION.

GENERAL DEMOLITION NOTES:

1. INTERFERENCE OF DEMOLITION

ALL CONTRACTORS: IF THE DEMOLITION CANNOT PROCEED BECAUSE OF UNFORESEEN EXISTING STRUCTURAL OR MECHANICAL, ETC. CONDITIONS, THE CONTRACTOR SHALL IMMEDIATELY REPORT THE CONDITION TO THE ARCHITECT.

2. FIRE PROTECTION DURING DEMOLITION AND NEW CONSTRUCTION

ALL CONTRACTORS: THE CONTRACTOR SHALL PROVIDE AND MAINTAIN ALL FIRE PROTECTION MEASURES AND EQUIPMENT DURING DEMOLITION AND NEW CONSTRUCTION AT THE DIRECTION OF THE FIRE PREVENTION OFFICER AT THE FIRE PROTECTION DISTRICT OFFICE.

3. COORDINATION OF DEMOLITION

ALL CONTRACTORS SHALL PROCEED WITH THE DEMOLITION IN A LOGICAL ORDER AND SHALL COORDINATE THE DEMOLITION WITH OTHER TRADES. EACH PHASE OF THE DEMOLITION SHALL BE PRECEDED BY INVESTIGATION OF THE AREA FOR REMOVAL, RELOCATION, DISCONNECTED ELECTRICAL OR REROUTING OF EXISTING ELEMENTS. PRIORITY OF DEMOLITION SHOULD BE:

- GENERAL TRADES CONTRACTOR: ARCHITECTURAL, HEATING, A/C AND VENTILATION CONTRACTORS: MECHANICAL WORK
- FIRE PROTECTION CONTRACTOR: FIRE PROTECTION WORK
- ELECTRICAL CONTRACTOR: ELECTRICAL WORK
- PLUMBING CONTRACTOR: PLUMBING WORK

WHERE INDICATED ON THE DRAWINGS, "SALVAGE" ITEMS MUST BE CAREFULLY REMOVED, CLEANED AND STORED IN SUCH A WAY AS TO PREVENT DAMAGE. TRANSPORT AND STORE ITEMS OFF SITE OR WITHIN THE AREA OF WORK IN A LEGAL MANNER, UNLESS DIRECTED BY OWNER TO TRANSPORT SAID MATERIALS TO OWNER'S STORAGE AREA.

5. REMOVAL OF EXISTING DOORS AND FRAMES

A. GENERAL TRADES CONTRACTOR: DOORS AND FRAMES THAT ARE TO BE REMOVED ARE INDICATED BY DASHED LINES ON THE DRAWINGS.

6. EXISTING WALL OR PARTITION DEMOLITION

A. GENERAL TRADES CONTRACTOR: WHEN REMOVING PORTIONS OR COMPLETE INTERIOR WALLS, INVESTIGATION MUST BE MADE TO DETERMINE IF THE WALL IS BEARING STRUCTURAL LOADS. IF IT IS DETERMINED THAT THE WALL IS BEARING, NOTIFY THE ARCHITECT BEFORE PROCEEDING WITH DEMOLITION. IF THE WALL IS NON-BEARING, PROCEED WITH DEMOLITION TAKING CARE THAT INTERACTING WALLS OR REMAINING WALLS ARE CUT CLEAN TO MINIMIZE FILLING AND PATCHING OF THE REMAINING PARTITION.

B. GENERAL TRADES CONTRACTOR: IF THE REMOVAL OF AN INTERIOR PARTITION DISTURBS THE EXISTING CEILING THAT IS TO REMAIN, CARE MUST BE TAKEN TO REMOVE AS LITTLE OF THE CEILING AS POSSIBLE AND PROTECT THE ADJACENT CEILING FROM DAMAGE. (UNLESS NOTED OTHERWISE)

C. GENERAL TRADES CONTRACTOR: IF THE PARTITION DEMOLITION INVOLVES DEMOLITION OF THE FLOORING IN THE AREA, CARE IS TO BE TAKEN TO MINIMIZE DAMAGE TO THE EXISTING FLOORING.

D. ELECTRICAL CONTRACTOR: INVESTIGATE ALL EXISTING WIRING IN THE AREAS OF DEMOLITION TO DETERMINE WHICH CIRCUITS CAN BE ABANDONED, AND IF ANY CIRCUITS MUST BE MAINTAINED TO SUPPLY OTHER AREAS. REMOVE ALL WIRING AND CONDUITS TO BE ABANDONED. RELOCATE ALL CIRCUITS TO BE MAINTAINED OR CLEAR NEW CONSTRUCTION.

E. ALL CONTRACTORS: ALL FINISHES SHALL BE PATCHED TO MATCH FOR IMPLEMENTATION OF WORK.

GENERAL DEMOLITION NOTES- CONTINUED:

7. PARTIAL REMOVAL OF EXISTING WALLS OR PARTITIONS

A. GENERAL TRADES CONTRACTOR: WHEN REMOVING PART OF A MASONRY WALL OR PARTITION TO ALLOW FOR THE INSTALLATION OF A NEW DOOR, CUTTING OF THE NEW MASONRY OPENING SHOULD BE ACCOMPLISHED IN A MANNER THAT RESULTS IN AS SMOOTH AN OPENING AS POSSIBLE.

B. GENERAL TRADES CONTRACTOR: PROVIDE TEMPORARY SHORING, BRACING AND OTHER SUPPORT NECESSARY TO PREVENT MOVEMENT, SETTLEMENT, COLLAPSE OR OTHER DAMAGE TO THE STRUCTURE OR ADJACENT WALLS.

8. DEMOLITION OF MECHANICAL/ PLUMBING/ ELECTRICAL SYSTEMS

A. IT WILL BE THE ASSOCIATED CONTRACTOR'S RESPONSIBILITY TO MAINTAIN THE CONDITION OF ALL REMAINING PIPING, CONDUIT, EQUIPMENT, ETC. WITHIN THEIR SCOPE OF WORK DURING DEMOLITION.

B. ALL CONTRACTORS: NOTIFY OWNER PRIOR TO ANY DEMOLITION OF UTILITIES OR SERVICES WHICH MAY AFFECT REMAINING OCCUPIED AREAS.

C. ALL CONTRACTORS: MAKE NECESSARY MODIFICATIONS AND ADJUSTMENTS TO ALL MECHANICAL, PLUMBING, AND ELECTRICAL ITEMS AND EQUIPMENT, BOTH NEW AND EXISTING, AS MAY BE REQUIRED BY THESE ALTERATIONS AND ADDITIONS.

D. PLUMBING CONTRACTOR: CAP ALL PLUMBING ABANDONED DURING DEMOLITION EITHER BELOW FINISH FLOOR LEVEL, ABOVE CEILING OR BEHIND FINISH WALL SURFACE. REROUTE PLUMBING THAT IS TO REMAIN IN SERVICE, AS REQUIRED, TO CLEAR NEW CONSTRUCTION.

E. HEATING & A/C, VENTILATION, ELECTRICAL, PLUMBING, AND FIRE PROTECTION CONTRACTORS: DISCONNECT AT SOURCE AND REMOVE EXISTING ELECTRICAL MATERIALS AND EQUIPMENT AND ALL OTHER MECHANICAL PLUMBING ITEMS WHICH ARE RENDERED OBSOLETE BY THESE ALTERATIONS AND ADDITIONS. THESE ARE THE PROPERTY OF THE OWNER AND SHALL EITHER BE REMOVED FROM THE SITE OR RETURNED TO THE OWNER'S STOCK AT THE DISCRETION OF THE OWNER.

F. HEATING & A/C AND VENTILATION CONTRACTORS: DISCONNECT, REMOVE AND RELOCATE EXISTING MECHANICAL MATERIALS AND EQUIPMENT, AND ALL OTHER MECHANICAL ITEMS WHICH INTERFERE OR ARE INTERFERED WITH, OBSTRUCT OR ARE OBSTRUCTED BY THESE LOCATIONS AS DIRECTED. RECONNECT SUCH ITEMS IN PROPER OPERATING CONDITION AT NEW LOCATIONS.

G. ALL CONTRACTORS: ALL CUTTING AND PATCHING AS REQUIRED FOR WORK IS TO BE INCLUDED IN ASSOCIATED SCOPE OF WORK. FINISH WORK SHALL BE BY FINISHING CONTRACTOR BUT UNDER THE GENERAL CONTRACTORS CONTRACT.

9. GENERAL ALL CONTRACTORS

A. ALL CONTRACTORS ARE RESPONSIBLE TO VISIT THE SITE TO DETERMINE THE EXTENT OF DEMOLITION AND PATCHING AS REQUIRED TO INSTALL THEIR PORTION OF WORK.

B. REFER TO ALL DRAWINGS FOR FULL EXTENT OF DEMOLITION WORK. GENERAL TRADES CONTRACTOR TO INSURE ALL WALL OR FLOOR MOUNTED OBJECTS TO BE REMOVED AND EXISTING TO BE PREPARED FOR NEW FINISHES.

C. ALL CONTRACTORS SHALL VISIT AND INSPECT THE EXISTING BUILDING AND SHALL THOROUGHLY FAMILIARIZE THEMSELVES WITH ACTUAL JOB CONDITIONS BEFORE SIGNING CONTRACTS. NO EXTRAS WILL BE ALLOWED FOR WORK WHICH MIGHT HAVE BEEN REASONABLY FORESEEN BY AN INSPECTION OF THESE PREMISES.

D. WHILE THE SIZE AND LOCATION OF NEW WORK AND EQUIPMENT IN THE EXISTING BUILDING HAS BEEN INDICATED ON THE DRAWINGS AS ACCURATELY AS POSSIBLE, ALL PRIME CONTRACTORS SHALL ADJUST THEIR WORK AS REQUIRED TO AVOID EXISTING DUCTS, PIPES, CONDUITS AND BEAMS NOT SHOWN ON PLANS. ALL CONTRACTORS SHALL ADAPT THEIR WORK TO MEET ALL ACTUAL CONDITIONS ON THE EXISTING PREMISES.

E. ALL CONTRACTORS SHALL INSPECT THE PREMISES AND MAKE A DETAILED EXAMINATION OF ALL LOCATIONS WHERE NEW WORK IS TO BE INSTALLED AND SHALL EXAMINE EXISTING PIPING, CONDUITS, STRUCTURAL SUPPORTING BEAMS, ETC.

F. ALL CONTRACTORS AFTER INSPECTING THE PREMISES AND THE DRAWINGS SHALL CALL TO THE ATTENTION OF THE ARCHITECT ANY LACK OF ANY NECESSARY SPACE OR CLEARANCE REQUIRED BY THE VARIOUS EQUIPMENT BEFORE CONTRACT IS SIGNED. ALL CONTRACTORS SHALL BE RESPONSIBLE FOR ALL CHANGES NECESSARY IF THEY NEGLECT TO DO SO.



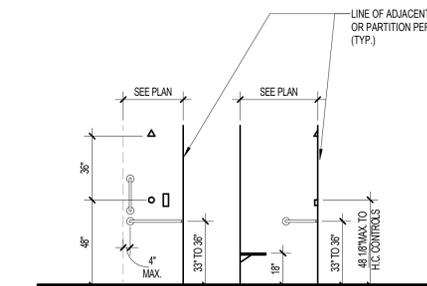
OAK PARK LOCKER ROOM REMODEL
VILLAGE OF OAK PARK
201 SOUTH BLVD
OAK PARK, IL 60302

COVER SHEET

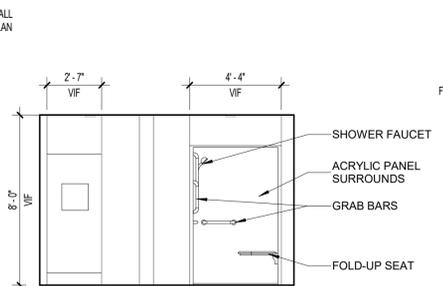
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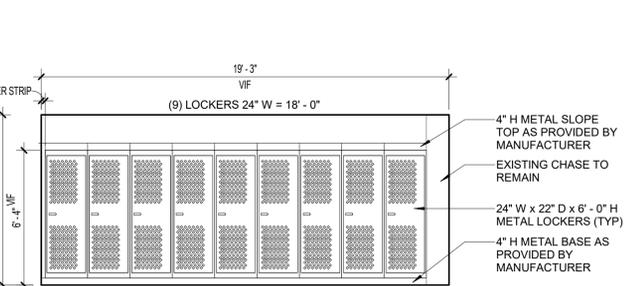
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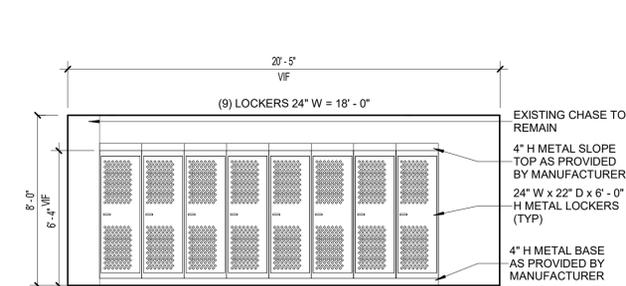
7 ADA MOUNTING HEIGHTS
1/4" = 1'-0"



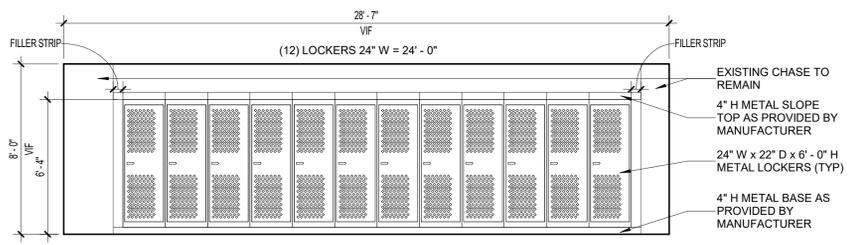
6 SHOWER ELEVATIONS
1/4" = 1'-0"



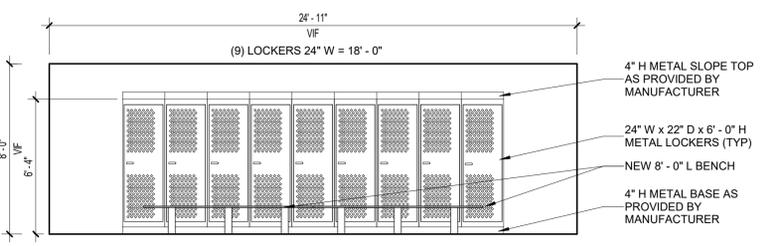
5 MENS LOCKER ROOM ELEVATION
1/4" = 1'-0"



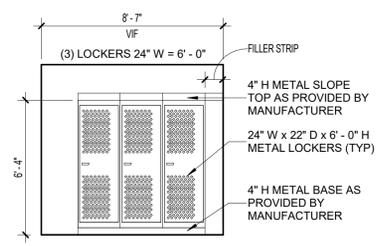
4 MENS LOCKER ROOM ELEVATION
1/4" = 1'-0"



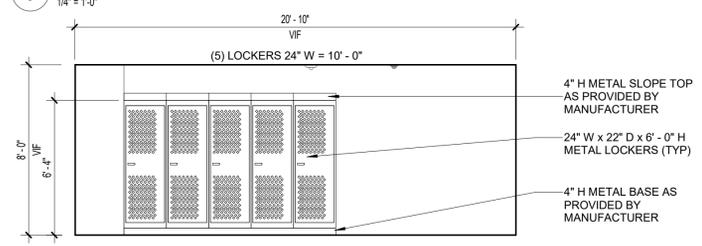
8 MENS LOCKER ROOM ELEVATION
1/4" = 1'-0"



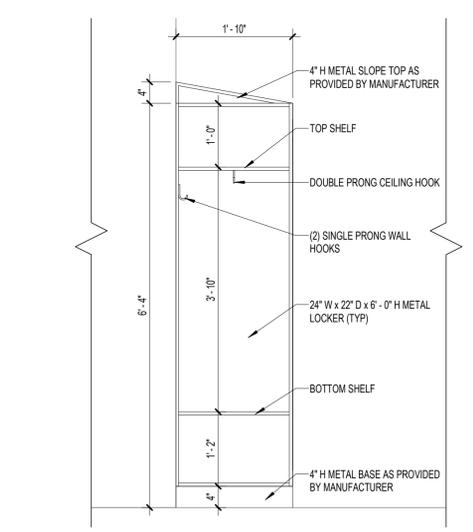
9 MENS LOCKER ROOM ELEVATION
1/4" = 1'-0"



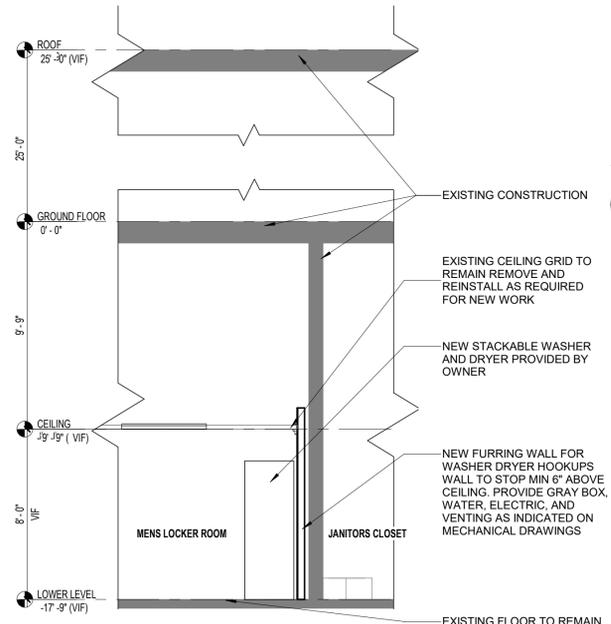
10 MENS LOCKER ROOM ELEVATION
1/4" = 1'-0"



11 WOMENS LOCKER ROOM ELEVATION
1/4" = 1'-0"



13 TYPICAL LOCKER SECTION
3/4" = 1'-0"

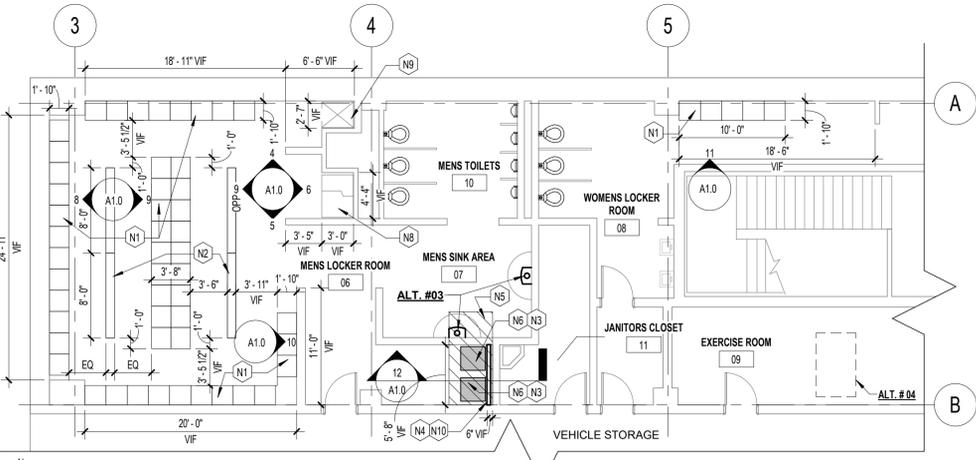


12 WASHER DRYER HOOK UP SECTION
1/4" = 1'-0"

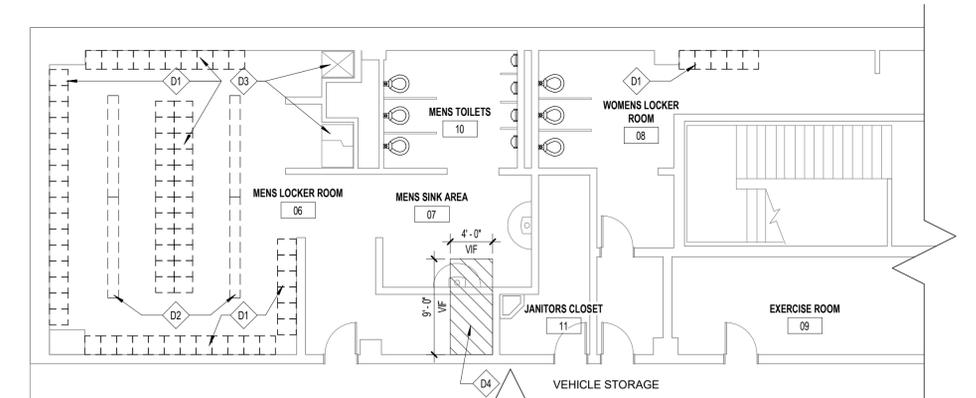


3 LOWER LEVEL - REFLECTED CEILING PLAN
1/8" = 1'-0"

REFLECTED CEILING LEGEND			
	2' x 4' LIGHT FIXTURE BASIS OF DESIGN - COLUMBIA LJ724-40MLG-FSA12-EU SERIES		2' x 4' ACT CEILING SYSTEM
	2' x 4' EMERGENCY LIGHT FIXTURE BASIS OF DESIGN - COLUMBIA LJ724-40MLG-FSA12-EU SERIES		MECHANICAL SUPPLY, RETURN, EXHAUST GRILLS SHOWN ONLY FOR REFERENCE
	EXIT SIGN		FIRE ALARM WALL MOUNTED
	RECESSED CAN DOWNLIGHT		HEAT DETECTOR
	FIRE ALARM CEILING MOUNTED		SPRINKLER HEAD



2 LOWER LEVEL - FLOOR PLAN
1/8" = 1'-0"



1 LOWER LEVEL - DEMOLITION PLAN
1/8" = 1'-0"

GENERAL NOTES

- FLOOR PLAN SHOWN FOR REFERENCE ONLY. CONTRACTOR IS RESPONSIBLE TO CONFIRM ALL EXISTING CONDITIONS THAT IMPACT WORK.
- PROTECT ALL EXISTING MATERIALS AND FINISHES TO REMAIN. ANY REPAIR OR CLEANING REQUIRED DUE TO IMPROPER PROTECTION MUST BE COMPLETED AT THE EXPENSE OF THE CONTRACTOR.
- ALL PENETRATIONS THROUGH WALLS ARE TO BE FIRE CAULKED.
- WHERE LOCKERS RUN WALL TO WALL, PROVIDE EQUAL FILLER STRIPS AT EACH END.
- REFER TO MECHANICAL DRAWINGS FOR FULL SCOPE OF WORK

GENERAL ELECTRICAL NOTES

- PROTECT AND SECURE ALL EXISTING CEILING MOUNTED DEVICES (SMOKE DETECTORS, SPEAKER, WIRELESS ACCESS POINTS) AS NEEDED TO ACCOMMODATE NEW WORK. REINSTALL TO WORKING ORDER IN NEW CEILINGS; EXTEND WIRING TO NEW LOCATIONS AS NEEDED. NOT ALL DEVICES ARE INDICATED ON PLANS. VERIFY IN FIELD ALL EXISTING CEILING MOUNTED DEVICES
- PROVIDE TEMPORARY LIGHTING AND POWER IN ALL WORK AREAS. COMPLY WITH NECA 200-2010 OR LATEST ITERATION.
- MINIMUM NEW CIRCUIT WIRING SHALL CONSIST OF #12, #14, #12G, #12C, WHERE HOME RUNS EXCEED 75' OR CONTINUOUS LOAD EXCEEDS 65% OF CIRCUIT RATING. MINIMUM CIRCUIT SIZE SHALL CONSIST OF #10G, #12C. ALL NEW CIRCUITS SHALL INCLUDE A CONTINUOUS EQUIPMENT GROUNDING CONDUCTOR.
- CONTRACTOR SHALL VERIFY EXACT LOCATIONS OF ALL RECESSED LIGHTING FIXTURES WITH ARCHITECTURAL REFLECTED CEILING PLANS PRIOR TO INSTALLATION. VERIFY CEILING CONSTRUCTION WITH ARCHITECT IN ALL AREAS. CONTRACTOR SHALL BE RESPONSIBLE FOR ORDERING FIXTURES WITH CORRECT TRIMS, ETC. TO ASSURE COMPATIBILITY WITH CEILING STRUCTURE.
- EMERGENCY EGRESS AND EXIT SIGN CIRCUITS SHALL BE SERVED FROM GENERATOR BACK-UP CIRCUITS; PROVIDE A LOCK-ON DEVICE FOR ALL CIRCUITS SERVING EMERGENCY CIRCUITS, FIRE ALARM, AND OTHER CRITICAL LOADS

DEMOLITION KEYNOTES

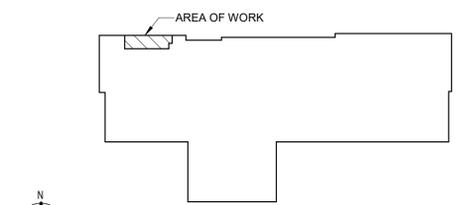
- REMOVE EXISTING LOCKERS IN BOTH THE MENS AND WOMENS LOCKER ROOMS.
- REMOVE EXISTING BENCHES IN THE MENS LOCKER ROOM.
- REMOVE SHOWER SURROUNDS AND FAUCETS IN THE MENS LOCKER ROOM, FOR THE INSTALLATION OF NEW MATERIALS.
- SAW CUT AND REMOVE EXISTING FLOOR AS REQUIRED FOR NEW WORK.

NEW WORK KEYNOTES

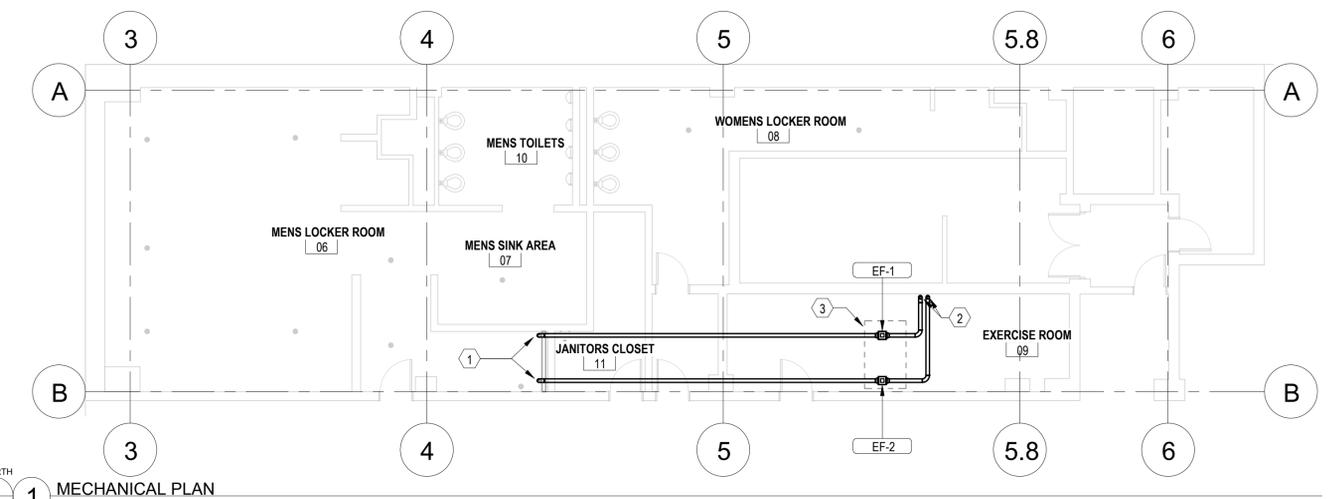
- INSTALL NEW 24" X 22" LOCKERS AS SPECIFIED. 50 LOCKERS IN MENS AND 5 LOCKERS IN WOMENS, TOTAL OF 55 LOCKERS.
- INSTALL NEW 8' - 0" LONG BENCHES AS SPECIFIED. TOTAL FOUR BENCHES.
- INSTALL NEW STACKABLE WASHER AND DRYER. PROVIDE NEW CODE COMPLIANT HOOK UP AT NEW WASHER/DRYER LOCATION. REFER TO MECHANICAL DRAWINGS.
- INSTALL NEW WALL. PROVIDE 5/8" MOISTURE RESISTANT/HIGH ABUSE GYP ON 3/8" STUDS. WALL TO CONTAIN MINIMUM OF 6" ABOVE CEILING. ADJUST EXISTING CEILING TO ACCOMMODATE NEW WALL.
- PATCH AND REPAIR THE FLOOR AND CERAMIC FLOOR TILE TO MATCH EXISTING ELEVATION AND FLOOR FINISH AS REQUIRED FOR NEW WORK.
- ELECTRICAL: PROVIDE A NEW 2-POLE 30A 208V CIRCUIT BREAKER IN PANEL "RP-BB" LOCATED IN SWITCHBOARD ROOM 021 AND #210 & 1#10G, 3/4"C. PROVIDE ALSO A NEMA 6-30R RECEPTACLE.
- REMOVE AND REINSTALL EXISTING CEILING GRID AND FIXTURES AS REQUIRED FOR NEW MECHANICAL AND PLUMBING WORK. CONTRACTOR SHALL REPLACE ANY DAMAGED GRID OR EQUIPMENT AT NO ADDITIONAL COST TO THE OWNER. ALL EXISTING CEILING MOUNTED DEVICES TO BE REINSTALLED ON NEW CEILING TILES. TYPICAL. REFER TO MECHANICAL AND PLUMBING
- ADA ACCESSIBLE SHOWER. PROVIDE NEW SHOWER SURROUND, PLUMBING FIXTURES, GRAB BARS, BENCH, SHOWER CURTAIN AND ROD. INSTALLATION OF SHOWER STALL / COMPONENTS SHALL BE COMPLIANT WITH ILLINOIS ACCESSIBILITY CODE. SEE ELEVATIONS AND PLUMBING DRAWINGS FOR MORE INFORMATION. BASIS OF DESIGN: AQUATIC 14836BFLP
- PROVIDE NEW SHOWER SURROUND, PLUMBING FIXTURES, SHOWER CURTAIN AND ROD. SEE ELEVATIONS AND PLUMBING DRAWINGS FOR MORE INFORMATION. BASIS OF DESIGN: AQUATIC 13232P
- RELOCATE FIRE ALARM DEVICE TO NEW CHASE WALL.

ALTERNATES

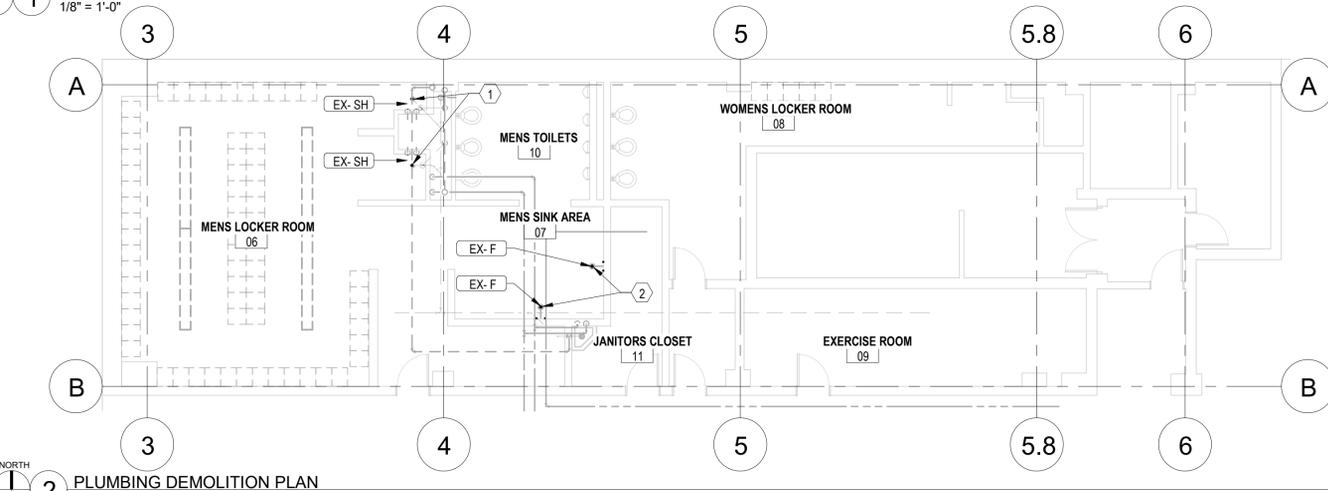
- ALTERNATE #01A (MENS LOCKER ROOM):**
REMOVE AND REPLACE ALL THE EXISTING ACT CEILING TILE AS SPECIFIED IN THE MENS LOCKER ROOM, WITHIN DASHED BOUNDARY. EXISTING CEILING GRID TO REMAIN.
- ALTERNATE #01B (MENS LOCKER ROOM):**
REMOVE AND REPLACE ALL THE EXISTING 2' X 4' CEILING LIGHTS IN THE MENS LOCKER ROOM, WITHIN DASHED BOUNDARY. REUSE EXISTING LIGHTING CIRCUIT AND CONNECT TO EXISTING PANEL LP-B FOR REGULAR LIGHTS AND EM-1 FOR EMERGENCY LIGHTS.
- ALTERNATE #02A (WOMENS LOCKER ROOM):**
REMOVE AND REPLACE ALL THE EXISTING ACT CEILING TILE AS SPECIFIED IN THE WOMENS LOCKER ROOM, WITHIN DASHED BOUNDARY. EXISTING CEILING GRID TO REMAIN.
- ALTERNATE #02B (WOMENS LOCKER ROOM):**
REMOVE AND REPLACE ALL THE EXISTING 2' X 4' CEILING LIGHTS IN THE WOMENS LOCKER ROOM, WITHIN DASHED BOUNDARY. REUSE EXISTING LIGHTING CIRCUIT AND CONNECT TO EXISTING PANEL LP-B FOR REGULAR LIGHTS AND EM-1 FOR EMERGENCY LIGHTS.
- ALTERNATE #03 (MENS SINK AREA):**
REMOVE EXISTING SINK FAUCET (2QTY) AND REPLACE ALL INTERNAL MECHANICAL, SENSOR PARTS AND REINSTALL. EXISTING SINK TO REMAIN. PROTECT AS REQUIRED TO PREVENT ANY DAMAGE. SEE PLUMBING DRAWINGS FOR MORE INFORMATION.
- ALTERNATE #04 (DRYER BOOSTER FAN):**
PROVIDE INLINE FAN AT EACH NEW DRYER VENT DUCT. REFER TO MECHANICAL. EXTEND GENERAL USE 120V RECEPTACLE CIRCUIT FOR NEW EXHAUST FAN COMPLIANT CONNECTION. MINIMUM #12 & #12 GRD, 3/4" C" WIRING. SEE MECHANICAL PLAN AND EQUIPMENT SCHEDULE FOR MORE INFORMATION.



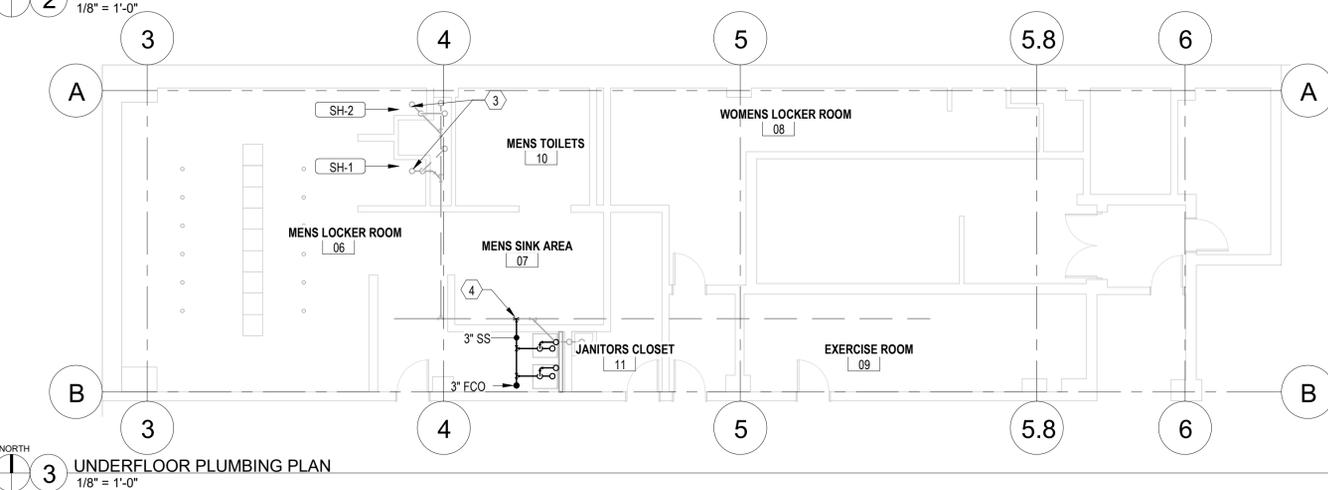
0 KEY PLAN
NOT TO SCALE



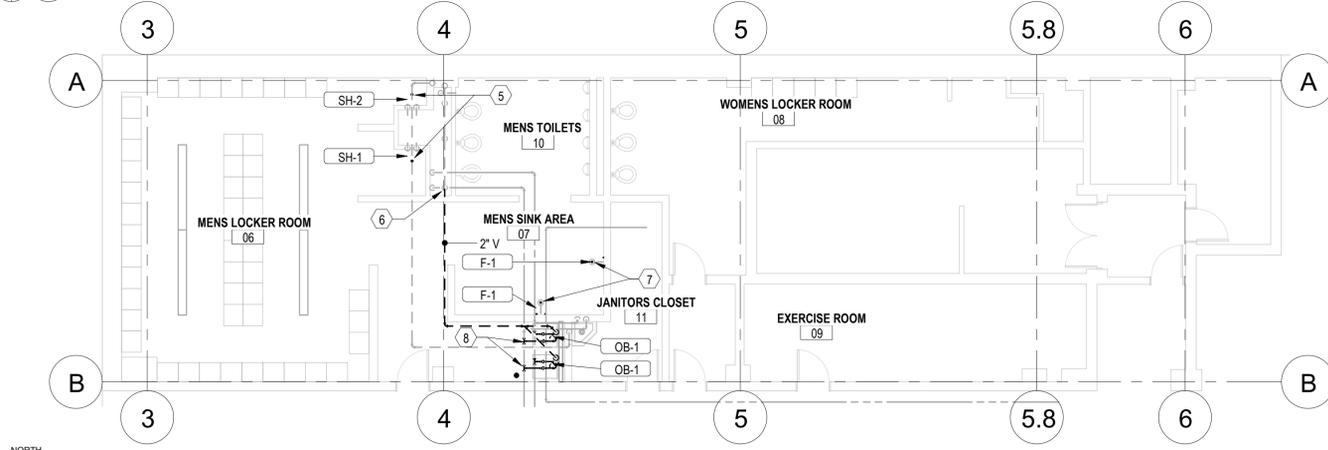
1 MECHANICAL PLAN
1/8" = 1'-0"



2 PLUMBING DEMOLITION PLAN
1/8" = 1'-0"



3 UNDERFLOOR PLUMBING PLAN
1/8" = 1'-0"



4 BASEMENT PLUMBING PLAN
1/8" = 1'-0"

GENERAL MECHANICAL NOTES

- IT IS THE INTENT OF THESE DRAWINGS AND ATTACHED ARCHITECTURAL AND MECHANICAL SPECIFICATIONS THAT THE CONTRACTOR SHALL PROVIDE, DELIVER, AND INSTALL ALL HEATING, VENTILATING AND AIR-CONDITIONING SYSTEMS, DUCTWORK, DIFFUSERS, REGISTERS, GRILLES, LOUVERS, LINING, INSULATION, EXHAUST AIR SYSTEMS, ACCESSORIES, TEMPERATURE CONTROL SYSTEMS, SPECIALTIES, PIPING AND WIRING, WATER SYSTEMS AND DISTRIBUTION PIPING, TOOLS AND EQUIPMENT FOR COMPLETE INSTALLATION OF ALL H.V.A.C. SYSTEMS, GUARANTEE AND SERVICE.
- THIS CONTRACTOR SHALL BE RESPONSIBLE TO INSTALL ALL ITEMS SPECIFIED USING CONSTRUCTION METHODS THAT WILL PROTECT AT ALL TIMES PROPERTY AND PREVENT BODILY INJURY AND/OR DEATH. SPECIAL ATTENTION AND PRECAUTION SHALL BE PAID BY THE CONTRACTOR IN SELECTING THE SAFEST METHODS OR MEANS FOR THE INSTALLATION.
- THIS ARCHITECT/ENGINEER HAS NO CONTRACTUAL DUTY TO CONTROL THE SAFEST METHODS OR MEANS OF THE WORK, JOB SITE RESPONSIBILITIES, SUPERVISION, OR TO SUPERVISE SAFETY AND DID NOT VOLUNTARILY ASSUME ANY SUCH DUTY OR RESPONSIBILITY.
- ALL MECHANICAL WORK SHALL BE EXECUTED IN STRICT ACCORDANCE WITH FEDERAL, STATE, AND LOCAL CODES, ACCEPTED BY THE ARCHITECT AND LEFT IN PERFECT OPERATING CONDITION.
- CONTRACTOR SHALL OBTAIN AND PAY ALL FEES AND PERMITS TO ALL PRIVATE AND PUBLIC AGENCIES HAVING JURISDICTION OVER THE PROJECT.
- CONTRACTOR SHALL CONSULT AND CHECK AT ALL TIMES THE LATEST ARCHITECTURAL, ELECTRICAL, PLUMBING AND EQUIPMENT DRAWINGS FOR EXACT LOCATION OF EACH DIFFUSER, REGISTER, GRILLE, LOUVER, DUCT AND EQUIPMENT.
- AFTER COMPLETION OF THE PROJECT, SUBMIT THREE SETS OF "AS BUILT", SHOP DRAWINGS AND ALL MANUFACTURER'S WARRANTIES, GUARANTIES AND INSTRUCTIONS OF ALL INSTALLED SYSTEMS AND EQUIPMENT PROPERLY BOUND AND LABELED FOR THIS PROJECT. PROVIDE SERVICE CONTACT INFORMATION AND WARRANTY LETTER FROM MECHANICAL INSTALLER ON THE COVER SHEET OF THE MANUALS.
- CONTRACTOR SHALL NOT ROUTE DUCTWORK OVER ELECTRICAL PANELS.
- CONTRACTOR SHALL ROUTE ALL DUCTWORK TIGHT TO STRUCTURE ABOVE IN EXPOSED CEILINGS.
- CONTRACTOR SHALL PROVIDE CAULK AROUND ALL PIPES AND DUCTWORK AT ALL WALL PENETRATIONS.
- FOR CLARITY, THESE DOCUMENTS DO NOT NECESSARILY SHOW EVERY OFFSET, FITTING, VALVE, ETC.
- UNLESS OTHERWISE NOTED ON THE ARCHITECTURAL DRAWINGS, CONTRACTOR SHALL CUT, PATCH, AND MATCH EXISTING BUILDING CONSTRUCTION TO REMOVE AND INSTALL WORK AS REQUIRED.
- PRIOR TO MECHANICAL EQUIPMENT SUBMITTALS, THE MECHANICAL CONTRACTOR, TEMPERATURE CONTROLS CONTRACTOR, AND EQUIPMENT MANUFACTURER SHALL COORDINATE TO ENSURE ALL SYSTEMS ARE USING THE SAME COMMUNICATION PROTOCOL.
- ALL MATERIAL SHALL COMPLY WITH THE REQUIREMENTS OF SECTION IMC SECTION 602.
- CONTRACTOR SHALL PROVIDE DYNAMIC FIRE DAMPERS AND ACCESS DOORS AT ALL FIRE RATED WALL OR FLOOR PENETRATIONS AS REQUIRED PER IMC.

MECHANICAL KEYNOTES

- PROVIDE GUY GRAY DRYER BOX MODEL DB-350.
- ROUTE 4" 316 SS DRYER VENT TO ROOF AND TERMINATE WITH DRYERJACK 486J LOCATED ON ROOF/THE CONTRACTOR SHALL VERIFY THE ROUTING REQUIRED FROM THE LOWER LEVEL TO THE ROOF AND PROVIDE INSTALLATION AND MATERIAL IN THE BID.
- ALTERNATE 4

PLUMBING KEYNOTES

- DISCONNECT AND REMOVE EXISTING (EX-SH) SYSTEM WITH ASSOCIATED ENCLOSURE. MODIFY EXISTING SANITARY ROUGH-IN, VENT ROUGH-IN, HOT WATER ROUGH-IN, AND COLD WATER ROUGH-IN AS REQUIRED TO INSTALL NEW SHOWER SYSTEM. VERIFY SIZE OF ALCOVE PROVIDED TO ENGINEER AT TIME OF SUBMITTALS.
- DISCONNECT AND REMOVE EXISTING (EX-F) WASH/FOUNTAIN SPRAYHEAD ASSEMBLY IN ITS ENTIRETY, WASH/FOUNTAIN BOWL, DRAIN, AND PEDESTAL TO REMAIN.
- CONNECT TO EXISTING SANITARY ROUGH-IN AS REQUIRED.
- CONNECT TO EXISTING SANITARY LINE AS REQUIRED. VERIFY LOCATION IN FIELD.
- CONNECT TO EXISTING HOT AND COLD WATER ROUGH-IN AS REQUIRED.
- CONNECT TO EXISTING SANITARY VENT AS REQUIRED.
- INSTALL NEW WASH/FOUNTAIN SPRAYHEAD ASSEMBLY PER MANUFACTURER'S INSTRUCTIONS.
- CONNECT TO EXISTING HOT AND COLD WATER PIPING WITH SHUT-OFF VALVE IN ACCESSIBLE LOCATION.

GENERAL PLUMBING NOTES

- OBTAIN AND PAY ALL FEES AND PERMITS TO ALL PRIVATE AND PUBLIC AGENCIES HAVING JURISDICTION.
- OSHA RULES, REGULATIONS AND REQUIREMENTS ARE A PART OF THIS PROJECT. CONTRACTOR SHALL FOLLOW THEM ALONG WITH FEDERAL, STATE AND LOCAL REQUIREMENTS FOR THE SAFETY OF WORKERS ON THE JOB AND PASSERS-BY.
- CONSULT AND CHECK AT ALL TIMES THE LATEST ARCHITECTURAL AND PLUMBING DRAWINGS, WHICH ARE A PART OF THIS CONTRACT, FOR EXACT LOCATION OF EACH PLUMBING FIXTURE, EQUIPMENT AND DRAIN AND WATER REQUIREMENTS.
- ALL WORK SHALL CONFORM TO ALL LOCAL CODES, AUTHORITIES AND INDUSTRY STANDARDS INCLUDING, BUT NOT LIMITED TO, INTERNATIONAL PLUMBING CODE AND ILLINOIS PLUMBING CODE.
- COORDINATE ALL EQUIPMENT CONNECTIONS, SIZES AND LOCATIONS WITH ACTUAL EQUIPMENT DELIVERED, INCLUDING EQUIPMENT FURNISHED BY OTHER CONTRACTORS AND/OR THE OWNER. PROVIDE ALL NECESSARY FITTINGS AND ADAPTERS REQUIRED FOR FINAL CONNECTIONS TO EQUIPMENT.
- FOR CLARITY, THESE DOCUMENTS DO NOT NECESSARILY SHOW EVERY OFFSET, FITTING, VALVE, ETC.
- THE PLUMBING CONTRACTOR SHALL PROVIDE, DELIVER, AND INSTALL ALL NEW PLUMBING SYSTEMS, PLUMBING FIXTURES, WASTE, VENT, HOT AND COLD WATER DISTRIBUTION PIPING AS SPECIFIED, AS WELL AS ALL ACCESSORIES, AND EQUIPMENT AND SPECIALTIES MATERIALS NOT SPECIFIED BUT NECESSARY FOR COMPLETE INSTALLATION, GUARANTEE AND SERVICE.
- ALL EXCAVATION AND BACKFILLING FOR THE ENTIRE PLUMBING INSTALLATION SHALL BE PROVIDED BY THE PLUMBING CONTRACTOR.
- PLUMBING CONTRACTOR SHALL FILL AND DRAIN EXISTING AND NEW DOMESTIC WATER LINES AS REQUIRED TO INSTALL PLUMBING SYSTEM.
- ALL HANGERS, RODS, SUPPORTS, SUPPLIES, UNISTRUTS, P-TRAPS, STOPS, VALVES, SLEEVES, AND MISCELLANEOUS ITEMS SHALL BE FURNISHED AND INSTALLED BY PLUMBING CONTRACTOR AS REQUIRED IN FIELD.
- ROUTE ALL PIPING TIGHT TO STRUCTURE ABOVE IN EXPOSED CEILINGS.
- DO NOT ROUTE DOMESTIC WATER PIPING OVER ELECTRICAL PANELS.
- PROVIDE CAULK AROUND ALL PIPES AT ALL WALL PENETRATIONS.
- PROVIDE P-TRAP ON FIXTURE NOT HAVING AN INTEGRAL PART OF THE SAME INTO WASTE LINE.
- TRAP SEALS SUBJECT TO EVAPORATION SHALL BE PROTECTED IN ACCORDANCE WITH 890.410F OF THE ILLINOIS PLUMBING CODE.
- TEMPERED HOT WATER NOT TO EXCEED 110 DEGREES TO BE SUPPLIED TO ALL PUBLIC LAVATORIES.
- 100 PSI AIR TEST OR WATER PRESSURE REQUIRED ON WATER PIPING AT TIME OF ROUGH INSPECTION.
- PROVIDE INSULATION WITH FACTORY APPLIED ALL SERVICE JACKET FOR ALL HOT AND COLD WATER PIPING.
- UNLESS OTHERWISE NOTED ON THE ARCHITECTURAL DRAWINGS, THE PLUMBING CONTRACTOR SHALL CUT, PATCH, AND MATCH EXISTING CONDITIONS AS REQUIRED TO REMOVE AND INSTALL WORK.

PLUMBING FIXTURE SCHEDULE

MARK	CW	HW	WASTE	VENT	MFR	MODEL	DESCRIPTION	REMARKS
F-1	1/2"	1/2"	-	-	BRADLEY	S50-367, S05-054B, S45-2504, S45-1336, 107-099, 140-126, 176-006A, S75-005, 125-011, & S45-055	WASH FOUNTAIN INFRARED SENSOR MODULE, SPRAYHEAD, VALVE ASSEMBLY, TIE ROD PRE-PACK, RESTRAINING BRACKET, TOP COVER, STANDARD TIE ROD, STANDARD SUPPORT TUBE, SUPPORT TUBE GASKET, AND THE BAR PRE-PACK.	PARTS NUMBERS LISTED FOR REFERENCE. PROVIDE ALL PARTS REQUIRED FOR A COMPLETE INSTALLATION.
FCO	-	-	VARIES	-	ZURN	EZC	ADJUSTABLE FLOOR CLEANOUT WITH PVC BODY AND NICKEL BRONZE SQUARE COVER.	-
OB-1	1/2"	1/2"	2"	1-1/2"	GUY GRAY	82371	WASHER MACHINE OUTLET BOX WITH PVC DRAIN FITTING AND WATER HAMMER ARRESTER VALVES.	INTERNAL AIR GAP WITH WASHING MACHINE.
SH-1	1/2"	1/2"	2"	2"	CHICAGO FAUCETS	SH-PB1-00-044	PRESSURE BALANCING SHOWER SYSTEM, WALL MOUNTED 36" ADA SLIDE/GRAB BAR, HAND SPRAY WITH 69" HOSE, LEVER HANDLE, 1.5 GPM, WALL ELBOW WITH VACUUM BREAKER, WATERSENSE CERTIFIED.	PROVIDE 48X36 ADA COMPLIANT SHOWER BY AQUATIC 14836BFLP-LB-RS-CD. VERIFY SIZE OF ALCOVE PRIOR TO ORDER.
SH-2	1/2"	1/2"	2"	2"	CHICAGO FAUCETS	SH-PB1-03-000	PRESSURE BALANCING SHOWER SYSTEM, SHOWER HEAD WITH BALL JOINT, LEVER HANDLE, 1.5 GPM, WATERSENSE CERTIFIED.	PROVIDE 32X32 SHOWER BY AQUATIC 13232P-WH. VERIFY SIZE OF ALCOVE PRIOR TO ORDER.

PLUMBING PIPING SCHEDULE

SYSTEM	MATERIAL	JOINTS	INSULATION	INSULATION TYPE
COLD WATER, ALL SIZES	TYPE L COPPER	PRESS / SOLDER	1"	FIBERGLASS
HOT WATER <1.5"	TYPE L COPPER	PRESS / SOLDER	1"	FIBERGLASS
HOT WATER >=1.5"	TYPE L COPPER	PRESS / SOLDER	1.5"	FIBERGLASS
HOT WATER RETURN	TYPE L COPPER	PRESS / SOLDER	1"	FIBERGLASS
WASTE AND VENT	SCH 40 PVC	SOLVENT WELD	-	-

EXHAUST FAN SCHEDULE-ALT 4

TAG	AMPS	VOLT.	MFR	MODEL	TYPE	CONTROL	NOTES
EF-1	0.92	120 / 1	TJERNLUND	LB2XL	INLINE	PRESSURE	1
EF-2	0.92	120 / 1	TJERNLUND	LB2XL	INLINE	PRESSURE	1

NOTES

- DRYER BOOSTER FAN, PRESSURE SENSOR, THERMISTER, AND WALL MOUNTED STATUS...

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SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes through-penetration firestop systems for penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items.
- B. Related Sections include the following:
1. Division 07 Section "Fire-Resistive Joint Systems."
 2. Division 21 Sections specifying fire-suppression piping penetrations.
 3. Division 22 and 23 Sections specifying duct and piping penetrations.
 4. Division 26, 27, and 28 Sections specifying cable and conduit penetrations.

1.3 PERFORMANCE REQUIREMENTS

- A. General: For penetrations through the following fire-resistance-rated constructions, including both empty openings and openings containing penetrating items, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.
1. Fire-resistance-rated walls including fire walls, fire partitions, fire barriers and smoke barriers.
 2. Fire-resistance-rated horizontal assemblies including floors, floor/ceiling assemblies, and ceiling membranes of roof/ceiling assemblies.
- B. Rated Systems: Provide through-penetration firestop systems with the following ratings determined per ASTM E 814 or UL 1479:
1. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.

2. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
 - a. Penetrations located outside wall cavities.
 - b. Penetrations located outside fire-resistance-rated shaft enclosures.
 3. L-Rated Systems: Where through-penetration firestop systems are indicated in smoke barriers, provide through-penetration firestop systems with L-ratings of not more than 3.0 cfm/sq. ft (0.01524cu. m/s x sq. m) at both ambient temperatures and 400 deg F (204 deg C).
- C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.
1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 2. For floor penetrations with annular spaces exceeding 4 inches (100 mm) in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved, either by installing floor plates or by other means.
 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- D. For through-penetration firestop systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For each through-penetration firestop system, show each type of construction condition penetrated, relationships to adjoining construction, and type of penetrating item. Include firestop design designation of qualified testing and inspecting agency that evidences compliance with requirements for each condition indicated.
1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
 2. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.
- C. Through-Penetration Firestop System Schedule: Indicate locations of each through-penetration firestop system, along with the following information:
1. Types of penetrating items.

2. Types of constructions penetrated, including fire-resistance ratings and, where applicable, thicknesses of construction penetrated.
3. Through-penetration firestop systems for each location identified by firestop design designation of qualified testing and inspecting agency.

D. Qualification Data: For Installer.

E. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FMG according to FMG 4991, "Approval of Firestop Contractors."

B. Installation Responsibility: Assign installation of through-penetration firestop systems and fire-resistive joint systems in Project to a single qualified installer.

C. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, through one source from a single manufacturer.

D. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in Part 1 "Performance Requirements" Article:

1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
2. Through-penetration firestop systems are identical to those tested per testing standard referenced in "Part 1 Performance Requirements" Article. Provide rated systems complying with the following requirements:
 - a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
 - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
 - 1) UL in its "Fire Resistance Directory."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency's classification marking applicable to Project, curing time, and mixing instructions for multicomponent materials.

- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- C. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until each installation has been examined by Owner's inspecting agency and building inspector, if required by authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the through-penetration firestop systems indicated for each application at the end of Part 3:
 - 1. A/D Fire Protection Systems Inc.
 - 2. Grace, W. R. & Co. - Conn.
 - 3. Hilti, Inc.
 - 4. Johns Manville.
 - 5. Nelson Firestop Products.
 - 6. NUCO Inc.
 - 7. RectorSeal Corporation (The).
 - 8. Specified Technologies Inc.
 - 9. 3M; Fire Protection Products Division.
 - 10. Tremco; Sealant/Weatherproofing Division.
 - 11. USG Corporation.

2.2 FIRESTOPPING, GENERAL

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another; with the substrates forming openings; and with the items, if any, penetrating through-

penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.

- B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-/rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 2. Temporary forming materials.
 3. Substrate primers.
 4. Collars.
 5. Steel sleeves.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of work.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with firestop system manufacturer's written instructions and with the following requirements:
1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with Part 1 "Performance Requirements" Article and with firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Identify through-penetration firestop systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of edge of the firestop systems so that labels will be visible to anyone seeking to remove penetrating items or firestop systems. Use mechanical fasteners for metal labels. For plastic labels, use self-adhering type with adhesives capable of permanently bonding labels to surfaces on which labels are placed and, in combination with label material, will result in partial destruction of label if removal is attempted. Include the following information on labels:
 - 1. The words "Warning - Through-Penetration Firestop System - Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Through-penetration firestop system designation of applicable testing and inspecting agency.
 - 4. Date of installation.
 - 5. Through-penetration firestop system manufacturer's name.
 - 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.
- B. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued and firestop installations comply with requirements.

3.6 CLEANING AND PROTECTING

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce systems complying with specified requirements.

3.7 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to alpha-alpha-numeric designations listed in UL's "Fire Resistance Directory" under product Category XHEZ.
- B. Firestop Systems with No Penetrating Items:
 - 1. Available UL-Classified Systems: C-AJ-.1001-1999.
- C. Firestop Systems for Metallic Pipes, Conduit, or Tubing:
 - 1. Available UL-Classified Systems: C-AJ-.
- D. Firestop Systems for Nonmetallic Pipe, Conduit, or Tubing:
 - 1. Available UL-Classified Systems: C-AJ- 2001-2999.
- E. Firestop Systems for Electrical Cables:
 - 1. Available UL-Classified Systems: C-AJ- 3001-3999.
- F. Firestop Systems for Cable Trays:
 - 1. Available UL-Classified Systems: C-AJ- 4001-4999.
- G. Firestop Systems for Insulated Pipes:
 - 1. Available UL-Classified Systems: C-AJ- 5001-5999.
- H. Firestop Systems for Miscellaneous Electrical Penetrants:

1. Available UL-Classified Systems: C-AJ- 6001-6999.
- I. Firestop Systems for Miscellaneous Mechanical Penetrants:
 1. AvailableUL-Classified Systems: C-AJ- 7001-7999.
 - a. Latex sealant.
 - b. Mortar.
- J. Firestop Systems for Groupings of Penetrants:
 1. Available UL-Classified Systems: C-AJ- 8001-8999.

END OF SECTION 078413

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior gypsum board assemblies.
2. Grid suspension systems for gypsum board ceilings and soffits.

1.2 ACTION SUBMITTALS

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: Provide materials and construction identical to those tested according to ASTM E 119.
- B. STC-Rated Assemblies: Provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413.

2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 2. Protective Coating: Coating with equivalent corrosion resistance of ASTM A 653/A 653M, G60, (Z180), hot-dip galvanized in all wet environments.
- B. Steel Studs and Runners: ASTM C 645. Use either steel studs and runners or dimpled steel studs and runners of equivalent minimum base-metal thickness.
1. Minimum Base-Metal Thickness: As indicated on Drawings and/or as required.
 2. Depth: As indicated on Drawings and/or as required.

- C. Slip-Type Head Joints: As required, provide the following in thickness not less than indicated for studs and in width to accommodate depth of studs:
1. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch- deep flanges and fastened to studs, and outer runner sized to friction fit inside runner.
 2. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes due to deflection of structure above.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Dietrich Metal Framing; SLP-TRK Slotted Deflection Track.
 - 2) MBA Building Supplies; FlatSteel Deflection Track.
 - 3) Steel Network Inc. (The); VertiClip SLD.
 - 4) Superior Metal Trim; Superior Flex Track System (SFT).
 - 5) Telling Industries; Vertical Slip Track.
- D. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
1. Minimum Base-Metal Thickness: 0.018 inch.
- E. Cold-Rolled Channel Bridging: Steel, 0.053-inch minimum base-metal thickness, with minimum 1/2-inch- wide flanges.
1. Depth: As indicated on Drawings
 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch- thick, galvanized steel.
- F. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
1. Minimum Base-Metal Thickness: 0.018 inch.
 2. Depth: As indicated on Drawings.
- G. Resilient Furring Channels: 1/2-inch- deep, steel sheet members designed to reduce sound transmission.
1. Configuration: Asymmetrical or hat shaped.
- H. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges.
1. Depth: As indicated on Drawings.
 2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 0.033 inch.
 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- diameter wire, or double strand of 0.048-inch- diameter wire.

2.3 AUXILIARY MATERIALS

- A. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

- B. Isolation Strip at Exterior Walls: Provide asphalt saturated organic felt or foam gasket.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
 - 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.

- D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
- E. Direct Furring:
1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
- F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each texture finish indicated on same backing indicated for Work.

PART 2 - PRODUCTS

2.1 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.2 INTERIOR GYPSUM BOARD

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Gypsum.
2. CertainTeed Corp.
3. Georgia-Pacific Gypsum LLC.
4. National Gypsum Company.
5. USG Corporation.

B. Gypsum Wallboard: ASTM C 1396.

1. Thickness: 5/8 inch.
2. Long Edges: Tapered.

C. Gypsum Board, Type X: ASTM C 1396.

1. Thickness: 5/8 inch.
 2. Long Edges: Tapered.
- D. Mold-Resistant Gypsum Board: ASTM C 1396. With moisture- and mold-resistant core and paper surfaces.
1. Core: 5/8 inch, Type X.
 2. Long Edges: Tapered.
 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.3 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: aluminum-coated steel sheet or plastic.
2. Shapes:
 - a. Cornerbead for all outside corners.
 - b. L-Bead / L-shaped: Exposed long leg receives joint compound.
 - c. Expansion (control) joint where indicated, or if not indicated, maximum spacing of 25' on center.

B. Exterior Trim: ASTM C 1047.

1. Material: Hot-dip galvanized-steel sheet, plastic, or rolled zinc.
2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.

C. Aluminum Trim: ASTM B 221, Alloy 6063-T5

1. Manufacturer: As noted on drawings.
2. Finish: As noted on drawings.
3. Profile: As noted on drawings.

2.4 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Mesh.
2. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
3. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

- D. Joint Compound for Exterior Applications:
 - 1. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.
- E. Joint Compound for Tile Backing Panels:
 - 1. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.5 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
- C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
 - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- E. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Accumetric LLC; BOSS 826 Acoustical Sound Sealant.
 - b. Grabber Construction Products; Acoustical Sound and Smoke Sealant GSCSF.
 - c. Pecora Corporation; AC-20 FTR.
 - d. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
 - e. USG Corporation; SHEETROCK Acoustical Sealant.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates with installer present and including welded hollow metal frames, cast in anchors and structural framing, for compliance with requirements and other conditions

affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Regular Type: As indicated in drawing partition types.
2. Type X: As indicated in drawing partition types.
3. Flexible Type: Apply in double layer at curved assemblies.
4. Ceiling Type: Ceiling surfaces.
5. Abuse-Resistant Type: In hallways, stairwells, emotionally disturbed classrooms, refocus rooms, and as indicated in drawing partition types.
6. Moisture- and Mold-Resistant Type: In toilets, wet rooms, showers, kitchens, pool spaces, and any other location as indicated on Drawings.
7. Cement Board: At all wall tile locations, and as indicated in drawing partition types.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing) or horizontally (perpendicular to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying face layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints 1 framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.

4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.
- D. Locate edge and end joints over supports or provide back blocking.
 - E. Isolate perimeter of non load bearing gypsum board partitions at structural abutments, except floors. Provide ¼ inch to 1/2" inch wide spaces at these locations and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustic sealant.
 - F. Cover both faces of steel stud partition framing with gypsum panels to bottom of structure including concealed spaces (above ceiling, etc) except in chases braced internally or unless noted otherwise
 - G. Install sound attenuating insulation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.
 - H. Sound-Insulated Assemblies: Seal construction at perimeters, behind control and expansion joints and at openings and penetrations with a continuous bead of acoustic sealant. Install acoustic sealant at both faces of partitions at perimeter and through penetrations. Comply with ASTM C 919 and manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings. Provide sound attenuating sealant at walls scheduled for sound attenuating insulation and/or improved STC performance, including but not limited to classrooms, offices, conference rooms, refocus rooms, toilet rooms, music classrooms, and practice rooms.

3.3 APPLYING AND FINISHING PANELS

- A. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- B. Comply with ASTM C 840.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- D. For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- E. Prefill open joints and damaged surface areas.
- F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- A. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 2. Level 2: Panels that are substrate for tile.
 3. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
- B. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.

3.4 PROTECTION

- A. Protect adjacent surfaces from drywall compound and texture finishes and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION 092900

SECTION 095123 - ACOUSTICAL TILE CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Acoustical tiles for interior ceilings.
 - 2. Fully concealed, direct-hung, suspension systems.
- B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. All submittals shall be in pdf format.
- B. Product Data: For each type of product.
- C. Samples: For each exposed product and for each color and texture specified, 6 inches in size.
- D. Samples for Initial Selection: For components with factory-applied finishes.
- E. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:
 - 1. Acoustical Tiles: Set of full-size Samples of each type, color, pattern, and texture.
 - 2. Concealed Suspension-System Members: 6-inch- long Sample of each type.
 - 3. Exposed Moldings and Trim: Set of 6-inch- long Samples of each type and color.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Ceiling suspension-system members.
 2. Structural members to which suspension systems will be attached.
 3. Method of attaching hangers to building structure.
 - a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
 4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
 5. Size and location of initial access modules for acoustical tile.
 6. Items penetrating finished ceiling and ceiling-mounted items including the following:
 - a. Lighting fixtures.
 - b. Diffusers.
 - c. Grilles.
 - d. Speakers.
 - e. Sprinklers.
 - f. Access panels.
 - g. Perimeter moldings.
- B. Product Test Reports

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Acoustical Ceiling Units: Full-size tiles equal to 2 percent of quantity installed.
 2. Suspension-System Components: Quantity of each concealed grid and exposed component equal to 2 percent of quantity installed.

1.8 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
1. Build mockup of typical ceiling area as shown on Drawings.
 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- 4.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical tiles, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical tiles, permit them to reach room temperature and a stabilized moisture content.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical tile ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
 1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical tile ceiling installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations:
 1. Suspended Acoustical Tile Ceilings: Obtain each type of acoustical ceiling tile and its suspension system from single source from single manufacturer.
 2. Directly Attached Acoustical Tile Ceilings: Obtain each type of acoustical ceiling tile from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
 1. Fire-Resistance Characteristics: Where indicated, provide acoustical tile ceilings identical to those of assemblies tested for fire resistance per ASTM E 119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - a. Identify materials with appropriate markings of applicable testing and inspecting agency.

2. Surface-Burning Characteristics: Acoustical tiles complying with ASTM E 1264 for Class A materials, when tested per ASTM E 84.
 - a. Smoke-Developed Index: 450 or less.

2.3 ACOUSTICAL TILE CEILINGS GENERAL

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. USG Corporation
 2. Armstrong World Industries, Inc.
 3. CertainTeed Corporation.
- B. Acoustical Tile Standard: Provide manufacturer's standard tiles of configuration indicated that comply with ASTM E1264 classifications as designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
- C. Metal Suspension System Standard: Comply with ASTM C 635.
 1. Recycled Content: Provide products made from steel sheet with average recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
- D. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated.
- E. Wire Hangers, Braces, and Ties: Zinc-coated carbon-steel wire; ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 1. Size: Select wire diameter so its stress at 3 times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- diameter wire.
- F. Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.

2.4 ACOUSTICAL TILES

- A. Acoustical Panel Type ACT
 1. Basis of Design: Subject to compliance with project requirements, the design is based on the following: USG Interiors, LLC, "Radar Ceramic ClimaPlus".
 2. Classification: Provide ceiling panels complying with ASTM E 1264 for type, form and pattern as follows:
 - a. Type: XX, Bonded mineral fiber with ceramic finish
 - b. Form: N/A
 - c. Pattern: C, E & G, perforated, small holes, light texture and smooth

3. Color: Flat White 050.
4. LR: Not less than 0.82.
5. NRC: Not less than 0.50.
6. CAC: Not less than 40.
7. Edge/Joint Detail: SQ Square.
8. Suspension Grid/Width: ZXLA 15/16 inch
9. Panel Thickness: 5/8 inch .
10. Modular Size: 24 by 48 inches.
11. Panel Features:
 - a. Firecode®, fire rated and designed to meet life safety codes.
 - b. Ceramic bonded mineral fiber withstands extreme heat, humidity chemical fumes and steam.
12. ClimaPlus™ 30 year limited system warranty performance: Contains a broad spectrum antimicrobial additive on the face and back of the panel that provides resistance against the growth of mold and mildew. Includes sag resistance performance.

2.5 METAL SUSPENSION SYSTEM

- A. **NOTE:** Existing suspension system to remain. Ceiling tiles are to be replaced as part of ceiling tile replacement alternates. If existing suspension is damaged, then it must be replaced to match existing profile and color.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. USG Corporation
 2. Armstrong World Industries, Inc.
 3. CertainTeed Corporation.
- C. Narrow Face, Capped, Double Web, Cold Rolled Steel Suspension System: Main and Cross Tees as defined by ASTM C635, commercial quality pretreated and painted hot-dipped galvanized cold-rolled steel, exposed surfaces prefinished in manufacturer's standard corrosion resistant enamel paint finish:
 1. Basis of Design: Subject to compliance with project requirements, the design is based on the following: USG Interiors, LLC, "USG DONN® Brand DX/DXL™ 15/16" Acoustical Suspension System".
 2. Tee Profile: Narrow Face 15/16" wide.
 3. Color: to be selected from manufacturers full range
- A. Double-web design; Heavy Duty as defined by ASTM C635. Bottom face with; 15/16" (24mm) exposed flange with pre-painted aluminum cap; cross tee holes and hanger wire holes at 6 in oc; integral reversible splices, commercial quality pretreated and painted, exposed surfaces prefinished in manufacturer's enhanced corrosion resistant polyester paint finish. Cross tees; roll-formed into double-web design with rectangular bulb; 15/16 (24mm) in exposed flange with pre-painted aluminum cap; Stainless Steel clips clenched to the web Main tees and cross tees shall be positively locked, yet shall be removable without the use of tools:

1. Basis of Design: Subject to compliance with project requirements, the design is based on the following: USG Interiors, LLC, "USG DONN® Brand ZXLA™ 15/16" Acoustical Suspension System".
2. Structural Classification: Heavy Duty.
3. Tee Profile: Standard Face 15/16" wide.
4. Fire Rating: Firecode.
5. Color: to be selected from Manufacturers full range.

2.6 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- B. Wire Hangers, Braces, and Ties: Provide wires as follows:
 1. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.
 2. Stainless-Steel Wire: ASTM A580/A580M, Type 304, nonmagnetic.
 3. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire
- C. Hanger Rods: Mild steel, zinc coated.
- D. Flat Hangers: Mild steel, zinc coated.
- E. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized-steel sheet complying with ASTM A653/A653M, G90 coating designation; with bolted connections and 5/16-inch-diameter bolts.

2.7 METAL EDGE MOLDINGS AND TRIM

- A. Extruded-Aluminum Edge Moldings and Trim: At all ceiling clouds, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements.
 1. Basis of Design: Subject to compliance with project requirements, the design is based on the following: USG Interiors, LLC, "USG COMPÄSSO™ ELITE ALUMINUM TRIM".
 - a. Trim Height: 4"
 - b. Trim Depth: 13/16".
 - c. Trim Length: 10'-0"
 - d. Color: standard flat white 050
 2. Accessories:
 - a. Compäso™ Elite Attachment Clip; attaches grid to backside bosses on Compäso™ Elite Trim. Splice Plate: steel in finish to match trim pans; formed for snap-fit into 8" pan ends, for use at cut ends of metal ceilings.
 - b. 90° corner trim pieces: to match Compäso™ Elite Suspension Trim.
 - c. USG Ceilings Compäso™ Elite Suspension Trim, 90 degree Inside Corner, standard flat white 050.

- d. USG Ceilings Compäso™ Elite Suspension Trim, 90 degree Outside Corner, standard flat white 050

2.8 MISCELLANEOUS MATERIALS

- A. Acoustical Tile Adhesive: Type recommended in writing by acoustical tile manufacturer, bearing UL label for Class 0-25 flame spread.
- B. Staples: 5/16-inch-long, divergent-point staples.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing and substrates to which acoustical tile ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine acoustical tiles before installation. Reject acoustical tiles that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Testing Substrates: Before adhesively bonding tiles to wet-placed substrates such as cast-in-place concrete or plaster, test and verify that moisture level is below tile manufacturer's recommended limits.
- B. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.
- C. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION OF SUSPENDED ACOUSTICAL TILE CEILINGS

- A. Install suspended acoustical tile ceilings according to ASTM C636/C636M and manufacturer's written instructions.
 - 1. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.
- B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 2. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
 6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 8. Do not attach hangers to steel deck tabs.
 9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical tiles.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Arrange directionally patterned acoustical tiles as follows:
1. As indicated on reflected ceiling plans.

- G. Install acoustical tiles in coordination with suspension system and exposed moldings and trim. Place splines or suspension-system flanges into kerfed edges of tiles so tile-to-tile joints are interlocked.
 - 1. Fit adjoining tiles to form flush, tight joints. Scribe and cut tiles for accurate fit at borders and around penetrations through ceiling.
 - 2. Hold tile field in compression by inserting leaf-type, spring-steel spacers between tiles and moldings, spaced 12 inches o.c.
 - 3. Protect lighting fixtures and air ducts according to requirements indicated for fire-resistance-rated assembly.

3.4 ERECTION TOLERANCES

- A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.
- B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.

3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Engage a qualified special inspector to perform the following special inspections:
 - 1. Periodic inspection during the installation of suspended ceiling grids according to ASCE/SEI 7.
- B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- C. Perform the following tests and inspections of completed installations of acoustical tile ceiling hangers and anchors and fasteners in successive stages and when installation of ceiling suspension systems on each floor has reached 20 percent completion, but no tiles have been installed. Do not proceed with installations of acoustical tile ceiling hangers for the next area until test results for previously completed installations of acoustical tile ceiling hangers show compliance with requirements.
 - 1. Within each test area, testing agency will select one of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 200 lbf of tension; it will also select one of every two postinstalled anchors used to attach bracing wires to concrete and will test them for 440 lbf of tension.
 - 2. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.
- D. Acoustical tile ceiling hangers, anchors, and fasteners will be considered defective if they do not pass tests and inspections.

- E. Prepare test and inspection reports.

3.6 ADJUSTING

- A. Clean exposed surfaces of acoustical tile ceilings, including trim and edge moldings. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace tiles and other ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095123

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes surface preparation and the application of paint systems on the following interior substrates:
 - 1. Concrete masonry units (CMU).
 - 2. Gypsum board.

1.3 DEFINITIONS

- A. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523. ("eggshell" finish)

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of topcoat product indicated.
- C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat indicated.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Step coats on Samples to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- D. Product List: For each product indicated, include the following:
 - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.

2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
- E. Submittals MUST include MPI #. Submittals without MPI # will be returned with no action taken.

1.5 QUALITY ASSURANCE

- A. MPI Standards:
1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
 2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.
- B. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft.
 - b. Other Items: Architect will designate items or areas required.
 2. Apply benchmark samples after permanent lighting and other environmental services have been activated.
 3. Final approval of color selections will be based on benchmark samples.
 - a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.7 PROJECT CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
 - 1. Quantity: Furnish an additional 5 percent, but not less than 1 gal. of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Sherwin-Williams Company (The).
 - 2. Benjamin Moor & Co.
 - 3. ICI Paints
 - 4. M.A.B. Paints
 - 5. Pratt & Lambert

2.2 PAINT, GENERAL

- A. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
 - 1. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
 - 2. Nonflat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.
 - 3. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
 - 4. Floor Coatings: VOC not more than 100 g/L.
 - 5. Flat Topcoat Paints: VOC content of not more than 50 g/L.
 - 6. Nonflat Topcoat Paints: VOC content of not more than 150 g/L.
 - 7. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
 - 8. Floor Coatings: VOC not more than 100 g/L.

9. Shellacs, Pigmented: VOC not more than 550 g/L.
10. Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.
11. Dry-Fog Coatings: VOC content of not more than 400 g/L.
12. Zinc-Rich Industrial Maintenance Primers: VOC content of not more than 340 g/L.
13. Pre-Treatment Wash Primers: VOC content of not more than 420 g/L.

C. Chemical Components of Field-Applied Interior Paints and Coatings: Provide topcoat paints and anti-corrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:

1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
2. Restricted Components: Paints and coatings shall not contain any of the following:
 - a. Acrolein.
 - b. Acrylonitrile.
 - c. Antimony.
 - d. Benzene.
 - e. Butyl benzyl phthalate.
 - f. Cadmium.
 - g. Di (2-ethylhexyl) phthalate.
 - h. Di-n-butyl phthalate.
 - i. Di-n-octyl phthalate.
 - j. 1,2-dichlorobenzene.
 - k. Diethyl phthalate.
 - l. Dimethyl phthalate.
 - m. Ethylbenzene.
 - n. Formaldehyde.
 - o. Hexavalent chromium.
 - p. Isophorone.
 - q. Lead.
 - r. Mercury.
 - s. Methyl ethyl ketone.
 - t. Methyl isobutyl ketone.
 - u. Methylene chloride.
 - v. Naphthalene.
 - w. Toluene (methylbenzene).
 - x. 1,1,1-trichloroethane.
 - y. Vinyl chloride.

D. Colors: As selected by Architect from manufacturer's full range

2.3 BLOCK FILLERS

A. Interior/Exterior Latex Block Filler: MPI #4.

1. VOC Content: E Range of E3.

2.4 PRIMERS/SEALERS

- A. Interior Latex Primer/Sealer: MPI #50.
 - 1. VOC Content: E Range of E3.
 - 2. Environmental Performance Rating: EPR 3.
- B. Interior Alkyd Primer/Sealer: MPI #45.
 - 1. VOC Content: E Range of E2.

2.5 LATEX PAINTS

- A. High-Performance Architectural Latex (Eggshell): MPI #139 (Gloss Level 3).
 - 1. VOC Content: E Range of E3.
 - 2. Environmental Performance Rating: [EPR 5].
 - 3. Three coat minimum.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Masonry (Clay and CMU): 12 percent.
 - 2. Gypsum Board: 12 percent.
 - 3. Plaster: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

- B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
 - 2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
- G. Aluminum Substrates: Remove surface oxidation.
- H. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions.
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:
 - 1. Mechanical Work:
 - a. Uninsulated metal piping.
 - b. Uninsulated plastic piping.
 - c. Pipe hangers and supports.
 - d. Tanks that do not have factory-applied final finishes.
 - e. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
 - f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - g. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
 - 2. Electrical Work:
 - a. Switchgear.
 - b. Panelboards.
 - c. Electrical equipment that is indicated to have a factory-primed finish for field painting.

3.4 FIELD QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:
 - 1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will perform tests for compliance with product requirements.
 - 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. CMU Substrates (Minimum three coats):

- 1. High-Performance Architectural Latex System: MPI INT 4.2D.
 - a. Prime Coat: Interior/exterior latex block filler.
 - b. Intermediate Coat: High-performance architectural latex matching topcoat.
 - c. Topcoat: High-performance architectural latex eggshell.

B. Gypsum Board Substrates (Minimum three coats):

- 1. Latex System: walls
 - a. Prime Coat: Interior latex primer/sealer and matching topcoat
 - b. Intermediate Coat: Interior latex matching topcoat.
 - c. Topcoat: Interior latex eggshell.

END OF SECTION 099123

SECTION 105113 - METAL LOCKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. All-Welded Angle iron athletic lockers.
 - 2. Locker benches.

1.3 LOCKER QUANTITIES (BY ROOM):

- A. MENS LOCKER ROOM
 - 1. LKR-01: 50 Openings
- B. WOMENS LOCKER ROOM
 - 1. LKR-01: 5 Openings

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project Site.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of metal locker.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal locker and benches (where applicable).
- B. Shop Drawings: For metal lockers.
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Show locker trim and accessories.
 - 3. Include locker identification system and numbering sequence.
- C. Samples: For each color specified, in manufacturer's standard size.

- D. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available.
- E. Samples for Verification: For the following products, in manufacturer's standard size:
 - 1. Lockers and equipment.
 - 2. Locker benches.
- F. Product Schedule: For lockers. Use same designations indicated on Drawings.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Full-size units of the following metal locker hardware items equal to 10 percent of amount installed for each type and finish installed, but no fewer than five units:
 - a. Locks.
 - b. Identification plates.
 - c. Hooks.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver metal lockers until spaces to receive them are clean, dry, and ready for their installation.
- B. Deliver master and control keys to Owner by registered mail or overnight package service.

1.10 FIELD CONDITIONS

- A. Field Measurements: Verify actual dimensions of recessed openings by field measurements before fabrication.

1.11 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other Sections to ensure that metal lockers can be supported and installed as indicated.

1.12 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures.
 - b. Faulty operation of latches and other door hardware.
 - 2. Damage from deliberate destruction and vandalism is excluded.
 - 3. Warranty Period for Welded Metal Lockers: Lifetime from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain metal lockers and accessories from single source from single locker manufacturer. Heavy duty free standing benches are excluded from source limitations.

2.2 PERFORMANCE REQUIREMENTS

- A. Accessibility Requirements: For lockers indicated to be accessible, comply with applicable provisions in **the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC A117.1**].

2.3 ALL WELDED LOCKERS <LKR-01>

- A. Basis-of-Design Product: Subject to compliance with requirements, provide comparable product by one of the following:
 - 1. Art Metal Products - Basis of Design: AMP-1001E TURN HANDLE ELITE ATHLETIC LOCKERS
 - a. Type: 1 Tier
 - b. Size: 24" wide x 22" deep x 72" high
 - 2. In addition to Art Metal Products, the following manufacturers are approved, provided they meet the requirements in the specifications:
 - a. DeBourgh Manufacturing Company
 - b. List Industries Inc.

- c. Lyon LLC.
- d. Penco Products Inc.

B. Locker Construction

- 1. Lockers to be welded unibody construction with exposed welds sanded smooth.
- 2. No bolts, screws, or rivets used in assembly of locker units.
- 3. Ship lockers set-up, ready to be anchored in place in accordance with manufacturer's instructions.

C. Body: Assembled by welding body components together. Fabricate from unperforated steel sheet with thicknesses as follows:

- 1. Tops, Bottoms, and Sides: 16 Ga domestic cold rolled steel for maximum durability.
- 2. Backs: Solid sheet of 18 Ga cold rolled steel welded to frames of sides and intermediate partitions.
- 3. Shelves: 16 Ga cold rolled steel welded to sides and intermediate partition construction.
 - a. Each locker to have (2) shelves (see typical locker section)

D. Doors:

- 1. One piece; fabricated from 14 Ga cold rolled steel formed outer panel with double bends on both sides and a single bend on top and bottom. Doors to be diamond perforated.
 - a. Reinforcement: Manufacturer's standard reinforcing angles, channels, or stiffeners for doors more than 15 inches wide; welded to inner face of doors.

E. Latching:

- 1. Heavy gauge 3-Point turn-handle latch
 - a. Latch mechanism designed to positively engage frame at top bottom and center of locker frame.
 - b. Latch mechanism to use 3/8" diameter vertical lock rods. Lock rods to have welded rod guides to insure proper engagement between lock rods and locker frame when door is in locked position.
 - c. Locking device shall be designed for use with padlocks.

F. Hinges:

- 1. 16 Ga continuous piano hinge on the right side of the opening.
- 2. Hinges welded to door and riveted to locker frame.

G. Slope Tops:

- 1. Provide 18 Ga all welded slope top with 4" rise (see typical locker section), attached at factory with concealed fasteners. Slope top to be in addition to standard 16 Ga flat top.

H. Closed Bases:

- 1. Provide 4" high, 14 Ga welded steel base enclosed on all four sides securely welded to locker bottom.

I. Filler Panels:

- 1. Manufacturers standard fabricated from 18 Ga solid steel finished to match lockers.

J. Finish:

- 1. Complete locker unit to be thoroughly cleaned, phosphatized, and sealed.

2. Finish to be baked powder coat with a minimum 2-3 mil thickness.
3. As selected from manufacturers full range of colors.

2.4 LOCKER ACCESSORIES

- A. Locks: Pad Locks, provided by owner.
- B. Identification Plates:
 1. Furnish each locker with black anodized laser-etched aluminum number plate.
 2. Locate number plate near center of each door.
 3. Owner to furnish numbering sequence.
- C. Hooks:
 1. Hooks to be heavy-duty forged steel with ball ends and zinc plated.
 2. Provide one double and two single ceiling hooks in each locker opening

2.5 LOCKER BENCHES

- A. Provide bench units with overall assembly height of 16 1/4 inches
- B. Bench Tops: Manufacturer's standard one-piece units, with rounded corners and edges.
 1. Bench tops to be made of butcher block, maple hardwood 1-1/4 inch thick and 9-1/2 inch wide. Apply double coat of satin-gloss sealer for protection.
- C. Heavy Duty Free Standing Pedestal: Heavy duty manufacturer's standard base. Overall pedestal height is 16 inches. Stainless-steel or powder coated pedestal. Provide manufacturer's full range of colors for powder coated option.

2.6 ACCESSORIES

- A. Fasteners: Zinc- or nickel-plated steel, slotless-type, exposed bolt heads; with self-locking nuts or lock washers for nuts on moving parts.
- B. Anchors: Material, type, and size required for secure anchorage to each substrate.
 1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls for corrosion resistance.
 2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls, floors, and support bases, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install lockers level, plumb, and true; shim as required, using concealed shims.
 - 1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36 inches o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion.
 - 2. Anchor single rows of metal lockers to walls near top of lockers and to floor.
 - 3. Anchor back-to-back metal lockers to floor.
- B. Welded Lockers: Connect groups together with standard fasteners, with no exposed fasteners on face frames.
- C. Equipment:
 - 1. Attach hooks with at least two fasteners.
 - 2. Attach door locks on doors using security-type fasteners.
 - 3. Identification Plates: Identify metal lockers with identification indicated on Drawings.
 - a. Attach plates to each locker door, near top, centered, with at least two aluminum rivets.
 - b. Attach plates to upper shelf of each open-front metal locker, centered, with a least two aluminum rivets.
- D. Trim: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.
 - 1. Attach recess trim to recessed metal lockers with concealed clips.
 - 2. Attach filler panels with concealed fasteners. Locate filler panels where indicated on Drawings.
 - 3. Attach sloping-top units to metal lockers, with closures at exposed ends.
 - 4. Attach finished end panels using fasteners only at perimeter to conceal exposed ends of nonrecessed metal lockers.
- E. Fixed Locker Benches: Spacing as indicated on drawings. Securely fasten tops of pedestals to undersides of bench tops, and anchor bases to floor.

3.3 ADJUSTING

- A. Clean, lubricate, and adjust hardware. Adjust doors and latches to operate easily without binding. Verify that integral locking devices operate properly.

3.4 PROTECTION

- A. Protect metal lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit use during construction.
- B. Touch up marred finishes, or replace metal lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION 105113

SECTION 220500 - COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 SUBMITTAL PROCEDURES

- A. All Division 22 submittals are to be submitted at one time as a complete package.
- B. Submittals are to be computer generated – scanned copies of printed documents are not acceptable.
- C. Resubmittals to be submitted all at one time within 2 weeks of return of original submittal.

1.2 RELATED DOCUMENTS

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

1.3 SUMMARY

- A. This Section includes the following:
 - 1. Piping materials and installation instructions common to most piping systems.
 - 2. Transition fittings.
 - 3. Dielectric fittings.
 - 4. Mechanical sleeve seals.
 - 5. Sleeves.
 - 6. Escutcheons.
 - 7. Grout.
 - 8. Equipment installation requirements common to equipment sections.
 - 9. Painting and finishing.
 - 10. Supports and anchorages.

1.4 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
 - 1. ABS: Acrylonitrile-butadiene-styrene plastic.
 - 2. CPVC: Chlorinated polyvinyl chloride plastic.
 - 3. PE: Polyethylene plastic.
 - 4. PVC: Polyvinyl chloride plastic.
- G. The following are industry abbreviations for rubber materials:
 - 1. EPDM: Ethylene-propylene-diene terpolymer rubber.
 - 2. NBR: Acrylonitrile-butadiene rubber.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Data: For the following in pdf format:
 - 1. Transition fittings.
 - 2. Dielectric fittings.
 - 3. Mechanical sleeve seals.
 - 4. Escutcheons.

- B. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
 - 1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
 - 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
- C. Electrical Characteristics for Plumbing Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.8 COORDINATION

- A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for plumbing installations.
- B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- C. Coordinate requirements for access panels and doors for plumbing items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

- A. Refer to individual Division 22 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
 - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.

- a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- E. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- F. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.
- G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- H. Solvent Cements for Joining Plastic Piping:
1. ABS Piping: ASTM D 2235.
 2. CPVC Piping: ASTM F 493.
 3. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
 4. PVC to ABS Piping Transition: ASTM D 3138.
- I. Fiberglass Pipe Adhesive: As furnished or recommended by pipe manufacturer.
- 2.4 TRANSITION FITTINGS
- A. AWWA Transition Couplings: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.
1. Manufacturers:
 - a. Cascade Waterworks Mfg. Co.
 - b. Dresser Industries, Inc.; DMD Div.
 - c. Ford Meter Box Company, Incorporated (The); Pipe Products Div.
 - d. JCM Industries.
 - e. Smith-Blair, Inc.
 - f. Viking Johnson.
 2. Underground Piping NPS 1-1/2 and Smaller: Manufactured fitting or coupling.
 3. Underground Piping NPS 2 and Larger: AWWA C219, metal sleeve-type coupling.
 4. Aboveground Pressure Piping: Pipe fitting.
- B. Plastic-to-Metal Transition Fittings: PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
1. Manufacturers:

- a. Eslon Thermoplastics.
- C. Plastic-to-Metal Transition Adaptors: One-piece fitting with manufacturer's SDR 11 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
 - 1. Manufacturers:
 - a. Thompson Plastics, Inc.
- D. Plastic-to-Metal Transition Unions: MSS SP-107, PVC four-part union. Include brass end, solvent-cement-joint end, rubber O-ring, and union nut.
 - 1. Manufacturers:
 - a. NIBCO INC.
 - b. NIBCO, Inc.; Chemtrol Div.
- E. Flexible Transition Couplings for Underground Nonpressure Drainage Piping: ASTM C 1173 with elastomeric sleeve, ends same size as piping to be joined, and corrosion-resistant metal band on each end.
 - 1. Manufacturers:
 - a. Cascade Waterworks Mfg. Co.
 - b. Ferenco, Inc.
 - c. Mission Rubber Company.
 - d. Plastic Oddities, Inc.

2.5 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.
 - 1. Manufacturers:
 - a. Capitol Manufacturing Co.
 - b. Central Plastics Company.
 - c. Eclipse, Inc.
 - d. Epco Sales, Inc.
 - e. Hart Industries, International, Inc.
 - f. Watts Industries, Inc.; Water Products Div.
 - g. Zurn Industries, Inc.; Wilkins Div.
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.

1. Manufacturers:
 - a. Capitol Manufacturing Co.
 - b. Central Plastics Company.
 - c. Epco Sales, Inc.
 - d. Watts Industries, Inc.; Water Products Div.

E. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.

1. Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Central Plastics Company.
 - d. Pipeline Seal and Insulator, Inc.

2. Separate companion flanges and steel bolts and nuts shall have 150- or 300-psig minimum working pressure where required to suit system pressures.

F. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.

1. Manufacturers:
 - a. Calpico, Inc.
 - b. Lochinvar Corp.

G. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F .

1. Manufacturers:
 - a. Perfection Corp.
 - b. Precision Plumbing Products, Inc.
 - c. Sioux Chief Manufacturing Co., Inc.
 - d. Victaulic Co. of America.

2.6 MECHANICAL SLEEVE SEALS

A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

1. Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Metraflex Co.
 - d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
3. Pressure Plates: Stainless steel. Include two for each sealing element.
4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.7 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
 1. Underdeck Clamp: Clamping ring with set screws.
- E. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.
- F. PVC Pipe: ASTM D 1785, Schedule 40.
- G. Molded PE: Reusable, PE, tapered-cup shaped, and smooth-outer surface with nailing flange for attaching to wooden forms.

2.8 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
 1. Finish: Polished chrome-plated.
- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
 1. Finish: Polished chrome-plated.
- E. One-Piece, Stamped-Steel Type: With set screw and chrome-plated finish.
- F. Split-Plate, Stamped-Steel Type: With concealed hinge, set screw, and chrome-plated finish.
- G. One-Piece, Floor-Plate Type: Cast-iron floor plate.

- H. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.9 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping in exposed rooms above bottom bar joist.
- G. Install piping to permit valve servicing.
- H. Install piping at indicated slopes.
- I. Install piping free of sags and bends.
- J. Install fittings for changes in direction and branch connections.
- K. Install piping to allow application of insulation.
- L. Select system components with pressure rating equal to or greater than system operating pressure.
- M. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:

1. New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
 - b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
 - c. Insulated Piping: One-piece, stamped-steel type with spring clips.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - f. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - g. Bare Piping in Equipment Rooms: One-piece, cast-brass type.
 - h. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.

- N. Sleeves are not required for core-drilled holes.

- O. Permanent sleeves are not required for holes formed by removable PE sleeves.

- P. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.

- Q. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
 3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
 - a. **Steel** Pipe Sleeves: For pipes smaller than NPS 6.
 - b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
 - c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 07 Section "Sheet Metal Flashing and Trim" for flashing.
 - 1) Seal space outside of sleeve fittings with grout.
 4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.

- R. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

1. Install steel pipe for sleeves smaller than 6 inches in diameter.
 2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
 3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- S. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- T. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.
- U. Verify final equipment locations for roughing-in.
- V. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.
- 3.2 PIPING JOINT CONSTRUCTION
- A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.
 - B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
 - C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
 - D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
 - E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
 - F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.
 - 3. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
 - 4. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
 - 5. PVC Nonpressure Piping: Join according to ASTM D 2855.
 - 6. PVC to ABS Nonpressure Transition Fittings: Join according to ASTM D 3138 Appendix.
- J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.
- K. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.
- L. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
 - 1. Plain-End Pipe and Fittings: Use butt fusion.
 - 2. Plain-End Pipe and Socket Fittings: Use socket fusion.
- M. Fiberglass Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

3.3 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
 - 3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
 - 4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.4 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install plumbing equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.5 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 05 Section "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

3.6 GROUTING

- A. Mix and install grout for plumbing equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

END OF SECTION 220500

SECTION 220513 - COMMON MOTOR REQUIREMENTS FOR PLUMBING EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes general requirements for single-phase and polyphase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on ac power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.3 COORDINATION

- A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:
 - 1. Motor controllers.
 - 2. Torque, speed, and horsepower requirements of the load.
 - 3. Ratings and characteristics of supply circuit and required control sequence.
 - 4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

- A. Comply with requirements in this Section except when stricter requirements are specified in plumbing equipment schedules or Sections.
- B. Comply with NEMA MG 1 unless otherwise indicated.
- C. Comply with IEEE 841 for severe-duty motors.

2.2 MOTOR CHARACTERISTICS

- A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level.

- B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.3 POLYPHASE MOTORS

- A. Description: NEMA MG 1, Design B, medium induction motor.
- B. Efficiency: Energy efficient, as defined in NEMA MG 1.
- C. Service Factor: 1.15.
- D. Multispeed Motors: Variable torque.
 - 1. For motors with 2:1 speed ratio, consequent pole, single winding.
 - 2. For motors with other than 2:1 speed ratio, separate winding for each speed.
- E. Multispeed Motors: Separate winding for each speed.
- F. Rotor: Random-wound, squirrel cage.
- G. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.
- H. Temperature Rise: Match insulation rating.
- I. Insulation: Class F.
- J. Code Letter Designation:
 - 1. Motors Smaller than 15 HP: Manufacturer's standard starting characteristic.
- K. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T.

2.4 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

- A. Motors Used with Variable Frequency Controllers:
 - 1. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters.
 - 2. Energy- and Premium-Efficient Motors: Class B temperature rise; Class F insulation.
 - 3. Inverter-Duty Motors with shaft ground rings: Class F temperature rise; Class H insulation.
 - 4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.
- B. Severe-Duty Motors: Comply with IEEE 841, with 1.15 minimum service factor.

2.5 SINGLE-PHASE MOTORS

- A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:
 - 1. Permanent-split capacitor.
 - 2. Split phase.
 - 3. Capacitor start, inductor run.
 - 4. Capacitor start, capacitor run.
- B. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.
- C. Motors 1/20 HP and Smaller: Shaded-pole type.
- D. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 220513

VILLAGE OF OAK PARK
OAK PARK LOCKER ROOM REMODEL
201 SOUTH BLVD
OAK PARK, IL 60302

CORDOGAN CLARK & ASSOCIATES, INC.
960 RIDGEWAY AVENUE
AURORA, ILLINOIS 60506
ISSUED FOR BID SET

SECTION 220523 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Bronze ball valves.
2. Iron, single-flange butterfly valves.
3. Iron, grooved-end butterfly valves.
4. Bronze lift check valves.
5. Bronze swing check valves.
6. Bronze gate valves.
7. Bronze globe valves.

B. Related Sections:

1. Section 220553 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.
2. Section 221116 "Domestic Water Piping" for valves applicable only to this piping.
3. Section 221513 "General-Service Compressed-Air Piping" for valves applicable only to this piping.

1.3 DEFINITIONS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Nonrising stem.
- E. OS&Y: Outside screw and yoke.
- F. RS: Rising stem.
- G. SWP: Steam working pressure.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Data: For each type of valve indicated.

1.5 QUALITY ASSURANCE

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 2. ASME B31.1 for power piping valves.
 3. ASME B31.9 for building services piping valves.
- C. NSF Compliance: NSF 61 for valve materials for potable-water service.
- D. Compliance with the current Federal NO-LEAD Standard.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
1. Protect internal parts against rust and corrosion.
 2. Protect threads, flange faces, grooves, and weld ends.
 3. Set angle, gate, and globe valves closed to prevent rattling.
 4. Set ball and plug valves open to minimize exposure of functional surfaces.
 5. Set butterfly valves closed or slightly open.
 6. Block check valves in either closed or open position.
- B. Use the following precautions during storage:
1. Maintain valve end protection.
 2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:

1. ASME B1.20.1 for threads for threaded end valves.
 2. ASME B16.1 for flanges on iron valves.
 3. ASME B16.5 for flanges on steel valves.
 4. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 5. ASME B16.18 for solder-joint connections.
 6. ASME B31.9 for building services piping valves.
- C. NSF Compliance: NSF 61 Annex G **and NSF 372** for valve materials for potable-water service.
- D. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
- E. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- F. Valve Sizes: Same as upstream piping unless otherwise indicated.
- G. Valve Actuator Types:
1. Gear Actuator: For quarter-turn valves **NPS 4** and larger.
 2. Handlever: For quarter-turn valves smaller than **NPS 4**.
- H. Valves in Insulated Piping:
1. Include **2-inch (50-mm)** stem extensions.
 2. Extended operating handles of nonthermal-conductive material and protective sleeves that allow operation of valves without breaking vapor seals or disturbing insulation.
 3. Memory stops that are fully adjustable after insulation is applied.
- 2.2 BRONZE BALL VALVES
- A. Two-Piece, Bronze Ball Valves with Full Port, and Bronze Trim:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Milwaukee Valve Company
 - b. Nibco
 - c. Watts
 - d. Apollo
 2. Description:
 - a. Standard: MSS-SP-110.
 - b. CWP Rating: 600 psig.
 - c. Body Design: Two piece.
 - d. Body Material: Bronze.
 - e. Ends: Threaded, soldered, or press fit.
 - f. Seats: PTFE
 - g. Stem: Stainless steel
 - h. Ball: Stainless steel
 - i. Port: Full.

2.3 IRON, SINGLE-FLANGE BUTTERFLY VALVES

A. 200 CWP, Iron, Single-Flange Butterfly Valves with EPDM Seat and Aluminum-Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Crane
 - b. Milwaukee Valve Company.
 - c. Nibco
 - d. Watts
2. Description:
 - a. Standard: MSS SP-67, Type I.
 - b. CWP Rating: 200 psig.
 - c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
 - d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
 - e. Seat: EPDM.
 - f. Stem: One- or two-piece stainless steel.
 - g. Disc: Aluminum bronze.

2.4 IRON, GROOVED-END BUTTERFLY VALVES

A. 175 CWP, Iron, Grooved-End Butterfly Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Kennedy Valve; a division of McWane, Inc.
 - b. Shurjoint Piping Products.
 - c. Tyco Fire Products LP; Grinnell Mechanical Products.
 - d. Victaulic Company.
2. Description:
 - a. Standard: MSS SP-67, Type I.
 - b. CWP Rating: 175 psig.
 - c. Body Material: Coated, ductile iron.
 - d. Stem: Two-piece stainless steel.
 - e. Disc: Coated, ductile iron.
 - f. Seal: EPDM.

2.5 BRONZE LIFT CHECK VALVES

A. Class 125, Lift Check Valves with Nonmetallic Disc:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Crane
- b. Milwaukee Valve Company
- c. NIBCO INC
- d. Watts

2. Description:

- a. Standard: MSS SP-80, Type 2.
- b. CWP Rating: 200 psig.
- c. Body Design: Vertical flow.
- d. Body Material: Silicon Bronze ASTM B584 Alloy C87850
- e. Ends: Threaded.
- f. Disc: NBR, PTFE, or TFE.
- g. Must be non-slam/silent type

2.6 BRONZE SWING CHECK VALVES

A. Class 125, Bronze Swing Check Valves with Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Crane
- b. Milwaukee Valve Company.
- c. NIBCO INC.
- d. Watts

2. Description:

- a. Standard: MSS SP-80, Type 3.
- b. CWP Rating: 200 psig.
- c. Body Design: Horizontal and Vertical flow.
- d. Body Material: Silicon Bronze ASTM B584 Alloy C87850
- e. Ends: Threaded.
- f. Disc Holder: Silicon Bronze ASTM B584 Alloy C87850
- g. Seat Disc: PTFE
- h. Disc Hanger: Silicon Bronze ASTM B584 Alloy C87850
- i. Must be non-slam/silent type

2.7 BRONZE GATE VALVES

A. Class 125, NRS Bronze Gate Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Crane
- b. Hammond Valve.
- c. Milwaukee Valve Company.
- d. NIBCO INC.
- e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

- a. Standard: MSS SP-80, Type 1.
- b. CWP Rating: 200 psig.
- c. Body Material: Silicon Bronze ASTM B584 Alloy C87850
- d. Ends: Threaded.
- e. Stem: Bronze.
- f. Bonnet: Silicon Bronze ASTM B584 Alloy C87850
- g. Packing Gland: Bronze ASTM B62 or ASTM B584 Alloy C84400 or Brass ASTM B16.
- h. Wedge: Silicon Bronze ASTM B584 Alloy C87850
- i. Handwheel: Malleable Iron ASTM A47(T-113)

2.8 BRONZE GLOBE VALVES

A. Class 125, Bronze Globe Valves with Bronze Disc:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Crane
 - b. Hammond Valve.
 - c. Milwaukee Valve Company.
 - d. NIBCO INC.
 - e. Watts
- 2. Description:
 - a. Standard: MSS SP-80, Type 1.
 - b. CWP Rating: 200 psig.
 - c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
 - d. Ends: Threaded
 - e. Stem and Disc: Bronze.
 - f. Packing: Asbestos free.
 - g. Handwheel: Malleable iron, bronze, or aluminum.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.

- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.
- E. Provide and install shutoff valves at all branch takeoffs.
- F. Install check valves for proper direction of flow and as follows:
 - 1. Swing Check Valves: In horizontal position with hinge pin level.
 - 2. Center-Guided and Plate-Type Check Valves: In horizontal or vertical position, between flanges.
 - 3. Lift Check Valves: With stem upright and plumb.

3.3 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valve applications are not indicated, use the following:
 - 1. Shutoff Service: Ball, butterfly, or gate valves.
 - 2. Butterfly Valve Dead-End Service: Single-flange (lug) type.
 - 3. Throttling Service: Globe valves.
 - 4. Pump-Discharge Check Valves:
 - a. NPS 2 and Smaller: Bronze swing check valves with bronze disc.
 - b. NPS 2-1/2 and Larger for Domestic Water: Iron swing check valves with lever and weight or with spring or iron, center-guided, metal-seat check valves.
 - c. NPS 2-1/2 and Larger for Sanitary Waste and Storm Drainage: Iron swing check valves with lever and weight or spring.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.

C. Select valves, except wafer types, with the following end connections:

1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
3. For Steel Piping, NPS 2 and Smaller: Threaded ends.
4. For Steel Piping, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
5. For Steel Piping, NPS 5 and Larger: Flanged ends.

3.5 DOMESTIC, HOT-AND COLD-WATER VALVE SCHEDULE

A. Pipe NPS 3 and Smaller:

1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
2. Ball Valves: Two piece, full port, bronze with bronze trim.
3. Bronze Swing Check Valves: Class 125, bronze disc.
4. Bronze Gate Valves: Class 125, NRS.

B. Pipe NPS 4 and Larger:

1. Iron, Single-Flange Butterfly Valves: 200 CWP, EPDM seat, ductile-iron disc.
2. Iron, Grooved-End Butterfly Valves: 175 CWP.

END OF SECTION 220523

SECTION 220529 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Steel pipe hangers and supports.
2. Trapeze pipe hangers.
3. Metal framing systems.
4. Thermal-hanger shield inserts.
5. Fastener systems.

B. Related Sections:

1. Section 220516 "Expansion Fittings and Loops for Plumbing Piping" for pipe guides and anchors.
2. Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment for vibration isolation devices.

1.3 DEFINITIONS

- A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.4 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
 2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
 3. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following; include Product Data for components:
 - 1. Trapeze pipe hangers.
 - 2. Metal framing systems.
 - 3. Pipe stands.
 - 4. Equipment supports.
- C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Detail fabrication and assembly of trapeze hangers.
 - 2. Design Calculations: Calculate requirements for designing trapeze hangers.

1.6 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

1.7 QUALITY ASSURANCE

- A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 STEEL PIPE HANGERS AND SUPPORTS

- A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.
- B. Manufacturers:
 - 1. AAA Technology & Specialties Co., Inc.
 - 2. Bergen-Power Pipe Supports.
 - 3. B-Line Systems, Inc.; a division of Cooper Industries.
 - 4. Carpenter & Paterson, Inc.
 - 5. Empire Industries, Inc.
 - 6. Globe Pipe Hanger Products, Inc.
 - 7. Grinnell Corp.

8. GS Metals Corp.
9. National Pipe Hanger Corporation.
10. PHD Manufacturing, Inc.
11. PHS Industries, Inc.
12. Piping Technology & Products, Inc.
13. Tolco Inc.

- C. Galvanized, Metallic Coatings: Pregalvanized or hot dipped.
- D. Nonmetallic Coatings: Plastic coating, jacket, or liner.
- E. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.

2.2 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.3 METAL FRAMING SYSTEMS

- A. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.
- B. Available Manufacturers:
1. B-Line Systems, Inc.; a division of Cooper Industries.
 2. ERICO/Michigan Hanger Co.; ERISTRUT Div.
 3. GS Metals Corp.
 4. Power-Strut Div.; Tyco International, Ltd.
 5. Thomas & Betts Corporation.
 6. Tolco Inc.
 7. Unistrut Corp.; Tyco International, Ltd.
- C. Coatings: Manufacturer's standard finish unless bare metal surfaces are indicated.
- D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

2.4 THERMAL-HANGER SHIELD INSERTS

- A. Description: 100-psig- minimum, compressive-strength insulation insert encased in sheet metal shield.
- B. Manufacturers:
1. Carpenter & Paterson, Inc.
 2. ERICO/Michigan Hanger Co.
 3. PHS Industries, Inc.

4. Pipe Shields, Inc.
 5. Rilco Manufacturing Company, Inc.
 6. Value Engineered Products, Inc.
- C. Insulation-Insert Material for Cold Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass with vapor barrier.
- D. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass.
- E. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- F. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- G. Insert Length: Extend 2 inches (50 mm) beyond sheet metal shield for piping operating below ambient air temperature.

2.5 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
1. Manufacturers:
 - a. Hilti, Inc.
 - b. ITW Ramset/Red Head.
 - c. Masterset Fastening Systems, Inc.
 - d. MKT Fastening, LLC.
 - e. Powers Fasteners.
- B. Mechanical-Expansion Anchors: Insert-wedge-type zinc-coated steel, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
1. Manufacturers:
 - a. B-Line Systems, Inc.; a division of Cooper Industries.
 - b. Empire Industries, Inc.
 - c. Hilti, Inc.
 - d. ITW Ramset/Red Head.
 - e. MKT Fastening, LLC.
 - f. Powers Fasteners.

2.6 PIPE POSITIONING SYSTEMS

- A. Description: IAPMO PS 42, system of metal brackets, clips, and straps for positioning piping in pipe spaces for plumbing fixtures for commercial applications.
- B. Manufacturers:

1. C & S Mfg. Corp.
2. HOLDRITE Corp.; Hubbard Enterprises.
3. Samco Stamping, Inc.

2.7 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.8 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

- A. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.
 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
 2. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.
- C. Fiberglass Pipe Hanger Installation: Comply with applicable portions of MSS SP-69 and MSS SP-89. Install hangers and attachments as required to properly support piping from building structure.
- D. Metal Framing System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled metal framing systems.
- E. Fiberglass Strut System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled fiberglass struts.

- F. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- G. Fastener System Installation:
1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- H. Pipe Stand Installation:
1. Pipe Stand Types except Curb-Mounting Type: Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.
 2. Curb-Mounting-Type Pipe Stands: Assemble components or fabricate pipe stand and mount on permanent, stationary roof curb. Refer to Division 07 Section "Roof Accessories" for curbs.
- I. Pipe Positioning System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture. Refer to Division 22 Section "Plumbing Fixtures" for plumbing fixtures.
- J. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.
- K. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- L. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- M. Install lateral bracing with pipe hangers and supports to prevent swaying.
- N. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- O. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- P. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9 (for building services piping) are not exceeded.
- Q. Insulated Piping: Comply with the following:
1. Attach clamps and spacers to piping.
 - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.

- c. Do not exceed pipe stress limits according to ASME B31.9 for building services piping.
2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
 - b. NPS 4: 12 inches long and 0.06 inch thick.
 - c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
 - d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
 - e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.
5. Pipes NPS 8 and Larger: Include wood inserts.
6. Insert Material: Length at least as long as protective shield.
7. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.3 HANGER AND SUPPORT APPLICATIONS

- A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.

- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use padded hangers for piping that is subject to scratching.
- F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30.
 - 2. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
 - 3. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated stationary pipes, NPS 3/4 to NPS 8.
 - 4. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
 - 5. Extension Hinged or 2-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 3.
 - 6. U-Bolts (MSS Type 24): For support of heavy pipes, NPS 1/2 to NPS 30.
 - 7. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
 - 8. Pipe Saddle Supports (MSS Type 36): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange.
 - 9. Pipe Stanchion Saddles (MSS Type 37): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange and with U-bolt to retain pipe.
 - 10. Adjustable, Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes, NPS 2-1/2 to NPS, if vertical adjustment is required, with steel pipe base stanchion support and cast-iron floor flange.
 - 11. Single Pipe Rolls (MSS Type 41): For suspension of pipes, NPS 1 to NPS 30, from 2 rods if longitudinal movement caused by expansion and contraction might occur.
 - 12. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes, NPS 2-1/2 to NPS 20, from single rod if horizontal movement caused by expansion and contraction might occur.
 - 13. Complete Pipe Rolls (MSS Type 44): For support of pipes, NPS 2 to NPS 42, if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
 - 14. Pipe Roll and Plate Units (MSS Type 45): For support of pipes, NPS 2 to NPS 24, if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
 - 15. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes, NPS 2 to NPS 30, if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.
- G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.
- H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
 3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
 4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
 5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction to attach to top flange of structural shape.
 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 6. C-Clamps (MSS Type 23): For structural shapes.
 7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
 8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
 9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
 10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
 11. Malleable Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
 12. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb.
 - b. Medium (MSS Type 32): 1500 lb.
 - c. Heavy (MSS Type 33): 3000 lb.
 13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
 15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- J. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- K. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
 2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
 3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41 roll hanger with springs.
 4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
 5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from hanger.
 6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from base support.
 7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from trapeze support.
 8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:
 - a. Horizontal (MSS Type 54): Mounted horizontally.
 - b. Vertical (MSS Type 55): Mounted vertically.
 - c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.
- L. Comply with MSS SP-69 for trapeze pipe hanger selections and applications that are not specified in piping system Sections.
- M. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.
- N. Use mechanical-expansion anchors instead of building attachments where required in concrete construction.
- 3.4 EQUIPMENT SUPPORTS
- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
 - B. Grouting: Place grout under supports for equipment and make bearing surface smooth.
 - C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.5 PAINTING

- A. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Section 099113 "Exterior Painting."
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.6 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

END OF SECTION 220529

VILLAGE OF OAK PARK
OAK PARK LOCKER ROOM REMODEL
201 SOUTH BLVD
OAK PARK, IL 60302

CORDOGAN CLARK & ASSOCIATES, INC.
960 RIDGEWAY AVENUE
AURORA, ILLINOIS 60506
ISSUED FOR BID SET

SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Pipe labels.
 - 2. Valve tags.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

1.4 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick, and having predrilled holes for attachment hardware.
2. Letter Color: White.
3. Background Color: Green.
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
6. Minimum Letter Size: 1/2 inch.
7. Fasteners: Stainless-steel rivets.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

2.2 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Snap on Pipe Labels: Printed plastic pre coiled for application without requiring adhesive or tape. Provide zip ties for pipe labels installed on piping with an outer diameter greater than 6".
- C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
 2. Lettering Size: At least 1-1/2 inches high.

2.3 VALVE TAGS

- A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.
 1. Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 2. Fasteners: Brass S-hook.
- B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
 1. Valve-tag schedule shall be included in operation and maintenance data.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

- A. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
 - 1. Near each valve and control device.
 - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 - 3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
 - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
 - 7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
- B. Pipe Label Color Schedule:
 - 1. Domestic Cold Water Piping:
 - a. Background Color: Green
 - b. Letter Color: White.
 - 2. Domestic Hot Water Piping:
 - a. Background Color: Green
 - b. Letter Color: White
 - 3. Sanitary Piping:
 - a. Background Color: Green
 - b. Letter Color: White.
 - 4. Vent Piping:
 - a. Background Color: Green
 - b. Letter Color: White
 - 5. Storm Piping:
 - a. Background Color: Green
 - b. Letter Color: White.
 - 6. Compressed Air Piping:

- a. Background Color: Blue
- b. Letter Color: White.

3.4 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
 - 1. Valve-Tag Size and Shape:
 - a. Cold Water: 2 inches, round
 - b. Hot Water: 2 inches, round
 - 2. Valve-Tag Color:
 - a. Cold Water: Green.
 - b. Hot Water: Green.
 - 3. Letter Color:
 - a. Cold Water: White.
 - b. Hot Water: White.

3.5 WARNING-TAG INSTALLATION

- A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 220553

SECTION 220719 - PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes insulating the following plumbing piping services:
 - 1. Domestic cold-water piping.
 - 2. Domestic hot-water piping.
 - 3. Domestic recirculating hot-water piping.
 - 4. Supplies and drains for handicap-accessible lavatories and sinks.
 - 5. Storm lines and overflows.
 - 6. Roof drain bodies.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied, if any).
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
 - 2. Detail attachment and covering of heat tracing inside insulation.
 - 3. Detail insulation application at pipe expansion joints for each type of insulation.
 - 4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
 - 5. Detail removable insulation at piping specialties, equipment connections, and access panels.
 - 6. Detail application of field-applied jackets.
 - 7. Detail application at linkages of control devices.
- C. Samples: For each type of insulation and jacket indicated. Identify each Sample, describing product and intended use. Sample sizes are as follows:
 - 1. Preformed Pipe Insulation Materials: 12 inches long by NPS 2.
 - 2. Jacket Materials for Pipe: 12 inches long by NPS 2.
 - 3. Sheet Jacket Materials: 12 inches square.
 - 4. Manufacturer's Color Charts: For products where color is specified, show the full range of colors available for each type of finish material.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.
- C. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
 - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
 - 2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.
- C. Mockups: Before installing insulation, build mockups for each type of insulation and finish listed below to demonstrate quality of insulation application and finishes. Build mockups in the location indicated or, if not indicated, as directed by Architect. Use materials indicated for the completed Work.
 - 1. Piping Mockups:
 - a. One 10-foot section of NPS 2 straight pipe.
 - b. One each of a 90-degree threaded, welded, and flanged elbow.
 - c. One each of a threaded, welded, and flanged tee fitting.
 - d. One NPS 2 or smaller valve, and one NPS 2-1/2 or larger valve.
 - e. Four support hangers including hanger shield and insert.
 - f. One threaded strainer and one flanged strainer with removable portion of insulation.
 - g. One threaded reducer and one welded reducer.
 - h. One pressure temperature tap.
 - i. One mechanical coupling.
 - 2. For each mockup, fabricate cutaway sections to allow observation of application details for insulation materials, adhesives, mastics, attachments, and jackets.
 - 3. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 - 4. Obtain Architect's approval of mockups before starting insulation application.

5. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
7. Demolish and remove mockups when directed.

D. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1. Supply and Drain Protective Shielding Guards: ICC A117.1.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.7 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

1.8 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in Part 3 schedule articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Mineral-Fiber, Preformed Pipe Insulation:
 - 1. Products: Subject to compliance with requirements, provide the following:
 - a. Fibrex Insulations Inc.; Coreplus 1200.
 - b. Johns Manville; Micro-Lok.
 - c. Knauf Insulation; 1000 Pipe Insulation.
 - d. Manson Insulation Inc.; Alley-K.
 - e. Owens Corning; Fiberglas Pipe Insulation.
 - 2. Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.2 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.
- B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
 - 1. Products: Subject to compliance with requirements, provide the following:
 - a. Childers Products, Division of ITW; CP-82.
 - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
 - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
 - d. Marathon Industries, Inc.; 225.
 - e. Mon-Eco Industries, Inc.; 22-25.
- C. ASJ Adhesive, and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
 - 1. Products: Subject to compliance with requirements, provide the following:
 - a. Childers Products, Division of ITW; CP-82.
 - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
 - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
 - d. Marathon Industries, Inc.; 225.
 - e. Mon-Eco Industries, Inc.; 22-25.

2.3 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.

2.4 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
1. Products: Subject to compliance with requirements, provide the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0835.
 - b. Compac Corp.; 104 and 105.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 428 AWF ASJ.
 - d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.
 2. Width: 3 inches.
 3. Thickness: 11.5 mils.
 4. Adhesion: 90 ounces force/inch in width.
 5. Elongation: 2 percent.
 6. Tensile Strength: 40 lbf/inch in width.
 7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

2.5 SECUREMENTS

- A. Bands:
1. Products: Subject to compliance with requirements, provide the following:
 - a. Childers Products; Bands.
 - b. PABCO Metals Corporation; Bands.
 - c. RPR Products, Inc.; Bands.
 2. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with wing or closed seal.
- B. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.
- C. Wire: 0.062-inch soft-annealed, galvanized steel.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. C & F Wire.
 - b. Childers Products.
 - c. PABCO Metals Corporation.
 - d. RPR Products, Inc.

2.6 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers,

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Engineered Brass Company.
 - b. Insul-Tect Products Co.; a subsidiary of MVG Molded Products.
 - c. McGuire Manufacturing.
 - d. Plumberex.
 - e. Truebro; a brand of IPS Corporation.
 - f. Zurn Industries, LLC; Tubular Brass Plumbing Products Operation.
2. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
 1. Verify that systems to be insulated have been tested and are free of defects.
 2. Verify that surfaces to be insulated are clean and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Surface Preparation: Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:
 1. Carbon Steel: Coat carbon steel operating at a service temperature between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
- C. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
 - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at **4 inches** o.c.
 - a. For below-ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- P. For above-ambient services, do not install insulation to the following:
1. Vibration-control devices.
 2. Testing agency labels and stamps.
 3. Nameplates and data plates.
 4. Cleanouts.

3.4 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.
- C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
 4. Seal jacket to wall flashing with flashing sealant.

- D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
 - 1. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping and fire-resistive joint sealers.
- F. Insulation Installation at Floor Penetrations:
 - 1. Pipe: Install insulation continuously through floor penetrations.
 - 2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.5 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
 - 1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
 - 2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
 - 3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
 - 4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
 - 5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
 - 6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
 - 7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for

- above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
 9. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
 2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
 3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
 4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
 5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.6 INSTALLATION OF MINERAL-FIBER INSULATION

- A. Insulation Installation on Straight Pipes and Tubes:
1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
 2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
 3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
 4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.
- B. Insulation Installation on Pipe Flanges:
1. Install preformed pipe insulation to outer diameter of pipe flange.

2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.7 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
 1. Drainage piping located in crawl spaces.
 2. Underground piping.
 3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.8 INDOOR CONTINUOUS PIPING INSULATION SCHEDULE

- a. Refer to plans for insulation schedule.

3.9 UNDERGROUND, FIELD-INSTALLED INSULATION JACKET

- A. For underground direct-buried piping applications, provide elastomeric insulation and Schedule 40 PVC pipe conduit.

END OF SECTION 220719

VILLAGE OF OAK PARK
OAK PARK LOCKER ROOM REMODEL
201 SOUTH BLVD
OAK PARK, IL 60302

CORDOGAN CLARK & ASSOCIATES, INC.
960 RIDGEWAY AVENUE
AURORA, ILLINOIS 60506
ISSUED FOR BID SET

SECTION 221116 - DOMESTIC WATER PIPING

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 includes domestic water piping inside the building.
- B. Water meters will be furnished and installed by Contractor.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide components and installation capable of producing domestic water piping systems with 125 psig, unless otherwise indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control test reports.
- B. Product Data: For pipe, tube, fittings, and couplings.
- C. System purging and disinfecting activities report.

1.5 FIELD CONDITIONS

- A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
 - 1. Notify Owner no fewer than FIVE WORKING days in advance of proposed interruption of water service.
 - 2. Do not interrupt water service without Construction Manager's written permission.

1.6 QUALITY ASSURANCE

- A. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9," for potable domestic water piping and components.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.
1. Cast-Copper Solder-Joint Fittings: ASME B16.18, pressure fittings.
 2. Wrought-Copper Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
 3. Bronze Flanges: ASME B16.24, Class 220, with solder-joint ends.
 4. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

2.3 GALVANIZED-STEEL PIPE AND FITTINGS

- A. Galvanized-Steel Pipe: ASTM A 53/A 53M, Type E, Grade B, Standard Weight. Include ends matching joining method.
1. Galvanized-Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106/A 106M, Standard Weight, seamless steel pipe with threaded ends.
 2. Galvanized, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.
 3. Malleable-Iron Unions: ASME B16.39, Class 220, hexagonal-stock body with ball-and-socket, metal-to-metal, bronze seating surface, and female threaded ends.
 4. Flanges: ASME B16.1, Class 125, cast iron.

2.4 VALVES

- A. Bronze and cast-iron, general-duty valves are specified in Division 22 Section "Valves."
- B. Balancing and drain valves are specified in Division 22 Section "Plumbing Specialties."

PART 3 - EXECUTION

3.1 EXCAVATION

- A. Excavating, trenching, and backfilling are specified in Division 2 Section "Earthwork."

3.2 PIPE AND FITTING APPLICATIONS

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.

- B. Flanges may be used on aboveground piping, unless otherwise indicated.
- C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.
- D. Under-Building-Slab, Domestic Water Piping on House Side of Water Meter, NPS 4 and Smaller: Hard copper tube, Type K; wrought copper fittings; and soldered joints.
- E. Aboveground domestic water piping, NPS 4 and smaller, shall be one of the following:
 - 1. Hard copper tube, ASTM B 88, Type L; Wrought - copper solder-joint fittings; and solder joints.
 - 2. Hard copper tube, ASTM B 88, Type L; copper press fittings, ASME B16.18/16.22; and press connect joints. (Viega ProPress or equal)
- F. Aboveground domestic water piping, NPS 5 to NPS 8, shall be one of the following:
 - 1. Galvanized-steel pipe and nipples; galvanized, gray-iron threaded fittings; and threaded joints.
 - 2. Galvanized-steel pipe; grooved-joint, galvanized-steel-pipe appurtenances; and grooved joints.

3.3 VALVE APPLICATIONS

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
 - 1. Shutoff Duty: Use bronze ball or gate valves for piping NPS 2 and smaller. Use cast-iron butterfly or gate valves with flanged ends for piping NPS 2-1/2 and larger.
 - 2. Throttling Duty: Use bronze ball or globe valves for piping NPS 2 and smaller. Use cast-iron butterfly valves with flanged ends for piping NPS 2-1/2 and larger.
 - 3. Hot-Water-Piping, Balancing Duty: Memory-stop balancing valves.
 - 4. Drain Duty: Hose-end drain valves.
- B. Install shutoff valve close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, and on each water supply to plumbing fixtures that do not have supply stops. Use ball or gate valves for piping NPS 2 and smaller. Use butterfly or gate valves for piping NPS 2-1/2 and larger.
- C. Install drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping.
 - 1. Install hose-end drain valves at low points in water mains, risers, and branches.
 - 2. Install stop-and-waste drain valves where indicated.
- D. Install balancing valve in each hot-water circulation return branch and discharge side of each pump and circulator. Set balancing valves partly open to restrict but not stop flow. Use ball valves for piping NPS 2 and smaller and butterfly valves for piping NPS 2-1/2 and larger. Balancing valves are specified in Division 22 Section "Plumbing Specialties."
- E. Install calibrated balancing valves in each hot-water circulation return branch and discharge side of each pump and circulator. Set calibrated balancing valves partly open to restrict but not

stop flow. Calibrated balancing valves are specified in Division 22 Section "Plumbing Specialties."

3.4 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."
- C. Install ductile-iron piping under building slab with restrained joints according to AWWA C600 and AWWA M41.
- D. Install underground copper tube and ductile-iron pipe in PE encasement according to ASTM A 674 or AWWA C105/A21.5.
- E. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve inside the building at each domestic water-service entrance. Comply with requirements for pressure gages in Section 220519 "Meters and Gages for Plumbing Piping" and with requirements for drain valves and strainers in Section 221119 "Domestic Water Piping Specialties."
- F. Install shutoff valve immediately upstream of each dielectric fitting.
- G. Install water-pressure-reducing valves downstream from shutoff valves. Comply with requirements for pressure-reducing valves in Section 221119 "Domestic Water Piping Specialties."
- H. Install domestic water piping level with 0.25 percent slope downward toward drain and plumb.
- I. Rough-in domestic water piping for water-meter installation according to utility company's requirements.
- J. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- K. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- L. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- M. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- N. Install piping to permit valve servicing.
- O. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.

- P. Install piping free of sags and bends.
- Q. Install fittings for changes in direction and branch connections.
- R. Install PEX piping with loop at each change of direction of more than 90 degrees.
- S. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
- T. Install pressure gages on suction and discharge piping for each plumbing pump and packaged booster pump. Comply with requirements for pressure gages in Section 220519 "Meters and Gages for Plumbing Piping."
- U. Install thermostats in hot-water circulation piping. Comply with requirements for thermostats in Section 221123 "Domestic Water Pumps."
- V. Install thermometers on inlet and outlet piping from each water heater. Comply with requirements for thermometers in Section 220519 "Meters and Gages for Plumbing Piping."
- W. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- X. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- Y. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."
- Z. If using press connect fitting system, leave behind one press tool for owner's use after project completion.

3.5 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- D. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.
- E. Press Connect Joints shall be made in accordance with manufacturer's installation instructions.

- F. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

3.6 HANGER AND SUPPORT INSTALLATION

- A. Pipe hanger and support devices are specified in Division 22 Section "Hangers and Supports." Install the following:
1. Vertical Piping: MSS Type 8 or Type 42, clamps.
 2. Individual, Straight, Horizontal Piping Runs: According to the following:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet: MSS Type 49, spring cushion rolls, if indicated.
 3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Install supports according to Division 22 Section "Hangers and Supports."
- C. Support vertical piping and tubing at base and at each floor.
- D. Rod diameter may be reduced 1 size for double-rod hangers, to a minimum of 3/8 inch.
- E. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:
1. NPS 1-1/4 and Smaller: 84 inches with 3/8-inch rod.
 2. NPS 1-1/2: 108 inches with 3/8-inch rod.
 3. NPS 2: 10 feet with 3/8-inch rod.
 4. NPS 2-1/2: 11 feet with 1/2-inch rod.
 5. NPS 3 and NPS 3-1/2: 12 feet with 1/2-inch rod.
 6. NPS 4 and NPS 5: 12 feet with 5/8-inch rod.
 7. NPS 6: 12 feet with 3/4-inch rod.
- F. Install supports for vertical steel piping every 22 feet.
- G. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
 2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
 3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
 4. NPS 2-1/2: 108 inches with 1/2-inch rod.
 5. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
 6. NPS 6: 10 feet with 5/8-inch rod.
- H. Install supports for vertical copper tubing every 10 feet.
- I. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.7 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment and machines to allow service and maintenance.
- C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.
- D. Connect domestic water piping to water-service piping with shutoff valve, and extend and connect to the following:
 - 1. Water Heaters: Cold-water supply and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
 - 2. Plumbing Fixtures: Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code. Refer to Division 22 Section "Plumbing Fixtures."
 - 3. Equipment: Cold- and hot-water supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.8 FIELD QUALITY CONTROL

- A. Inspect domestic water piping as follows:
 - 1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
 - 2. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - b. Final Inspection: Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
 - 3. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
 - 4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- B. Test domestic water piping as follows:
 - 1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
 - 2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 - 3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 - 4. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and

allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.

5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
6. Prepare reports for tests and required corrective action.

3.9 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Open throttling valves to proper setting.
4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.
 - a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide flow of hot water in each branch.
 - b. Adjust calibrated balancing valves to flows indicated.
5. Remove plugs used during testing of piping and plugs used for temporary sealing of piping during installation.
6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.10 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing domestic water piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction or, if methods are not prescribed, procedures described in either AWWA C651 or AWWA C652 or as described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.

B. Prepare and submit reports of purging and disinfecting activities.

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201 SOUTH BLVD
OAK PARK, IL 60302

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- C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

END OF SECTION 221116

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SECTION 221119 - DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Vacuum breakers.
 - 2. Backflow preventers.
 - 3. Balancing valves.
 - 4. Temperature-actuated, water mixing valves.
 - 5. Strainers.
 - 6. Hose bibbs.
 - 7. Drain valves.
 - 8. Air vents.
 - 9. Expansion tanks. (ASME Rated)

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For domestic water piping specialties.
 - 1. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

- A. Potable-water piping and components shall comply with NSF 61 and NSF 14.

2.2 PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig unless otherwise indicated.

2.3 VACUUM BREAKERS

- A. Pipe-Applied, Atmospheric-Type Vacuum Breakers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Ames Co.
 - b. Cash Acme.
 - c. Conbraco Industries, Inc.
 - d. FEBCO; SPX Valves & Controls.
 - e. Rain Bird Corporation.
 - f. Toro Company (The); Irrigation Div.
 - g. Watts Industries, Inc.; Water Products Div.
 - h. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1001.
3. Size: NPS 1/4 to NPS 3, as required to match connected piping.
4. Body: Bronze.
5. Inlet and Outlet Connections: Threaded.
6. Finish: Rough bronze.

- B. Hose-Connection Vacuum Breakers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Arrowhead Brass Products, Inc.
 - b. Cash Acme.
 - c. Conbraco Industries, Inc.
 - d. Legend Valve.
 - e. MIFAB, Inc.
 - f. Prier Products, Inc.
 - g. Watts Industries, Inc.; Water Products Div.
 - h. Woodford Manufacturing Company.
 - i. Zurn Plumbing Products Group; Light Commercial Operation.
 - j. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1011.

3. Body: Bronze, nonremovable, with manual drain.
4. Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.
5. Finish: [Chrome or nickel plated] [Rough bronze].

2.4 BALANCING VALVES

A. Copper-Alloy Calibrated Balancing Valves :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Flo Fab Inc.
 - b. ITT Industries; Bell & Gossett Div.
 - c. NIBCO INC.
 - d. TAC Americas.
 - e. Taco, Inc.
 - f. Watts Industries, Inc.; Water Products Div.
2. Type: Ball valve with two readout ports and memory setting indicator.
3. Body: Brass ASTM B283-C69300
4. Size: Same as connected piping, but not larger than NPS 2.

2.5 TEMPERATURE-ACTUATED, WATER MIXING VALVES

A. Water-Temperature Limiting Devices

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cash Acme
 - b. Symmons Industries, Inc.
 - c. Watts Industries, Inc.; Water Products Div.

B. Individual-Fixture, Water Tempering Valves

1. Standard: ASSE 1016, thermostatically controlled, water tempering valve.
2. Pressure Rating: 125 psig (860 kPa) minimum unless otherwise indicated.
3. Body: Bronze body with corrosion-resistant interior components.
4. Temperature Control: Adjustable.
5. Inlets and Outlet: Threaded.
6. Finish: Rough or chrome-plated bronze.
7. Tempered-Water Setting: 110 deg F..
8. Tempered-Water Design Flow Rate: Refer to faucet

2.6 STRAINERS FOR DOMESTIC WATER PIPING

A. Y-Pattern Strainers:

1. Pressure Rating: 125 psig minimum unless otherwise indicated.

2. Body: Bronze for NPS 2 and smaller; cast iron with interior lining that complies with AWWA C550 or that is FDA approved, epoxy coated and for NPS 2-1/2 and larger.
3. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
4. Screen: Stainless steel with round perforations unless otherwise indicated.
5. Drain: Factory-installed, hose-end drain valve.

2.7 DRAIN VALVES

A. Ball-Valve-Type, Hose-End Drain Valves:

1. Standard: MSS SP-110 for standard-port, two-piece ball valves.
2. Pressure Rating: 400-psig minimum CWP.
3. Size: NPS 3/4.
4. Body: Copper alloy.
5. Ball: Chrome-plated brass.
6. Seats and Seals: Replaceable.
7. Handle: Vinyl-covered steel.
8. Inlet: Threaded or solder joint.
9. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

2.8 AIR VENTS

A. Bolted-Construction Automatic Air Vents:

1. Body: Bronze.
2. Pressure Rating and Temperature: 125-psig minimum pressure rating at 140 deg F.
3. Float: Replaceable, corrosion-resistant metal.
4. Mechanism and Seat: Stainless steel.
5. Size: NPS 1/2 minimum inlet.
6. Inlet and Vent Outlet End Connections: Threaded.

2.9 ASME RATED EXPANSION TANK

A. Manufacturers:

1. Bell & Gossett
2. Amtrol
3. Grundfos

B. See plans for description.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.
 - 1. Locate backflow preventers in same room as connected equipment or system.
 - 2. Install drain for backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe-to-floor drain. Locate air-gap device attached to or under backflow preventer. Simple air breaks are unacceptable for this application.
 - 3. Do not install bypass piping around backflow preventers.
- B. Install balancing valves in locations where they can easily be adjusted.
- C. Install temperature-actuated, water mixing valves with check stops or shutoff valves on inlets and with shutoff valve on outlet.
 - 1. Install cabinet-type units recessed in or surface mounted on wall as specified.
- D. Install outlet boxes recessed in wall or surface mounted on wall. Install 2-by-4-inch fire-retardant-treated-wood blocking, wall reinforcement between studs. Comply with requirements for fire-retardant-treated-wood blocking in Section 061000 "Rough Carpentry."
- E. Install draining-type post hydrants with 1 cu. yd. of crushed gravel around drain hole. Set post hydrants in concrete paving or in 1 cu. ft. of concrete block at grade.
- F. Set nonfreeze, nondraining-type post hydrants in concrete or pavement.
- G. Set freeze-resistant yard hydrants with riser pipe in concrete or pavement. Do not encase canister in concrete.
- H. Install air vents at high points of water piping. Install drain piping and discharge onto floor drain.
- I. Install supply-type, trap-seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.
- J. Install drainage-type, trap-seal primer valves as lavatory trap with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting.

3.2 CONNECTIONS

- A. Comply with requirements for ground equipment in Section 260526 "Grounding and Bonding for Electrical Systems."
- B. Fire-retardant-treated-wood blocking is specified in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for electrical connections.

3.3 LABELING AND IDENTIFYING

- A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
1. Pressure vacuum breakers.
 2. Intermediate atmospheric-vent backflow preventers.
 3. Reduced-pressure-principle backflow preventers.
 4. Double-check, backflow-prevention assemblies.
 5. Carbonated-beverage-machine backflow preventers.
 6. Dual-check-valve backflow preventers.
 7. Reduced-pressure-detector, fire-protection, backflow-preventer assemblies.
 8. Double-check, detector-assembly backflow preventers.
 9. Water pressure-reducing valves.
 10. Calibrated balancing valves.
 11. Manifold, thermostatic, water mixing-valve assemblies.
 12. Photographic-process, thermostatic, water mixing-valve assemblies.
 13. Primary water tempering valves.
 14. Outlet boxes.
 15. Hose stations.
 16. Supply-type, trap-seal primer valves.
 17. Trap-seal primer systems.
- B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.4 FIELD QUALITY CONTROL

- A. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.
- B. Prepare test and inspection reports.

3.5 ADJUSTING

- A. Set field-adjustable pressure set points of water pressure-reducing valves.
- B. Set field-adjustable flow set points of balancing valves.
- C. Set field-adjustable temperature set points of temperature-actuated, water mixing valves.

END OF SECTION 221119

SECTION 221316 - SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Pipe, tube, and fittings.
 - 2. Specialty pipe fittings.
 - 3. Encasement for underground metal piping.

1.3 PERFORMANCE REQUIREMENTS

- A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:
 - 1. Soil, Waste, and Vent Piping: 10-foot head of water
- B. Seismic Performance: Soil, waste, and vent piping and support and installation shall withstand the effects of earthquake motions determined according to ASCE/SEI 7

1.4 ACTION SUBMITTALS

- A. Shop Drawings: For sovent drainage system. Include plans, elevations, sections, and details.

1.5 INFORMATIONAL SUBMITTALS

- A. Seismic Qualification Certificates: For waste and vent piping, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Detailed description of piping anchorage devices on which the certification is based and their installation requirements.
- B. Field quality-control reports.
- C. Product Data: For each type of product indicated.

1.6 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF/ANSI 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping and "NSF-sewer" for plastic sewer piping.

1.7 PROJECT CONDITIONS

- A. Interruption of Existing Sanitary Waste Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
 - 1. Notify Owner no fewer than two days in advance of proposed interruption of sanitary waste service.
 - 2. Do not proceed with interruption of sanitary waste service without Owner's written permission.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 888 or CISPI 301.
- B. Cast-Iron, Hubless-Piping Couplings:
 - 1. Standard: ASTM C 1277.
 - 2. Description: Two-piece ASTM A 48/A 48M, cast-iron housing; stainless-steel bolts and nuts; and ASTM C 564, rubber sleeve with integral, center pipe stop.

2.3 PVC PIPE AND FITTINGS

- A. Solid-Wall PVC Pipe: ASTM D 2665, drain, waste, and vent.
- B. PVC Socket Fittings: ASTM D 2665, made to ASTM D 3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.
- C. Adhesive Primer: ASTM F 656.
 - 1. Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2. Adhesive primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- D. Solvent Cement: ASTM D 2564.
1. PVC solvent cement shall have a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Solvent cement shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 - EXECUTION

3.1 EARTH MOVING

- A. Comply with requirements for excavating, trenching, and backfilling specified in Section 312000 "Earth Moving."

3.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping to permit valve servicing.
- F. Install piping at indicated slopes.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Install piping to allow application of insulation.
- J. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

- K. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.
- L. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- M. Install soil and waste drainage and vent piping at the following minimum slopes unless otherwise indicated:
1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
 2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
 3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.
- N. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
1. Install encasement on underground piping according to ASTM A 674 or AWWA C105/A 21.5.
- O. Install steel piping according to applicable plumbing code.
- P. Install stainless-steel piping according to ASME A112.3.1 and applicable plumbing code.
- Q. Install aboveground copper tubing according to CDA's "Copper Tube Handbook."
- R. Install aboveground ABS piping according to ASTM D 2661.
- S. Install aboveground PVC piping according to ASTM D 2665.
- T. Install underground PVC piping according to ASTM D 2321.
- U. Install engineered soil and waste drainage and vent piping systems as follows:
1. Combination Waste and Vent: Comply with standards of authorities having jurisdiction.
 2. Solvent Drainage System: Comply with ASSE 1043 and solvent fitting manufacturer's written installation instructions.
 3. Reduced-Size Venting: Comply with standards of authorities having jurisdiction.
- V. Install underground, ductile-iron, force-main piping according to AWWA C600. Install buried piping inside building between wall and floor penetrations and connection to sanitary sewer piping outside building with restrained joints. Anchor pipe to wall or floor. Install thrust-block supports at vertical and horizontal offsets.

1. Install encasement on piping according to ASTM A 674 or AWWA C105/A 21.5.
 - W. Install underground, copper, force-main tubing according to CDA's "Copper Tube Handbook."
 1. Install encasement on piping according to ASTM A 674 or AWWA C105/A 21.5.
 - X. Install force mains at elevations indicated.
 - Y. Plumbing Specialties:
 1. Install backwater valves in sanitary waster gravity-flow piping. Comply with requirements for backwater valves specified in Section 221319 "Sanitary Waste Piping Specialties."
 2. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary drainage gravity-flow piping. Install cleanout fitting with closure plug inside the building in sanitary drainage force-main piping. Comply with requirements for cleanouts specified in Section 221319 "Sanitary Waste Piping Specialties."
 3. Install drains in sanitary drainage gravity-flow piping. Comply with requirements for drains specified in Section 221319 "Sanitary Waste Piping Specialties."
 - Z. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
 - AA. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
 - BB. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
 - CC. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."
- 3.3 JOINT CONSTRUCTION
- A. Join hubless, cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.
 - B. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
 - C. Join hub-and-spigot, cast-iron soil piping with calked joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead-and-oakum calked joints.
 - D. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

- E. Plastic, Nonpressure-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.
 - 3. PVC Piping: Join according to ASTM D 2855 and ASTM D 2665 Appendixes.

3.4 VALVE INSTALLATION

- A. General valve installation requirements are specified in Section 220523 "General-Duty Valves for Plumbing Piping."
- B. Shutoff Valves:
 - 1. Install shutoff valve on each sewage pump discharge.
 - 2. Install gate or full-port ball valve for piping NPS 2 and smaller.
 - 3. Install gate valve for piping NPS 2-1/2 and larger.
- C. Check Valves: Install swing check valve, between pump and shutoff valve, on each sewage pump discharge.
- D. Backwater Valves: Install backwater valves in piping subject to backflow.
 - 1. Horizontal Piping: Horizontal backwater valves. Use normally closed type unless otherwise indicated.
 - 2. Floor Drains: Drain outlet backwater valves unless drain has integral backwater valve.
 - 3. Install backwater valves in accessible locations.
 - 4. Comply with requirements for backwater valve specified in Section 221319 "Sanitary Waste Piping Specialties."

3.5 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- B. Comply with requirements for pipe hanger and support devices and installation specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
 - 1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
 - 2. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.
 - 3. Install stainless-steel pipe support clamps for vertical piping in corrosive environments.
 - 4. Vertical Piping: MSS Type 8 or Type 42, clamps.
 - 5. Install individual, straight, horizontal piping runs:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.
 - 6. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.

7. Base of Vertical Piping: MSS Type 52, spring hangers.
- C. Support horizontal piping and tubing within 12 inches of each fitting, valve, and coupling.
- D. Support vertical piping and tubing at base and at each floor.
- E. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.
- F. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
 1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
 2. NPS 3: 60 inches with 1/2-inch rod.
 3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
 4. NPS 6 and NPS 8: 60 inches with 3/4-inch rod.
 5. NPS 10 and NPS 12: 60 inches with 7/8-inch rod.
 6. Spacing for 10-foot lengths may be increased to 10 feet . Spacing for fittings is limited to 60 inches.
- G. Install supports for vertical cast-iron soil piping every 15 feet.
- H. Install hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:
 1. NPS 1-1/2 and NPS 2: 48 inches with 3/8-inch rod.
 2. NPS 3 : 48 inches with 1/2-inch rod.
 3. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.
 4. NPS 6 and NPS 8: 48 inches with 3/4-inch rod.
 5. NPS 10 and NPS 12 : 48 inches with 7/8-inch rod.
- I. Install supports for vertical [ABS] [and] [PVC] piping every 48 inches (1200 mm).
- J. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.6 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
- C. Connect drainage and vent piping to the following:
 1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
 2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
 3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.
 4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.

5. Install horizontal backwater valves with cleanout cover flush with floor in pit with pit cover flush with floor.
6. Comply with requirements for backwater valves, cleanouts, and drains specified in Section 221319 "Sanitary Waste Piping Specialties."
7. Equipment: Connect drainage piping as indicated. Provide shutoff valve if indicated and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.

D. Connect force-main piping to the following:

1. Sanitary Sewer: To exterior force main.
2. Sewage Pump: To sewage pump discharge.

E. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.

F. Make connections according to the following unless otherwise indicated:

1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.

3.7 IDENTIFICATION

- A. Identify exposed sanitary waste and vent piping. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.8 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

- B. Once a waste or vent pipe travels into a plenum ceiling, the piping material shall be cast iron. Refer to mechanical plans for plenum ceiling location.

- C. Re-inspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

- D. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

- E. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping except outside leaders on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
 4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.
 5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
 6. Prepare reports for tests and required corrective action.
- F. Test force-main piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
1. Leave uncovered and unconcealed new, altered, extended, or replaced force-main piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 2. Cap and subject piping to static-water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
 3. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
 4. Prepare reports for tests and required corrective action.

3.9 CLEANING AND PROTECTION

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.
- D. Exposed PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

3.10 PIPING SCHEDULE

- A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.

- B. Underground, soil and waste piping shall be any of the following:
 - 1. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.

- C. Underground, vent piping shall be any of the following:
 - 1. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.

- D. Aboveground, soil and waste piping shall be any of the following:
 - 1. Plenum ceiling - Hubless, cast-iron soil pipe and fittings.
 - 2. Non-plenum ceiling - Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.

- E. Aboveground, vent piping shall be any of the following:
 - 1. Plenum ceiling - Hubless, cast-iron soil pipe and fittings.
 - 2. Non-plenum ceiling - Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.

END OF SECTION 221316

SECTION 221319 - SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Cleanouts.
 - 2. Floor drains
 - 3. Trench drains.
 - 4. Roof flashing assemblies.
 - 5. Flashing materials.
 - 6. Miscellaneous sanitary drainage piping specialties.
 - 7. Oil interceptors.

1.3 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. FOG: Fats, oils, and greases.
- C. FRP: Fiberglass-reinforced plastic.
- D. HDPE: High-density polyethylene plastic.
- E. PE: Polyethylene plastic.
- F. PP: Polypropylene plastic.
- G. PVC: Polyvinyl chloride plastic.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and accessories for the following:
 - 1. Grease interceptors.
 - 2. Oil interceptors.
 - 3. Solids interceptors.

1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Shop Drawings: Show fabrication and installation details for frost-resistant vent terminals.
 - 1. Wiring Diagrams: Power, signal, and control wiring.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For drainage piping specialties to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic sanitary piping specialty components.

1.8 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Section 033000 "Cast-in-Place Concrete."
- B. Coordinate size and location of roof penetrations.

PART 2 - PRODUCTS

2.1 CLEANOUTS

- A. Metal Floor Cleanouts, Wall Cleanouts:
- B. See plans for description.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Josam Company; Josam Div.
 - b. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - c. Watts Drainage Products Inc.

- d. Zurn

2.2 FLOOR DRAINS, FLOOR SINKS, ROOF DRAINS, AND TRENCH DRAINS

A. See plans for description

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Josam Company; Josam Div.
 - b. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - c. Watts Drainage Products Inc.
 - d. Zurn

2.3 ROOF FLASHING ASSEMBLIES

A. Roof Flashing Assemblies

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Acorn Engineering Company; Elmdor/Stoneman Div.
 - b. Thaler Metal Industries Ltd.
2. Description: Manufactured assembly made of 4.0-lb/sq. ft., 0.0625-inch- thick, lead flashing collar and skirt extending at least 8 inches from pipe, with galvanized-steel boot reinforcement and counterflashing fitting.
 - a. Open-Top Vent Cap: Without cap.
 - b. Low-Silhouette Vent Cap: With vandal-proof vent cap.
 - c. Extended Vent Cap: With field-installed, vandal-proof vent cap.

2.4 THROUGH-PENETRATION FIRESTOP ASSEMBLIES

A. Through-Penetration Firestop Assemblies:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ProSet Systems Inc.
2. Standard: UL 1479 assembly of sleeve and stack fitting with firestopping plug.
3. Size: Same as connected soil, waste, or vent stack.
4. Sleeve: Molded PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.
5. Stack Fitting: ASTM A 48/A 48M, gray-iron, hubless-pattern, wye branch with neoprene O-ring at base and gray-iron plug in thermal-release harness. Include PVC protective cap for plug.
6. Special Coating: Corrosion resistant on interior of fittings.

2.5 FLASHING MATERIALS

- A. Lead Sheet: ASTM B 749, Type L51121, copper bearing, with the following minimum weights and thicknesses, unless otherwise indicated:
 - 1. General Use: 4.0-lb/sq. ft. thickness.
 - 2. Vent Pipe Flashing: 3.0-lb/sq. ft. thickness.
- B. Fasteners: Metal compatible with material and substrate being fastened.
- C. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.

2.6 Solder: ASTM B 32, lead-free alloy

2.7 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

- A. Open Drains
 - 1. Description: Shop or field fabricate from ASTM A 74, Service class, hub-and-spigot, cast-iron, soil-pipe fittings. Include P-trap, hub-and-spigot riser section; and where required, increaser fitting joined with ASTM C 564, rubber gaskets.
 - 2. Size: Same as connected waste piping with increaser fitting of size indicated.
- B. Stack Flashing Fittings:
 - 1. Description: Counterflashing-type, cast-iron fitting, with bottom recess for terminating roof membrane, and with threaded or hub top for extending vent pipe.
 - 2. Size: Same as connected stack vent or vent stack.
- C. Vent Caps
 - 1. Description: Cast-iron body with threaded or hub inlet and vandal-proof design. Include vented hood and setscrews to secure to vent pipe.
 - 2. Size: Same as connected stack vent or vent stack.

2.8 MOTORS

- A. General requirements for motors are specified in Section 220513 "Common Motor Requirements for Plumbing Equipment."
 - 1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
 - 2. Mounting: Recessed, flush with floor
 - 3. Operation: Manual cleaning

2.9 OIL INTERCEPTORS

A. Oil Interceptors

1. Plastic Oil Interceptors:
2. Type: Factory-fabricated interceptor for separating and removing light oil from wastewater.
3. Body Material: Plastic
4. Interior Lining: Not required
5. Exterior Coating: Not required
6. Body Dimensions: Refer to plumbing schedule.
7. Flow Rate: Refer to plumbing schedule.
8. Inlet and Outlet Size: Refer to plumbing schedule.
9. End Connections: Flanged or Hub.
10. Cleanout: Integral or field installed on outlet.
11. Mounting: Recessed, flush with floor

2.10 SOLIDS INTERCEPTORS

- A. See plans for description.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Equipment Mounting:
1. Comply with requirements for vibration isolation and seismic control devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment"
 2. Comply with requirements for vibration isolation devices specified in Section 220548.13 "Vibration Controls for Plumbing Piping and Equipment."
 3. Install on level surface.
- B. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:
1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
 2. Locate at each change in direction of piping greater than 45 degrees.
 3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
 4. Locate at base of each vertical soil and waste stack.
- C. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- D. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.

- E. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.
 - 1. Position floor drains for easy access and maintenance.
 - 2. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:
 - a. Radius, 30 Inches or Less: Equivalent to 1 percent slope, but not less than 1/4-inch total depression.
 - b. Radius, 30 to 60 Inches: Equivalent to 1 percent slope.
 - c. Radius, 60 Inches or Larger: Equivalent to 1 percent slope, but not greater than 1-inch total depression.
 - 3. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
 - 4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.
- F. Install trench drains at low points of surface areas to be drained. Set grates of drains flush with finished surface, unless otherwise indicated.
- G. Assemble and install ASME A112.3.1, stainless-steel channel drainage systems according to ASME A112.3.1. Install on support devices so that top will be flush with surface.
- H. Assemble non-ASME A112.3.1, stainless-steel channel drainage system components according to manufacturer's written instructions. Install on support devices so that top will be flush with adjacent surface.
- I. Assemble FRP channel drainage system components according to manufacturer's written instructions. Install on support devices so that top will be flush with adjacent surface.
- J. Assemble plastic channel drainage system components according to manufacturer's written instructions. Install on support devices so that top will be flush with adjacent surface.
- K. Install fixture air-admittance valves on fixture drain piping.
- L. Install stack air-admittance valves at top of stack vent and vent stack piping.
- M. Install air-admittance-valve wall boxes recessed in wall.
- N. Install roof flashing assemblies on sanitary stack vents and vent stacks that extend through roof.
- O. Install flashing fittings on sanitary stack vents and vent stacks that extend through roof.
- P. Install through-penetration firestop assemblies in plastic conductors and stacks at floor penetrations.
- Q. Assemble open drain fittings and install with top of hub 2 inch above floor.
- R. Install deep-seal traps on floor drains and other waste outlets, if indicated.
- S. Install floor-drain, trap-seal primer fittings on inlet to floor drains that require trap-seal primer connection.

1. Exception: Fitting may be omitted if trap has trap-seal primer connection.
 2. Size: Same as floor drain inlet.
- T. Install air-gap fittings on draining-type backflow preventers and on indirect-waste piping discharge into sanitary drainage system.
- U. Install sleeve flashing device with each riser and stack passing through floors with waterproof membrane.
- V. Install vent caps on each vent pipe passing through roof.
- W. Install frost-resistant vent terminals on each vent pipe passing through roof. Maintain 1-inch clearance between vent pipe and roof substrate.
- X. Install expansion joints on vertical stacks and conductors. Position expansion joints for easy access and maintenance.
- Y. Install frost-proof vent caps on each vent pipe passing through roof. Maintain 1-inch clearance between vent pipe and roof substrate.
- Z. Assemble components of FOG disposal systems and install on floor. Install trap, vent, fresh-air inlet, and flow-control fitting according to authorities having jurisdiction. Install shelf fastened to reinforcement in wall construction and adjacent to unit, unless otherwise indicated. Install culture bottle, culture metering pump, timer, and control on shelf. Install tubing between culture bottle, metering pump, and chamber.
- AA. Install grease interceptors, including trapping, venting, and flow-control fitting, according to authorities having jurisdiction and with clear space for servicing.
1. Above-Floor Installation: Set unit with bottom resting on floor, unless otherwise indicated.
 2. Flush with Floor Installation: Set unit and extension, if required, with cover flush with finished floor.
 3. Recessed Floor Installation: Set unit in receiver housing having bottom or cradle supports, with receiver housing cover flush with finished floor.
 4. Install cleanout immediately downstream from interceptors not having integral cleanout on outlet.
- BB. Install grease removal devices on floor. Install trap, vent, and flow-control fitting according to authorities having jurisdiction. Install control panel adjacent to unit, unless otherwise indicated.
- CC. Install oil interceptors, including trapping, venting, and flow-control fitting, according to authorities having jurisdiction and with clear space for servicing. Coordinate oil-interceptor storage tank and gravity drain with Section 231113 "Facility Fuel-Oil Piping."
- DD. Install solids interceptors with cleanout immediately downstream from interceptors that do not have integral cleanout on outlet. Install trap on interceptors that do not have integral trap and are connected to sanitary drainage and vent systems.
- EE. Install wood-blocking reinforcement for wall-mounting-type specialties.
- FF. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.

3.2 CONNECTIONS

- A. Comply with requirements in Section 221316 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment to allow service and maintenance.
- C. FOG Disposal Systems: Connect inlet and outlet to unit, connect flow-control fitting and fresh-air inlet piping to unit inlet piping, and connect vent piping between trap and media chamber. Connect electrical power.
- D. Grease Interceptors: Connect inlet and outlet to unit, and connect flow-control fitting and vent to unit inlet piping. Install valve on outlet of automatic drawoff-type unit.
- E. Grease Removal Devices: Connect controls, electrical power, factory-furnished accessories, and inlet, outlet, and vent piping to unit.
- F. Oil Interceptors: Connect inlet, outlet, vent, and gravity drawoff piping to unit; flow-control fitting and vent to unit inlet piping; and gravity drawoff and suction piping to oil storage tank.
- G. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- H. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.3 LABELING AND IDENTIFYING

- A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
 - 1. Grease interceptors.
- B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled grease removal device and their installation, including piping and electrical connections, and to assist in testing.
- B. Tests and Inspections:
 - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.5 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain grease removal devices. Refer to Section 017900 "Demonstration and Training."

END OF SECTION 221319

VILLAGE OF OAK PARK
OAK PARK LOCKER ROOM REMODEL
201 SOUTH BLVD
OAK PARK, IL 60302

CORDOGAN CLARK & ASSOCIATES, INC.
960 RIDGEWAY AVENUE
AURORA, ILLINOIS 60506
ISSUED FOR BID SET

SECTION 224000 - PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following conventional plumbing fixtures and related components:

1. Faucets for lavatories, showers, and sinks.
2. Flushometers.
3. Toilet seats.
4. Protective shielding guards.
5. Fixture supports.
6. Shower receptors.
7. Dishwasher air-gap fittings.
8. Water closets.
9. Urinals.
10. Lavatories.
11. Individual showers.
12. Kitchen sinks.
13. Service basins.
14. Bedpan washers.

- B. Related Sections include the following:

1. Division 10 Section "Toilet, Bath, and Laundry Accessories."
2. Division 22 Section "Domestic Water Piping Specialties" for backflow preventers, floor drains, and specialty fixtures not included in this Section.
3. Division 22 Section "Domestic Water Filtration Equipment" for water filters.
4. Division 22 Section "Healthcare Plumbing Fixtures."
5. Division 22 Section "Emergency Plumbing Fixtures."
6. Division 22 Section "Security Plumbing Fixtures."
7. Division 22 Section "Drinking Fountains and Water Coolers."
8. Division 31 Section "Facility Water Distribution Piping" for exterior plumbing fixtures and hydrants.

1.3 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities.

- C. Cast Polymer: Cast-filled-polymer-plastic material. This material includes cultured-marble and solid-surface materials.
- D. Cultured Marble: Cast-filled-polymer-plastic material with surface coating.
- E. Fitting: Device that controls the flow of water into or out of the plumbing fixture. Fittings specified in this Section include supplies and stops, faucets and spouts, shower heads and tub spouts, drains and tailpieces, and traps and waste pipes. Piping and general-duty valves are included where indicated.
- F. FRP: Fiberglass-reinforced plastic.
- G. PMMA: Polymethyl methacrylate (acrylic) plastic.
- H. PVC: Polyvinyl chloride plastic.
- I. Solid Surface: Nonporous, homogeneous, cast-polymer-plastic material with heat-, impact-, scratch-, and stain-resistance qualities.

1.4 SUBMITTALS

- A. Product Data: For each type of plumbing fixture indicated. Include selected fixture and trim, fittings, accessories, appliances, appurtenances, equipment, and supports. Indicate materials and finishes, dimensions, construction details, and flow-control rates.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Operation and Maintenance Data: For plumbing fixtures to include in emergency, operation, and maintenance manuals.
- D. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain plumbing fixtures, faucets, and other components of each category through one source from a single manufacturer.
 - 1. Exception: If fixtures, faucets, or other components are not available from a single manufacturer, obtain similar products from other manufacturers specified for that category.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities"; Public Law 90-480, "Architectural Barriers Act"; and Public Law 101-336, "Americans with Disabilities Act"; for plumbing fixtures for people with disabilities.

- D. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.
- E. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.
- F. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.
- G. Comply with the following applicable standards and other requirements specified for plumbing fixtures:
1. Enameled, Cast-Iron Fixtures: ASME A112.19.1M.
 2. Plastic Bathtubs: ANSI Z124.1.
 3. Plastic Lavatories: ANSI Z124.3.
 4. Plastic Laundry Trays: ANSI Z124.6.
 5. Plastic Mop-Service Basins: ANSI Z124.6.
 6. Plastic Shower Enclosures: ANSI Z124.2.
 7. Plastic Sinks: ANSI Z124.6.
 8. Plastic Urinal Fixtures: ANSI Z124.9.
 9. Plastic Whirlpool Bathtubs: ANSI Z124.1 and ASME A112.19.7M.
 10. Porcelain-Enameled, Formed-Steel Fixtures: ASME A112.19.4M.
 11. Slip-Resistant Bathing Surfaces: ASTM F 462.
 12. Solid-Surface-Material Lavatories and Sinks: ANSI/ICPA SS-1.
 13. Stainless-Steel Commercial, Handwash Sinks: NSF 2 construction.
 14. Stainless-Steel Residential Sinks: ASME A112.19.3.
 15. Vitreous-China Fixtures: ASME A112.19.2M.
 16. Water-Closet, Flush Valve, Tank Trim: ASME A112.19.5.
 17. Water-Closet, Flushometer Tank Trim: ASSE 1037.
 18. Whirlpool Bathtub Fittings: ASME A112.19.8M.
- H. Comply with the following applicable standards and other requirements specified for lavatory and sink faucets:
1. Backflow Protection Devices for Faucets with Side Spray: ASME A112.18.3M.
 2. Backflow Protection Devices for Faucets with Hose-Thread Outlet: ASME A112.18.3M.
 3. Diverter Valves for Faucets with Hose Spray: ASSE 1025.
 4. Faucets: ASME A112.18.1.
 5. Hose-Connection Vacuum Breakers: ASSE 1011.
 6. Hose-Coupling Threads: ASME B1.20.7.
 7. Integral, Atmospheric Vacuum Breakers: ASSE 1001.
 8. NSF Potable-Water Materials: NSF 61.
 9. Pipe Threads: ASME B1.20.1.
 10. Sensor-Actuated Faucets and Electrical Devices: UL 1951.
 11. Supply Fittings: ASME A112.18.1.
 12. Brass Waste Fittings: ASME A112.18.2.
- I. Comply with the following applicable standards and other requirements specified for bathtub and shower faucets:
1. Backflow Protection Devices for Hand-Held Showers: ASME A112.18.3M.
 2. Combination, Pressure-Equalizing and Thermostatic-Control Antiscald Faucets: ASSE 1016.

3. Deck-Mounted Bath/Shower Transfer Valves: ASME 18.7.
4. Faucets: ASME A112.18.1.
5. Hand-Held Showers: ASSE 1014.
6. High-Temperature-Limit Controls for Thermal-Shock-Preventing Devices: ASTM F 445.
7. Hose-Coupling Threads: ASME B1.20.7.
8. Manual-Control Antiscald Faucets: ASTM F 444.
9. Pipe Threads: ASME B1.20.1.
10. Pressure-Equalizing-Control Antiscald Faucets: ASTM F 444 and ASSE 1016.
11. Sensor-Actuated Faucets and Electrical Devices: UL 1951.
12. Thermostatic-Control Antiscald Faucets: ASTM F 444 and ASSE 1016.

J. Comply with the following applicable standards and other requirements specified for miscellaneous fittings:

1. Atmospheric Vacuum Breakers: ASSE 1001.
2. Brass and Copper Supplies: ASME A112.18.1.
3. Dishwasher Air-Gap Fittings: ASSE 1021.
4. Manual-Operation Flushometers: ASSE 1037.
5. Plastic Tubular Fittings: ASTM F 409.
6. Brass Waste Fittings: ASME A112.18.2.
7. Sensor-Operation Flushometers: ASSE 1037 and UL 1951.

K. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1. Disposers: ASSE 1008 and UL 430.
2. Dishwasher Air-Gap Fittings: ASSE 1021.
3. Flexible Water Connectors: ASME A112.18.6.
4. Floor Drains: ASME A112.6.3.
5. Grab Bars: ASTM F 446.
6. Hose-Coupling Threads: ASME B1.20.7.
7. Hot-Water Dispensers: ASSE 1023 and UL 499.
8. Off-Floor Fixture Supports: ASME A112.6.1M.
9. Pipe Threads: ASME B1.20.1.
10. Plastic Shower Receptors: ANSI Z124.2.
11. Plastic Toilet Seats: ANSI Z124.5.
12. Supply and Drain Protective Shielding Guards: ICC A117.1.
13. Whirlpool Bathtub Equipment: UL 1795.

1.6 WARRANTY

A. Special Warranties: Manufacturer's standard form in which manufacturer agrees to repair or replace components of whirlpools that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Structural failures of unit shell.
 - b. Faulty operation of controls, blowers, pumps, heaters, and timers.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal use.

2. Warranty Period for Commercial Applications: Three year(s) from date of Substantial Completion.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Faucet Washers and O-Rings: Equal to 10 percent of amount of each type and size installed.
 2. Faucet Cartridges and O-Rings: Equal to 5 percent of amount of each type and size installed.
 3. Flushometer Valve, Repair Kits: Equal to 10 percent of amount of each type installed, but no fewer than 12 of each type.
 4. Toilet Seats: Equal to 5 percent of amount of each type installed.

PART 2 - PRODUCTS

2.1 VITREOUS CHINA FIXTURES

- A. Wall mounted lavatories, water closets, urinals
 1. Manufacturers:
 - a. American Standard
 - b. Kohler
 - c. Toto
 2. See plans for description

2.2 STAINLESS STEEL FIXTURES

- A. Sinks, mop basins
 1. Manufacturers
 - a. Advance Tabco
 - b. Eagle Group
 - c. Elkay
 - d. Kohler
 2. See plans for description

2.3 MOLDED STONE AND SOLID SURFACE FIXTURES

- A. Mop basins
 1. Manufacturers
 - a. Fiat Products
 - b. E.L. Mustee
 - c. Swan
 2. See plans for description

2.4 FAUCETS AND SHOWERS

- A. Manufacturers
 - 1. Chicago Faucets
 - 2. Kohler
 - 3. Toto
- B. See plans for description

2.5 FLUSHOMETERS

- A. Manufacturers
 - 1. Sloan

2.6 P-TRAPS FOR LAVATORIES AND SINKS

- A. Material: 17 gauge brass with chrome plate, provide wall escutcheon.

2.7 TOILET SEATS

- A. Toilet Seats:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Standard Companies, Inc.
 - b. Bemis Manufacturing Company.
 - c. Church Seats.
 - d. Eljer.
 - e. Kohler Co.
 - f. Olsonite.
 - 2. Description: See plans

2.8 FIXTURE SUPPORTS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Josam Company.
 - 2. Smith, Jay R. Mfg. Co.
 - 3. Watts
 - 4. Zurn Plumbing Products Group; Specification Drainage Operation.

C. Water-Closet Supports

1. Description: Combination carrier designed for accessible mounting height of wall-mounting, water-closet-type fixture. Include single or double, vertical or horizontal, hub-and-spigot or hubless waste fitting as required for piping arrangement; faceplates; couplings with gaskets; feet; and fixture bolts and hardware matching fixture. Include additional extension coupling, faceplate, and feet for installation in wide pipe space.

D. Urinal Supports

1. Description: Type II, urinal carrier with hanger and bearing plates for wall-mounting, urinal-type fixture. Include steel uprights with feet.
2. Accessible-Fixture Support: Include rectangular steel uprights.

E. Lavatory Supports

1. Description: Type II, lavatory carrier with concealed arms and tie rod for wall-mounting, lavatory-type fixture. Include steel uprights with feet.
2. Accessible-Fixture Support: Include rectangular steel uprights.

2.9 DISHWASHER AIR-GAP FITTINGS

A. Dishwasher Air-Gap Fittings,

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. B & K Industries, Inc.
 - b. Brass Craft Mfg. Co.; a Subsidiary of Masco Corporation.
 - c. Geberit Manufacturing, Inc.
 - d. Sioux Chief Manufacturing Company, Inc.
 - e. Watts Brass & Tubular; a division of Watts Regulator Co.
2. Description: Fitting suitable for use with domestic dishwashers and for deck mounting; with plastic body, chrome-plated brass cover; and capacity of at least 5 gpm and inlet pressure of at least 5 psig at a temperature of at least 140 deg F. Include 5/8-inch- ID inlet and 7/8-inch- ID outlet hose connections.
3. Hoses: Rubber and suitable for temperature of at least 140 deg F.
 - a. Inlet Hose: 5/8-inch ID and 48 inches long.
 - b. Outlet Hose: 7/8-inch ID and 48 inches long.

EXECUTION

2.10 EXAMINATION

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before plumbing fixture installation.

- B. Examine cabinets, counters, floors, and walls for suitable conditions where fixtures will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

2.11 INSTALLATION

- A. Assemble plumbing fixtures, trim, fittings, and other components according to manufacturers' written instructions.
- B. Install off-floor supports, affixed to building substrate, for wall-mounting fixtures.
 - 1. Use carrier supports with waste fitting and seal for back-outlet fixtures.
 - 2. Use carrier supports without waste fitting for fixtures with tubular waste piping.
 - 3. Use chair-type carrier supports with rectangular steel uprights for accessible fixtures.
- C. Install back-outlet, wall-mounting fixtures onto waste fitting seals and attach to supports.
- D. Install floor-mounting fixtures on closet flanges or other attachments to piping or building substrate.
- E. Install wall-mounting fixtures with tubular waste piping attached to supports.
- F. Install floor-mounting, back-outlet water closets attached to building floor substrate and wall bracket and onto waste fitting seals.
- G. Install counter-mounting fixtures in and attached to casework.
- H. Install fixtures level and plumb according to roughing-in drawings.
- I. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.
 - 1. Exception: Use ball, gate, or globe valves if supply stops are not specified with fixture. Valves are specified in Division 22 Section "General-Duty Valves for Plumbing Piping."
- J. Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.
- K. Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.
- L. Install flushometer valves for accessible water closets and urinals with handle mounted on wide side of compartment. Install other actuators in locations that are easy for people with disabilities to reach.
- M. Install tanks for accessible, tank-type water closets with lever handle mounted on wide side of compartment.
- N. Install toilet seats on water closets.

- O. Install trap-seal liquid in dry urinals.
 - P. Install faucet-spout fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
 - Q. Install water-supply flow-control fittings with specified flow rates in fixture supplies at stop valves.
 - R. Install faucet flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
 - S. Install shower flow-control fittings with specified maximum flow rates in shower arms.
 - T. Install traps on fixture outlets.
 - 1. Exception: Omit trap on fixtures with integral traps.
 - 2. Exception: Omit trap on indirect wastes, unless otherwise indicated.
 - U. Install disposer in outlet of each sink indicated to have disposer. Install switch where indicated or in wall adjacent to sink if location is not indicated.
 - V. Install dishwasher air-gap fitting at each sink indicated to have air-gap fitting. Install in sink deck on countertop at sink. Connect inlet hose to dishwasher and outlet hose to disposer.
 - W. Install hot-water dispensers in back top surface of sink or in countertop with spout over sink.
 - X. Install escutcheons at piping wall ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding fittings. Escutcheons are specified in Division 22 Section "Escutcheons for Plumbing Piping."
 - Y. Set bathtubs and service basins in leveling bed of cement grout. Grout is specified in Division 22 Section "Common Work Results for Plumbing."
 - Z. Seal joints between fixtures and walls, floors, and countertops using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Sealants are specified in Division 07 Section "Joint Sealants."
 - AA. Install devices to limit maximum water temperature at the fixture to the following:
 - 1. Lavatories: 110F
 - 2. Public sinks: 120F
 - 3. Showers: 115F
- 2.12 CONNECTIONS
- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
 - B. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

- C. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- D. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

2.13 FIELD QUALITY CONTROL

- A. Verify that installed plumbing fixtures are categories and types specified for locations where installed.
- B. Check that plumbing fixtures are complete with trim, faucets, fittings, and other specified components.
- C. Inspect installed plumbing fixtures for damage. Replace damaged fixtures and components.
- D. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.
- E. Install fresh batteries in sensor-operated mechanisms.

2.14 ADJUSTING

- A. Operate and adjust faucets and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.
- B. Adjust water pressure at faucets and flushometer valves to produce proper flow and stream.
- C. Replace washers and seals of leaking and dripping faucets and stops.
- D. Install fresh batteries in sensor-operated mechanisms.

2.15 CLEANING

- A. Clean fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials. Do the following:
 - 1. Remove faucet spouts and strainers, remove sediment and debris, and reinstall strainers and spouts.
 - 2. Remove sediment and debris from drains.
- B. After completing installation of exposed, factory-finished fixtures, faucets, and fittings, inspect exposed finishes and repair damaged finishes.

2.16 PROTECTION

- A. Provide protective covering for installed fixtures and fittings.

VILLAGE OF OAK PARK
OAK PARK LOCKER ROOM REMODEL
201 SOUTH BLVD
OAK PARK, IL 60302

CORDOGAN CLARK & ASSOCIATES, INC.
960 RIDGEWAY AVENUE
AURORA, ILLINOIS 60506
ISSUED FOR BID SET

- B. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION 224000

SECTION 230500 - COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 SUBMITTAL PROCEDURES

- A. All Division 23 submittals are to be submitted at one time as a complete package. The only exception to this requirement is the temperature control submittal, which may be submitted separately.
- B. Submittals are to be computer generated – scanned copies of printed documents are not acceptable.
- C. Resubmittals to be submitted all at one time within 2 weeks of return of original submittal.

1.2 RELATED DOCUMENTS

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

1.3 SUMMARY

- A. This Section includes the following:
 - 1. Piping materials and installation instructions common to most piping systems.
 - 2. Transition fittings.
 - 3. Dielectric fittings.
 - 4. Mechanical sleeve seals.
 - 5. Sleeves.
 - 6. Escutcheons.
 - 7. Grout.
 - 8. Equipment installation requirements common to equipment sections.
 - 9. Supports and anchorages.

1.4 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
 - 1. CPVC: Chlorinated polyvinyl chloride plastic.
 - 2. PE: Polyethylene plastic.
 - 3. PVC: Polyvinyl chloride plastic.
- G. The following are industry abbreviations for rubber materials:
 - 1. EPDM: Ethylene-propylene-diene terpolymer rubber.
 - 2. NBR: Acrylonitrile-butadiene rubber.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Data: For the following i9n pdf format:
 - 1. Transition fittings.
 - 2. Dielectric fittings.
 - 3. Mechanical sleeve seals.
 - 4. Escutcheons.

- B. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
 - 1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
 - 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
- C. Electrical Characteristics for HVAC Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.8 COORDINATION

- A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for HVAC installations.
- B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- C. Coordinate requirements for access panels and doors for HVAC items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 8 Section "Access Doors and Frames."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 15 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

- A. Refer to individual Division 15 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
 - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.

- a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- E. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.
- F. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.4 TRANSITION FITTINGS

- A. Plastic-to-Metal Transition Fittings: PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
1. Manufacturers:
 - a. Eslon Thermoplastics.
- B. Plastic-to-Metal Transition Adaptors: One-piece fitting with manufacturer's SDR 11 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
1. Manufacturers:
 - a. Thompson Plastics, Inc.
- C. Plastic-to-Metal Transition Unions: MSS SP-107, PVC four-part union. Include brass end, solvent-cement-joint end, rubber O-ring, and union nut.
1. Manufacturers:
 - a. NIBCO INC.
 - b. NIBCO, Inc.; Chemtrol Div.

2.5 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.

- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.
1. Manufacturers:
 - a. Capitol Manufacturing Co.
 - b. Central Plastics Company.
 - c. Eclipse, Inc.
 - d. Epco Sales, Inc.
 - e. Hart Industries, International, Inc.
 - f. Watts Industries, Inc.; Water Products Div.
 - g. Zurn Industries, Inc.; Wilkins Div.
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.
1. Manufacturers:
 - a. Capitol Manufacturing Co.
 - b. Central Plastics Company.
 - c. Epco Sales, Inc.
 - d. Watts Industries, Inc.; Water Products Div.
- E. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
1. Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Central Plastics Company.
 - d. Pipeline Seal and Insulator, Inc.
 2. Separate companion flanges and steel bolts and nuts shall have 150- or 300-psig minimum working pressure where required to suit system pressures.
- F. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.
1. Manufacturers:
 - a. Calpico, Inc.
 - b. Lochinvar Corp.
- G. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.
1. Manufacturers:
 - a. Perfection Corp.
 - b. Precision Plumbing Products, Inc.
 - c. Sioux Chief Manufacturing Co., Inc.

- d. Victaulic Co. of America.

2.6 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
1. Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Metraflex Co.
 - d. Pipeline Seal and Insulator, Inc.
 2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 3. Pressure Plates: Carbon steel. Include two for each sealing element.
 4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.7 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
1. Underdeck Clamp: Clamping ring with set screws.
- E. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.
- F. PVC Pipe: ASTM D 1785, Schedule 40.
- G. Molded PE: Reusable, PE, tapered-cup shaped, and smooth-outer surface with nailing flange for attaching to wooden forms.

2.8 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
 - 1. Finish: Polished chrome-plated.
- D. One-Piece, Stamped-Steel Type: With set screw and chrome-plated finish.
- E. One-Piece, Floor-Plate Type: Cast-iron floor plate.

2.9 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 15 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.

- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
 - 1. New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
 - b. Insulated Piping: One-piece, stamped-steel type with spring clips.
 - c. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - d. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - e. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with rough-brass finish.
 - f. Bare Piping in Equipment Rooms: One-piece, cast-brass type.
 - g. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.
- M. Sleeves are not required for core-drilled holes.
- N. Permanent sleeves are not required for holes formed by removable PE sleeves.
- O. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.
- P. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
 - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
 - 3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
 - a. Steel Pipe Sleeves: For pipes smaller than NPS 6.
 - b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
 - c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 7 Section "Sheet Metal Flashing and Trim" for flashing.
 - 1) Seal space outside of sleeve fittings with grout.

4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 7 Section "Joint Sealants" for materials and installation.
- Q. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
1. Install steel pipe for sleeves smaller than 6 inches in diameter.
 2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
 3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- R. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- S. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 7 Section "Through-Penetration Firestop Systems" for materials.
- T. Verify final equipment locations for roughing-in.
- U. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.
- 3.2 PIPING JOINT CONSTRUCTION
- A. Join pipe and fittings according to the following requirements and Division 15 Sections specifying piping systems.
 - B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
 - C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
 - D. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
 - E. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

F. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

G. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.3 PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:

1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.4 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install HVAC equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.5 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 5 Section "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor HVAC materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

3.6 GROUTING

- A. Mix and install grout for HVAC equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

END OF SECTION 230500

SECTION 230513 - COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes general requirements for single-phase and polyphase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on ac power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.3 COORDINATION

- A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:
 - 1. Motor controllers.
 - 2. Torque, speed, and horsepower requirements of the load.
 - 3. Ratings and characteristics of supply circuit and required control sequence.
 - 4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

- A. Comply with NEMA MG 1 unless otherwise indicated.
- B. Comply with IEEE 841 for severe-duty motors.

2.2 MOTOR CHARACTERISTICS

- A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level.
- B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.3 POLYPHASE MOTORS

- A. Description: NEMA MG 1, Design B, medium induction motor.
- B. Efficiency: Energy efficient, as defined in NEMA MG 1.
- C. Service Factor: 1.15.
- D. Multispeed Motors: Variable torque.
 - 1. For motors with 2:1 speed ratio, consequent pole, single winding.
 - 2. For motors with other than 2:1 speed ratio, separate winding for each speed.
- E. Multispeed Motors: Separate winding for each speed.
- F. Rotor: Random-wound, squirrel cage.
- G. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.
- H. Temperature Rise: Match insulation rating.
- I. Insulation: Class F
- J. Code Letter Designation:
 - 1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
 - 2. Motors Smaller than 15 HP: Manufacturer's standard starting characteristic.
- K. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T.

2.4 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

- A. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.
- B. Motors Used with Variable Frequency Controllers/Drives:
 - 1. Provide shaft grounding rings for all motors with VFDs.
 - 2. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters.
 - 3. Energy- and Premium-Efficient Motors: Class B temperature rise; Class F insulation.
 - 4. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
 - 5. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.
- C. Severe-Duty Motors: Comply with IEEE 841, with 1.15 minimum service factor.

2.5 SINGLE-PHASE ECM MOTORS

- A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:
 - 1. Split phase.
 - 2. Capacitor start, inductor run.
 - 3. Capacitor start, capacitor run.
- B. Multispeed Motors: Variable-torque, permanent-split-capacitor type.
- C. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.
- D. Motors 1/20 HP and Smaller: Shaded-pole type.
- E. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 230513

VILLAGE OF OAK PARK
OAK PARK LOCKER ROOM REMODEL
201 SOUTH BLVD
OAK PARK, IL 60302

CORDOGAN CLARK & ASSOCIATES, INC.
960 RIDGEWAY AVENUE
AURORA, ILLINOIS 60506
ISSUED FOR BID SET

SECTION 233113 - METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Single-wall rectangular ducts and fittings.
2. Double-wall rectangular ducts and fittings.
3. Single-wall round ducts and fittings.
4. Sheet metal materials.
5. Sealants and gaskets.
6. Hangers and supports.

B. Related Sections:

1. Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
2. Division 23 Section "HVAC Casings" for factory- and field-fabricated casings for mechanical equipment.
3. Division 23 Section "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.3 PERFORMANCE REQUIREMENTS

- A. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.

1.4 SUBMITTALS

A. Product Data: For each type of the following products:

1. Liners and adhesives.
2. Sealants and gaskets.

- B. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
2. Suspended ceiling components.
3. Structural members to which duct will be attached.
4. Size and location of initial access modules for acoustical tile.
5. Penetrations of smoke barriers and fire-rated construction.
6. Items penetrating finished ceiling including the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Sprinklers.
 - e. Access panels.
 - f. Perimeter moldings.

C. Welding certificates.

D. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum," for aluminum supports.
3. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-4, "Transverse (Girth) Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-5, "Longitudinal Seams - Rectangular Ducts," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 2, "Fittings and Other Construction," for static-pressure class, applicable

sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 DOUBLE-WALL RECTANGULAR DUCTS AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. McGill AirFlow LLC.
 2. Sheet Metal Connectors, Inc.
 3. Lindab
 4. Linx
- B. Rectangular Ducts: Fabricate ducts with indicated dimensions.
- C. Outer Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- D. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-4, "Transverse (Girth) Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- E. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-5, "Longitudinal Seams - Rectangular Ducts," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- F. Interstitial Insulation: Fiberglass, UL-181 listed.
1. Minimum Thermal Resistance: R6
- G. Inner Duct: Minimum 22 gauge galvanized sheet steel or aluminum, solid or perforated. Refer to plans for inner duct type.
- H. Formed-on Transverse Joints (Flanges): Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-4, "Traverse (Girth) Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- I. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-5, "Longitudinal Seams - Rectangular Ducts," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SINGLE-WALL ROUND DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Lindab Inc.
 - b. McGill AirFlow LLC.
 - c. SEMCO Incorporated.
 - d. Sheet Metal Connectors, Inc.
 - e. Spiral Manufacturing Co., Inc.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Transverse Joints - Round Duct," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Seams - Round Duct and Fittings," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
1. Fabricate round ducts larger than 90 inches in diameter with butt-welded longitudinal seams.
 2. Fabricate flat-oval ducts larger than 72 inches in width (major dimension) with butt-welded longitudinal seams.
- D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.4 SHEET METAL MATERIALS

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
1. Galvanized Coating Designation: G90.
 2. Finishes for Surfaces Exposed to View: Mill phosphatized.
 3. Provide paint grip finish for exposed ducts.

- C. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304 or 316, as indicated in the "Duct Schedule" Article; cold rolled, annealed, sheet. Exposed surface finish shall be No. 2B, No. 2D, No. 3, or No. 4 as indicated in the "Duct Schedule" Article.
- D. Aluminum Sheets: Comply with ASTM B209 (ASTM B209M) Alloy 3003, H14 temper; with mill finish for concealed ducts, and standard, one-side bright finish for duct surfaces exposed to view.
- E. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
 - 1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.
- F. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.5 DUCT LINER

- A. Fibrous-Glass Duct Liner: Comply with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation; Insulation Group.
 - b. Johns Manville.
 - c. Knauf Insulation.
 - d. Owens Corning.
 - 2. Maximum Thermal Conductivity:
 - a. Type I, Flexible: 0.27 Btu x in./h x sq. ft. x deg F at 75 deg F mean temperature.
 - 3. Antimicrobial Erosion-Resistant Coating: Apply to the surface of the liner that will form the interior surface of the duct to act as a moisture repellent and erosion-resistant coating. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.
 - 4. Solvent-Based Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.
 - a. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Flexible Elastomeric Duct Liner: Preformed, cellular, closed-cell, sheet materials complying with ASTM C 534, Type II, Grade 1; and with NFPA 90A or NFPA 90B.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Aeroflex USA Inc.
 - b. Armacell LLC.

- c. Rubatex International, LLC
2. Surface-Burning Characteristics: Maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
3. Liner Adhesive: As recommended by insulation manufacturer and complying with NFPA 90A or NFPA 90B.
 - a. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Insulation Pins and Washers:
 1. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
- D. Shop Application of Duct Liner: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-19, "Flexible Duct Liner Installation."
 1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
 2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
 3. Butt transverse joints without gaps, and coat joint with adhesive.
 4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
 5. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.
 6. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm.
 7. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12 inches transversely; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.
 8. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:
 - a. Fan discharges.
 - b. Intervals of lined duct preceding unlined duct.
 - c. Upstream edges of transverse joints in ducts where air velocities are higher than 2500 fpm or where indicated.
 9. Secure insulation between perforated sheet metal inner duct of same thickness as specified for outer shell. Use mechanical fasteners that maintain inner duct at uniform distance from outer shell without compressing insulation.
 - a. Sheet Metal Inner Duct Perforations: 3/32-inch (2.4-mm) diameter, with an overall open area of 23 percent.
 10. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct walls with bolts, screws, rivets, or welds.

2.6 SEALANT AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
- B. Two-Part Tape Sealing System:
1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
 2. Tape Width: 3 inches.
 3. Sealant: Modified styrene acrylic.
 4. Water resistant.
 5. Mold and mildew resistant.
 6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
 7. Service: Indoor and outdoor.
 8. Service Temperature: Minus 40 to plus 200 deg F.
 9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
 10. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Water-Based Joint and Seam Sealant:
1. Application Method: Brush on.
 2. Solids Content: Minimum 65 percent.
 3. Shore A Hardness: Minimum 20.
 4. Water resistant.
 5. Mold and mildew resistant.
 6. VOC: Maximum 75 g/L (less water).
 7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
 8. Service: Indoor or outdoor.
 9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
- D. Solvent-Based Joint and Seam Sealant:
1. Application Method: Brush on.
 2. Base: Synthetic rubber resin.
 3. Solvent: Toluene and heptane.
 4. Solids Content: Minimum 60 percent.
 5. Shore A Hardness: Minimum 60.
 6. Water resistant.
 7. Mold and mildew resistant.
 8. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 9. VOC: Maximum 395 g/L.
 10. Maximum Static-Pressure Class: 10-inch wg, positive or negative.
 11. Service: Indoor or outdoor.
 12. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
- E. Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.
5. Use: O.
6. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

F. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

G. Round Duct Joint O-Ring Seals:

1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for 10-inch wg static-pressure class, positive or negative.
2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

2.7 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," [Table 4-1](#), "Rectangular Duct Hangers Minimum Size," and [Table 4-2](#), "Minimum Hanger Sizes for Round Duct."

D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.

E. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.

F. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

G. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

H. Trapeze and Riser Supports:

1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.
- B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- C. Install round ducts in maximum practical lengths.
- D. Install ducts with fewest possible joints.
- E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.
- J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct with sound caulk. Overlap openings on four sides by at least 1-1/2 inches.
- K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Division 23 Section "Air Duct Accessories" for fire and smoke dampers.
- L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials.

3.2 INSTALLATION OF EXPOSED DUCTWORK

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Remove excess oils.
- C. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.

- D. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
- E. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
- F. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 DUCT SEALING

- A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

3.4 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Hangers and Supports."
- B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
 - 1. Where practical, install concrete inserts before placing concrete.
 - 2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
 - 3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
 - 4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
 - 5. Do not use powder-actuated concrete fasteners for seismic restraints.
- C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- D. Hangers Exposed to View: Threaded rod and angle or channel supports.
- E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.
- F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.5 CONNECTIONS

- A. Make connections to equipment with flexible connectors complying with Division 23 Section "Air Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 PAINTING

- A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Division 09 painting Sections.

3.7 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Leakage Tests:
 - 1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual." Submit a test report for each test.
 - 2. Test the following systems:
 - a. Ducts with a Pressure Class Higher Than 3-Inch wg: Test representative duct sections totaling no less than 25 percent of total installed duct area for each designated pressure class.
 - 3. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
 - 4. Test for leaks before applying external insulation.
 - 5. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure.
- C. Duct system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

3.8 START UP

- A. Air Balance: Comply with requirements in Division 23 Section "Testing, Adjusting, and Balancing for HVAC."

3.9 DUCT MATERIAL SCHEDULE

- A. Refer to plans for duct material schedule.

- B. Unless otherwise noted on plans, all ductwork located outside of the building to be double wall with perforated inner shell and 1" liner.

3.10 DUCT SCHEDULE

- A. Supply Ducts Connected to Air Handling Units – (0-2" ESP):
- a. Pressure Class: Positive 2-inch wg.
 - b. Minimum SMACNA Seal Class: C.
 - c. SMACNA Leakage Class for Rectangular: 24.
 - d. SMACNA Leakage Class for Round and Flat Oval: 12.
- B. Supply Ducts Connected to Air Handling Units – (2-3" ESP):
- a. Pressure Class: Positive 3-inch wg.
 - b. Minimum SMACNA Seal Class: B.
 - c. SMACNA Leakage Class for Rectangular: 12.
 - d. SMACNA Leakage Class for Round and Flat Oval: 6.
- C. Supply Ducts Connected to Air Handling Units – (3-4" ESP):
- a. Pressure Class: Positive 4-inch wg.
 - b. Minimum SMACNA Seal Class: A.
 - c. SMACNA Leakage Class for Rectangular: 6.
 - d. SMACNA Leakage Class for Round and Flat Oval: 3.
- D. Return Ducts:
- 1. Ducts Connected to Air Handling Units:
 - a. Pressure Class: Positive or negative 2-inch wg.
 - b. Minimum SMACNA Seal Class: C.
 - c. SMACNA Leakage Class for Rectangular: 24.
 - d. SMACNA Leakage Class for Round and Flat Oval: 12.
- E. Exhaust Ducts:
- 1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:
 - a. Pressure Class: Negative 2-inch wg.
 - b. Minimum SMACNA Seal Class: C if negative pressure, and A if positive pressure.
 - c. SMACNA Leakage Class for Rectangular: 24/6.
 - d. SMACNA Leakage Class for Round and Flat Oval: 12/3.
 - 2. Ducts Connected to Fans Exhausting Laboratory and Process (ASHRAE 62.1, Class 3 and 4) Air:
 - a. Type 316, stainless-steel sheet.
 - 1) Concealed: No. 2B finish.
 - b. PVC-coated, galvanized sheet steel with thicker coating on duct interior.

- c. Pressure Class: Positive or negative 3-inch wg.
 - d. Minimum SMACNA Seal Class: A.
 - e. SMACNA Leakage Class: 3.
3. Ducts Connected to dryer exhaust.
- a. 316 stainless steel.
 - b. Minimum SMACNA Seal Class: C if negative pressure, and A if positive pressure.
 - c. SMACNA Leakage Class for Rectangular: 24/6.
 - d. SMACNA Leakage Class for Round and Flat Oval: 12/3.
4. Ducts Connected to Commercial Kitchen Hoods: Comply with NFPA 96.
- a. Exposed to View: Type 304, stainless-steel sheet, No. 4 finish.
 - b. Concealed: Type 304, stainless-steel sheet, No. 2D finish
 - c. Welded seams and joints.
 - d. Pressure Class: Positive or negative 2-inch wg
 - e. Minimum SMACNA Seal Class: Welded seams, joints, and penetrations.
 - f. SMACNA Leakage Class: 3.
- F. Outdoor-Air (Not Filtered, Heated, or Cooled) Ducts:
1. Ducts Connected to Air-Handling Units:
- a. Pressure Class: Positive or negative 2-inch wg.
 - b. Minimum SMACNA Seal Class: B.
 - c. SMACNA Leakage Class for Rectangular: 12.
 - d. SMACNA Leakage Class for Round and Flat Oval: 12.
- G. Intermediate Reinforcement:
1. Galvanized-Steel Ducts: Galvanized steel.
2. Stainless-Steel Ducts:
- a. Exposed to Airstream: Match duct material.
 - b. Not Exposed to Airstream: Match duct material.
- H. Elbow Configuration:
1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."
- a. Velocity 1000 fpm or Lower:
 - 1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
 - 2) Mitered Type RE 4 without vanes.
 - b. Velocity 1000 to 1500 fpm:
 - 1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
 - 2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.

- 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
- c. Velocity 1500 fpm or Higher:
 - 1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
 - 2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
 - 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
2. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."
 - a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
 - b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
 - c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
3. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-3, "Round Duct Elbows."
 - a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
 - 1) Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
 - 2) Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
 - 3) Velocity 1500 fpm or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.
 - 4) Radius-to Diameter Ratio: 1.5.
 - b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
 - c. Round Elbows, 14 Inches and Larger in Diameter: Standing seam.
- I. Branch Configuration:
 1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-6, "Branch Connections."
 - a. Rectangular Main to Rectangular Branch: 45-degree entry.
 - b. Rectangular Main to Round Branch: Spin in.
 2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees." Saddle taps are permitted in existing duct.
 - a. Velocity 1000 fpm or Lower: 90-degree tap.

VILLAGE OF OAK PARK
OAK PARK LOCKER ROOM REMODEL
201 SOUTH BLVD
OAK PARK, IL 60302

CORDOGAN CLARK & ASSOCIATES, INC.
960 RIDGEWAY AVENUE
AURORA, ILLINOIS 60506
ISSUED FOR BID SET

- b. Velocity 1000 to 1500 fpm: Conical tap.
- c. Velocity 1500 fpm or Higher: 45-degree lateral.

END OF SECTION 233113

SECTION 260100 - BASIC ELECTRICAL MATERIALS AND METHODS

26-1 GENERAL INSTRUCTIONS.

1. All requirements under division one and the general supplementary conditions of these specifications shall be a part of this section. Each contractor shall be responsible for becoming thoroughly familiar with all its contents as to requirements which affect this division or section. The work required under this section includes all material, tools, equipment, appliances, hoisting, excavation, backfill, restoration, and labor required to complete all the work as required by the drawings and specifications or reasonably inferred to be necessary to facilitate each system functioning as indicated by the design and the equipment specified. Total installation is to conform to all codes and standards affecting the work. Coordinate with the owner. The contractor shall do all alterations and rework required for the proper integration of new with existing areas.

2. Inspection of site.

The contractor shall personally inspect the site of the proposed work and become fully informed as to the conditions under which the work is to be done. Use field measurements and observations to prepare bid. Commencement of work infers acceptance of all existing conditions.

3. Material and workmanship.

All material and apparatus shall be new and in first class condition. All material and apparatus shall have markings or nameplate identifying the manufacturer and providing sufficient reference to establish quality, size, and capacity. All workmanship shall comply with published industry standards, including NECA/NEIS, NECA-1-2010, and the American Electrician's Handbook, latest edition. OSHA rules, regulations, and requirements are a part of this contract. Electrical contractor shall follow them as well as state and local requirements for the safety of workers on the job and passers-by.

4. Coordination.

The contractor shall coordinate all work with other contractors and subcontractors so that various components of the electrical system will be installed at the proper time, will fit the available space, and will allow proper service access to all equipment. The contractor shall refer to architectural, structural, and mechanical drawings and relevant equipment drawings to determine the extent of clear spaces. The contractor shall make all offsets required to clear equipment, beams, and other structural members, and to facilitate concealing conduit in the manner anticipated in the design. The contractor shall provide materials with trim which will fit properly the types of ceiling, wall, or floor finish actually installed.

5. Dimensions and layout.

The drawings are schematic in nature and not intended to show every accessory or component necessary for a complete installation. Figured dimensions shall be taken in preference to scale dimensions. Determine exact locations by job measurements, by checking the requirements of other trades, and by reviewing all contract documents. The contractor shall be held responsible for errors which could have been avoided by proper checking and inspection.

6. Minor Electrical Demolition.

- a. Demolition and remodel work is to be phased according to areas indicated on the drawings.
- b. The Owner determines which sections of the existing Fire Alarm and/or Fire Suppression systems, intercom/clock systems, surveillance equipment, WiFi antennas, and the like shall remain in service during any particular phase of demolition.
- c. The Owner determines which sections of any existing telecommunication system shall remain in or out of service during demolition.
- d. The drawings are intended to indicate the scope of new work required and do not indicate every existing box, conduit, or wire that must be removed to accommodate the renovation. **THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING A BID AND VERIFY EXISTING CONDITIONS.**
- e. Disconnect electrical systems in walls, floors, structures, and ceilings scheduled for removal. Preserve existing equipment intended for reuse or reinstallation.
- f. Where walls, ceilings, structures, etc., are indicated as being removed on general drawings, the Contractor shall be responsible for the removal of all electrical equipment, devices, fixtures, raceways, wiring, systems, etc., from the removed area.
- g. Where ceilings, walls, structures, etc., are temporarily removed and replaced by others, this Contractor shall be responsible for the removal, storage, and replacement of equipment, devices, fixtures, raceways, wiring, systems, etc.
- h. Where ceilings, walls, structures, etc., must be removed solely to accommodate new electrical work, this Contractor shall be responsible for the removal, storage, and replacement of ceilings, walls, structures, equipment, devices, fixtures, raceways, wiring, systems, etc.
- i. Verify that abandoned wiring and equipment serve only abandoned equipment or facilities. Extend conduit and wire to facilities and equipment that will remain in operation following demolition. Extension of conduit and wire to equipment shall be compatible with the surrounding area.
- j. Coordinate scope of work with all other Contractors and the Owner at the project site. Schedule removal of equipment and electrical service to avoid conflicts.
- k. Bid submittal shall mean the Contractor has visited the project site and has verified existing conditions and scope of work.
- l. When applicable, maintain the existing Fire Alarm as required by Owner until new system is in place and accepted.
 - a. Temporary disabling of an in-service system requires that the Owner be notified 24 hours in advance.
 - b. Provide fire watch for areas left unprotected by the fire alarm system.
- m. When the work affects the existing electrical service: Maintain existing system for as long as possible. Coordinate a transition outage to occur at a time most convenient to the Owner. Include furnishing two weeks of temporary diesel generator power (three phase, nominal 125kVA, 208-volts) to critical areas to span the outage.
- n. 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. Assume all equipment and systems must remain operational unless specifically noted otherwise on drawings.
- o. The E.C. is responsible for all temporary lighting and power in all work areas per Division 1. Comply with NECA 200-2010.
- p. Remove, relocate, and extend existing installations to accommodate new construction. Do not extend or retain rubber insulated wiring (e.g., Types R or RW); all wire in all areas shall comply with wire specifications in Section 2 below.
- q. Remove abandoned wiring and raceway to source of supply.

- r. Remove exposed abandoned raceway, including abandoned raceway above accessible ceiling finishes. Cut raceway flush with walls and floors, and patch surfaces. Remove all associated clamps, hangers, supports, etc. associated with raceway removal.
- s. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is removed. Provide blank cover for abandoned outlets that are not removed. Patch openings created from removal of devices to match surrounding finishes.
- t. Disconnect and remove abandoned panelboards and distribution equipment.
- u. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- v. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories. Provide for proper recycling or disposal of existing lamps and ballasts removed from the site in accordance with EPA and State of Illinois regulations.
- w. Repair adjacent construction and finishes damaged during demolition and extension work. Patch openings to match existing surrounding finishes.
- x. Maintain access to existing electrical installations that remain active. Modify the installation or provide an access panel with placard.
- y. Extend existing installations using materials and methods compatible with existing electrical installations, but not less than specified.
- z. HID and fluorescent lamps, determined by the Toxicity Characteristic Leachate procedure (TCLP), to be hazardous waste shall be disposed of in a permitted hazardous waste disposal facility or by a permitted lamp recycler.
- aa. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- bb. Floor slabs may contain conduit systems. The Contractor is responsible for taking any measures required to ensure no conduits or other services are damaged. This includes X-ray or similar non-destructive means.
- cc. The Contractor is responsible for all costs incurred in repair, relocations, or replacement of any cables, conduits, or other services if damaged without proper investigation.
- dd. Distribution and Branch Panelboards to remain: Clean exposed surfaces and check tightness of electrical connections. Lubricate where required. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

6. Ordinances and codes.

Contractor's performance, workmanship, and materials shall comply with state and local building codes, NFPA codes as referenced therein, local amendments, industry standards (NEMA, NECA, etc.), and/or all other applicable codes and ordinances. Contractor shall comply with rules and regulations of the public utilities and municipal departments affected as applicable. Obtain and pay all permits, unless stipulated otherwise in other Division 1. Contractor shall be held responsible for any violations of law. Contractor shall maintain all necessary signal lights and guards for the safety of the public. See drawings for additional information.

Comply with the current iterations of the International Building Code, International Fire Code, and National Electrical Code as locally accepted and amended as applicable; comply with other referenced codes and standards.

7. Substitutions:

a. The specification provides that the base bid of all contractors shall include the products specifically named, the contractor being permitted to submit in the form of alternates with his proposal products of any other manufacturers for similar use, provided the difference in cost, if any, is specified in each case. The terms "approved" or "approved equal" shall mean approved by the architect as an acceptable alternate bid. The term "equal" or "available manufacturers" shall mean products similar or identical in appearance, function, or specification to a basis-of-design product and manufactured to directly compete with, replace, or supersede the specified product. The architect shall have final authority as to whether a substitution is an acceptable replacement to the specified item. The proposed substitution may also be rejected for aesthetic reasons. In the event of rejection, the specified item shall be furnished.

b. Value Substitutions: The contractor is completely responsible for all substitutions, changes, or deletions of work or products proposed to and accepted by the owner or architect in lieu of specified and shall hold the owner and architect harmless for any liabilities created by such changes. As much as is possible, such proposals for change shall indicate how the specified design goals, the work of other trades, and the construction schedule are expected to be impacted. The contractor is responsible for research of all codes and standards applicable to the proposed change, professional design services necessary to implement the change, re-submittals for state and municipal permits and additional fees invoked by the change, and notification of and coordination with other trades impacted by the change. After acceptance of a change proposal by the owner or architect, the contractor shall notify them within ten calendar days of any unexpected discovered conditions that may impact the work. After this period, the contractor shall not be excused from any liabilities created by their own proposed change(s) and shall be responsible for any discovered costs incurred by anyone due to the change(s).

8. Adjusting, aligning, and testing.

All electrical equipment on this project furnished under this division and all electrical equipment furnished by others and installed by the electrical contractor shall be adjusted, aligned, and tested for proper operation by the electrical contractor. Complete wiring systems shall be free from faults. All motors shall be verified for proper rotation and protection. The contractor shall maintain on the project premises the following at all times: a true rms reading voltmeter and ammeter, a megger insulation resistance tester. The contractor shall provide test data readings as requested or as required.

9. Operation and maintenance instructions.

Submit to the architect three copies, unless indicated otherwise in Division 1, of maintenance and operation instruction manuals appropriately bound into manual form including record copies of the following, revised if necessary to show system and equipment as actually installed: manufacturer catalog sheets, wiring diagrams, maintenance instructions, operating instructions, parts lists. Contractor shall also provide adequate owner's staff training at the termination of the work. Electronic submittals are acceptable with the approval of the owner and/or architect.

11. Start up of systems and Commissioning.

Prior to startup of the electrical systems, the contractor shall check all components and devices, lubricate items accordingly, and tighten all screwed and bolted connections. Adjust taps on each transformer for rated secondary voltage. Check and record building's service entrance voltage, grounding conditions, ground resistance, and proper phasing. Balance all single phase loads at each panelboard; redistribute branch circuit connections until balance is achieved. Replace all burned-out lamps. Touch-up paint all marred equipment finishes. After all systems have been inspected and adjusted, confirm all operating features required by the drawings and specifications and make final adjustments as necessary.

Commissioning.

All electrical systems shall be commissioned by the contractor in accordance with applicable sections of IECC 2012 and with NECA 90-2009 (or latest iterations), Recommended Practice for Commissioning Building Electrical Systems (ANSI), available from NECA Order Desk at (301)215-4504, orderdesk@necanet.org, or www.neca-neis.org/catalog. Documentation shall be included in the close-out documents.

12. Guarantee.

The contractor shall guarantee against defective workmanship and material for a period of one year from date of substantial completion. Guarantee shall include material to be replaced and all labor required. Manufacturers' standard guarantees and warranties of longer duration shall be in force.

26-2 ELECTRICAL INSTALLATION.

1. Cleaning.

Dirt and refuse resulting from the performance of the work shall be removed from the premises as required to prevent accumulation. The contractor shall cooperate in maintaining reasonably clean premises at all times. Immediately prior to final inspection, the contractor shall make a final cleanup of dirt and refuse resulting from his work. The contractor shall clean all material and equipment installed under the electrical contract. Dirt, dust, plaster, stains, and foreign matter shall be removed from all surfaces. Damaged finishes shall be touched up and restored to their original condition.

2. Cutting and patching.

This contractor shall do all cutting of walls, floors, ceiling etc. as required to install work under this section. The contractor shall obtain permission of the architect or owner before doing any cutting or coring. All holes shall be cut as small as possible. Contractor shall patch walls, floors, etc. as required by work under this section. All patching/repairs shall match the original finish and construction and be approved by the architect.

3. Rough-in.

Coordinate without delay all roughing-in with general construction. All conduit rough-in shall be concealed except in unfinished areas and where otherwise shown.

4. Conduit.

All conduits shall be run concealed except where otherwise noted (see Section 6 below). All conduits associated with the electrical service or run underground, exposed to weather, or other hazardous conditions shall be rigid (IMC is not an acceptable equivalent). All other interior conduits may be EMT where approved by local code. Install PVC exposed in corrosive areas such as pools and pool pump rooms and chemical rooms as permitted. PVC in or under slab shall be an acceptable substitute when allowed by local code, and where it is changed to rigid at least 10'-0" before it exits the slab. Minimum conduit size for power applications is 1/2" trade size; minimum conduit size for low voltage applications is 3/4" trade size; minimum size embedded conduit is 3/4" trade size; maximum size embedded in toppings is 1" trade size. Use flexible metal conduit or liquidtight flexible metal conduit for connections to vibrating equipment, transformer, lighting troffers, and the like. All feeder conduits shall be provided with an insulated equipment grounding conductor.

Concealed flexible wiring methods: Where acceptable to the local building officials, Type MC cable shall be an acceptable wiring method where installed concealed and compliant with the NEC. Type MC shall be equal to Southwire brand Armormlite (Alflex type not acceptable), constructed with soft-drawn copper, Type THHN/THWN minimum #12 conductors rated 90°C, and a green insulated grounding conductor.

The conductors shall be cabled together with a binder tape bearing the print legend wrapped around the assembly and covered with aluminum interlocking armor. The product shall meet or exceed UL 83, UL 1569, UL 1685, Fed. Spec. A-A56544, FT4/IEEE 1202 (70,000 Btu/hr) Vertical Cable Tray Flame Test, NEC, Listed for use in UL 1, 2, 3-hour Through Penetration Firestop Systems, and REACH/RoHS-2. Fittings shall be manufactured specifically for the purpose; equal to Steel City XC-7xx and XC-130 series. Die cast zinc two-screw universal clamp connectors, such as Steel City XC-280, are not acceptable. Comply with NACMA (NECA/NACMA 120) installation procedures.

6. Conduit installation.

Comply with NECA 101-2013.

All wiring shall be run in conduit, except that power limited cable may be installed concealed using open wiring methods compliant with NEC 725, et al, where acceptable to the local AHJ. Conduit shall be installed concealed above suspended ceilings, in wall cavities, or below floors wherever possible or unless noted otherwise on the plans. Notify the architect where concealment is not possible and provide equivalent surface metallic raceway manufactured for the purpose. Run parallel and perpendicular to building lines. Conduit shall be installed to requirements of structure and to requirements of all other work on the project. Conduit shall be installed to clear all openings, depressions, pipes, ducts, reinforcing steel, etc. Conduits shall be installed continuous between connections with a minimum possible number of bends and not more than four 90-degree bends between boxes. Bends shall be smooth and even and shall be made without flattening conduit or flaking enamel or galvanizing. Long radius elbows shall be used where necessary or specified; short radius bends must be approved prior to use. Conduits shall be securely fastened in place with approved straps, hangers, and steel supports as required. Groups of horizontal conduit runs shall be clamped to steel channels and suspended from inserts or anchors spaced not more than 10 feet apart. Vertical feeder conduits shall be securely clamped to structural steel members attached to structure. Cable clamps shall be installed for support of vertical feeders where required. Conduit supports shall be added within 12" at one end of all bends. Conduit shall not be supported from suspended ceiling components. Conduit ends shall be reamed before installation and all conduits shall be thoroughly cleaned before installation and kept clean after installation. Openings in boxes shall be plugged or covered as required to keep conduit clean during construction and all conduits shall be fished clear of obstructions before the pulling of wires. All conduits shall be of ample size for pulling of wire and shall not be smaller than code requirements. All electrical work shall be protected against damage during construction. Any work damaged or moved out of line after roughing-in shall be repaired to meet engineer's approval without additional cost to the owner. Conduit termination at panelboards, switchboards, motor control equipment and junction boxes shall be aligned and installed true and plumb. Install approved expansion fittings where conduit passes through expansion joints, and elsewhere as prescribed by code. Install a pull wire in each empty conduit which is left by the contractor for installation of wires or cables by others. Make all joints and connections in a manner which will insure mechanical strength and electrical continuity. Thru-wiring of light fixtures is not permitted except in lighting channels intended for the purpose. Conduit seals shall be installed on all conduits passing from non-conditioned to conditioned spaces and in all conduit penetrations of freezer and cooler walls. Furnish and install the necessary junction boxes, couplings, supports, adapters, etc., to form a complete assembly.

Conduits shall be identified for voltage per ANSI A13.1.

7. Conduit sizes indicated on the plan are intended to represent the minimum size required to accommodate the specified conductors. The contractor shall select larger trade sizes and longer radius bends where necessary to alleviate jamming and excessive pulling tension due to distance, number of bends, manufacturer directives, and the like.

8. Bushings and locknuts.

Where conduits enter boxes, they shall be rigidly clamped to the box by interior and exterior locknuts or approved fittings, and the conduit end capped with suitable bushing. Pre-insulated fittings are acceptable.

9. Wire.

All building wire shall have copper conductors, with U.L. label and 600-volt insulation. All wire shall be run in conduit (except as noted otherwise above). All wire installed outdoors shall be type XHHW, above or below grade, except where the wire originates outdoors and enters the building within 5' of the enclosure. All interior feeder and branch circuit wire shall be type THHN/THWN unless indicated otherwise. All wire #10 and smaller shall be solid or stranded per contractor's discretion; wire larger than #10 shall be stranded. Wire within lighting channels containing drivers and/or ballasts shall be type THHN. All branch circuit wire shall be not smaller than #12 awg wire. If no wire size is indicated on the drawings for a branch circuit, provide #12 awg wire and 20-amp circuit breaker. Non-power limited control wire shall have 600-v insulation and be the proper type, size, construction, and number as required by the equipment manufacturer.

10. Wiring installation.

All wiring shall be installed in approved raceway and enclosures, except where low voltage wire is permitted to be installed via open methods. Support all wire and cables in vertical installations as required by code by installing cable supports or plug-type conduit riser supports. All wire and cable in conduit shall be continuous without taps or splices. All splices or taps shall occur in approved boxes and enclosures and shall be kept to the minimum required and made with approved solderless connections. All splices, taps, and joints shall be insulated as required by code. All materials used to terminate, splice, or tap conductors shall be designed for the purpose, properly sized, U.L. listed for the specific application and conductors involved, and installed in strict accordance with the manufacturer's specifications using specified tools. Where wire is indicated to be installed, but the connection is indicated "future" or "by others", contractor shall leave a minimum of 3 feet of slack at the box, taping the ends of the conductors.

Branch circuit wiring connectors shall be twist on type equal to Ideal Twister, Twister Pro, Wing-Nut, Buchanan, or B-twist series; products such as or equal to Wire-Nut series and In-sure (Wago) push-in type are not acceptable.

Conductors shall have insulation of the proper color to match NEC color code table and as indicated below. In larger wire sizes where properly colored insulations are not available, the contractor shall install listed vinyl plastic identification tape of the appropriate color at all termination points, junction boxes, and pull boxes.

120/208-volt system: phase A, black; phase B, red; phase C, blue; neutral, white; ground, green.

277/480-volt system: phase A, brown; phase B, orange; phase C, yellow; neutral, gray; ground, green with white stripe.

All terminal blocks and wire terminals for control wiring shall be properly numbered for identification with listed vinyl stick-on markers or equivalent. Identify fire alarm wiring per NEC 760.

Wiring to low voltage wiring systems shall comply with NEC Section 411 and other sections referenced therein.

Use consistent identification designations throughout Project. Install identifying devices before installing ceilings and similar concealment.

11. Cable Ties.

1. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, Type 6/6 nylon.
 - a. Minimum Width: 3/16 inch (5 mm).
 - b. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 12,000 psi (82.7 MPa).
 - c. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
 - d. Color: Black except where used for color-coding.
2. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, Type 6/6 nylon.
 - a. Minimum Width: 3/16 inch (5 mm).
 - b. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 12,000 psi (82.7 MPa).
 - c. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
 - d. Color: Black.
3. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, self-locking.
 - a. Minimum Width: 3/16 inch (5 mm).
 - b. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 7000 psi (48.2 MPa).
 - c. UL 94 Flame Rating: 94V-0.
 - d. Temperature Range: Minus 50 to plus 284 deg F (Minus 46 to plus 140 deg C).
 - e. Color: Black

11. Junction boxes.

Provide junction boxes, pull boxes, cabinets, and wireways wherever necessary for proper installation of various electrical systems according to the National Electrical Code and as indicated on the drawings. Size as required for the specific function or as required by the NEC, whichever is more restrictive. Junction boxes shall be minimum 4" square or larger, with galvanized cover. Larger sizes shall have manufacturer's standard compliant painted finish.

12. Outlet boxes.

All outlet boxes including switch, receptacle, and outlets, shall be galvanized metallic type manufactured for the purpose, and sized as required per NEC. All boxes shall be set in walls, columns, floors, or ceilings in finished areas so as to be flush with the finished surface and be accurately set and rigidly secured in position. When using spring steel or similar clips to mount a box to a stud, also provide matching far side box supports. Provide plaster rings, extension rings, and masonry rings as required for flush mounting.

13. Outlet locations.

Outlets are only approximately located on the plans, and great care must be used in the actual location by consulting the various large scale detailed drawings and equipment cuts, or by securing definite locations from the architect. The height of outlets shall be installed according to the device height detail provided on the plans, or as otherwise required by locally accepted accessibility rules, or to accommodate casework heights.

14. Wiring devices.

Comply with NECA 130-2010, Standard for Installing and Maintaining Wiring Devices.

Furnish and install outlets and switches as shown or required. Minor changes relative to the location of electrical equipment may be made by this contractor to comply with the structural and building requirements as determined in the course of construction. All outlets and switches must be of the same

manufacturer and not mixed on the project. Color of toggles and receptacles shall be brown in wood surfaces and white for painted surfaces. All switches shall be minimum 20-amp commercial grade equal to Hubbell CS120 series. All receptacles shall be minimum 20-amp commercial grade equal to the Hubbell CRxx family; provide GFCI protection wherever required by code and tamper resistant devices where indicated. Other devices shown but not specified above shall be of the same construction quality as defined above. Receptacles shall be oriented vertically with the ground prong up or horizontally with the neutral up to match a building standard or where a specific orientation is required by local code.

15. Cover plates.

All commercial switch and outlet plates shall be brushed stainless steel. Contractor shall verify the desired material with the architect before installation. Device plates in unfinished spaces shall be compliant stamped steel ("garvin") type manufactured for the purpose; trim covers in damp locations shall be weatherproof as indicated below. Group switches serving the same area under multi-gang trim plates. Plates shall be set plumb, parallel, and flush with the wall finish.

16. Weatherproof covers.

Raintite cover plates shall be cast metal "in-us" type with neoprene gasketing and not relying on the device for the integrity of its attachment to the box, equal to Red-Dot Code Keeper series. Damp location covers shall be durable cast metal with neoprene gasketing and flip-top cover. Devices shall be listed weather-resistant type.

17. Firestopping.

This contractor shall seal all penetrations through fire rated floor and wall assemblies in accordance with the NFPA codes and UL wall construction types. The sealing system shall be capable of passing a three-hour test, per ASTM E-814 (UL 1479). Penetration sealing system shall be acceptable to the AHJ (E.C. to verify) and installed per the manufacturers recommendations. Use silicon type where accumulation of water is an issue. PVC conduit may not be used as a sleeve through fire rated partitions for any reason.

18. Roof penetrations.

Provide gasketed roof portals (equal to Portals Plus, Pate, RPS, et al) listed for use with the roofing material as required. All roof penetrations shall be leaktight at the termination of the work.

19. Access doors.

Provide access doors in ceilings, walls, etc. as indicated or required for access to or to maintain work installed under this section. Provide fire rated type in fire-resistance rated elements, gasketed type in showers and locker rooms and similar areas. Milcor or equal.

20. Equipment identification.

This contractor shall furnish and install equipment identification nameplates on all panelboards, safety switches, starters, dimmers, drives, and the like, and wherever mandated by code. Nameplates shall be engraved phenolic plastic and shall be firmly attached to the equipment. Nameplates shall clearly identify each item, its voltage, and what it controls. Provide arc flash computations and placarding for main distribution panelboard.

21. Plenum spaces.

All equipment and wiring methods in ceiling cavities used as environmental air plenums shall be approved for the application and conform to the NEC.

22. Seismic Bracing.

Verify seismic rating of the structure with the structural plans. Provide approved engineered seismic bracing or anchors where required for lay-in fixtures, cable trays, conduits, enclosures, and the like as required by code.

26-3. ELECTRICAL SERVICE AND GROUNDING.

1. Connection to serving utilities, when applicable.

Contractor shall provide proper termination, metering provisions, grounding, etc., for electrical services for connection by the serving utility in strict compliance with the requirements of all codes having jurisdiction and the rules of the serving utility involved. All service terminations and connection points shall be verified in the field by this contractor, and he shall work in conjunction with the utility involved in the installation of all service equipment and cable. This contractor shall provide all conduit, cable, accessories, etc. specified by the utility. The contractor shall notify the utility company involved within two weeks after notice to proceed, of all required information necessary in order for the utility to supply the project without delay.

2. Grounding.

Furnish and install a complete bonded grounding electrode system complying with the latest applicable edition of the National Electrical Code. The electrical service, all transformers, raceways, frames, and the like shall be effectively grounded by this contractor in a thorough and efficient manner in conformance with the NEC. All raceways shall contain an equipment grounding conductor; branch circuit raceways may not be relied upon as an effective ground return path. Voltage drop shall not exceed 2%.

3. Unless superseded by locally accepted codes and standards, grounding and bonding shall be performed in accordance with NECA 331-2004 (or latest applicable iteration), Standard for Installing Bonding and Service Entrance Grounding.

26-4. DISTRIBUTION AND CONTROL EQUIPMENT.

1. Power distribution panels.

Circuit breaker Types: Panels installed as service entrance equipment shall be permanently marked to identify it as suitable for use as service entrance equipment with number and size breakers as scheduled. Panels shall have copper bus and be braced for available inrush (E.C. to verify with utility). Branch breakers shall have an engraved phenolic nameplate for circuit identification. Panels shall have a hinged, lockable door to cover the circuit breaker handles. A typewritten circuit directory shall be installed on the inside face of the door. Match existing manufacturer.

2. Panelboards.

Comply with NECA 407-2009, Recommended Practice for Installing and Maintaining Panelboards. Load Centers with plug-in circuit breakers shall be match existing. Panelboard or load center construction shall be of NEMA design suitable for the environment into which it is installed.

3. Existing panelboards.

New circuit breakers required to be installed in existing load centers shall be of the same manufacturer, type, and AIC rating as the existing circuit breakers without field adaptation; the new breaker shall be listed for the application. Provide new typewritten panel directories showing assignments of all circuits affected by the work. See plans for additional information.

4. Disconnect switches.

Contractor shall furnish and install fused or non-fused safety switches as noted or required. Fuse holders shall have Class R rejection feature. Construction shall be of a NEMA design suitable for the environment into which it is installed.

In wet kitchen applications, such as ware washing equipment, provide NEMA 4X compact non-metallic types equal to Bussmann EFJ/ENF series, Hubbell HBLDS3 series, or similar.

Manually test all safety switches for proper operation prior to energizing.

5. Fuses.

Fuses shall be of the size and type required. Fuses larger than 600-amp shall be Class L current limiting type. Fuses for motors shall be class RK5 time-delay type. All fuses shall have a minimum 100kaic rating. When applicable, comply with NECA 700-2010, Standard for Installing Overcurrent Protection to Achieve Selective Coordination.

6. Dry-type transformers (where applicable).

Dry-type transformers shall be 150-degree temp rise above 40-degree ambient rated. Insulating materials shall exceed NEMA ST20 standards and be rated for 220-degree c UL component recognized insulation system. Phase, voltage, and size shall be as noted on the drawings. Sound level shall not exceed 45 db per NEMA standards. Units larger than 24kva shall have four 2.5% full capacity primary taps. Units up to 225 kva shall be mounted on vibration isolation pads with a .25" static deflection. Conduit connections to transformers shall be made with flexible metallic conduit with at least 6" of slack in all directions. Transformer enclosures shall be ventilated and be fabricated of heavy gauge sheet steel construction. Maintain minimum NEC clearances and manufacturer required clearances.

7. Variable frequency drives are specified in Division 26 2923 when applicable.

8. For new buildings with emergency power sources and utility services in excess of 1200-amperes, engage the distribution equipment manufacturer's engineering services to provide a selective coordination fault-current study of the electrical distribution system from normal and alternate power sources using a computer software program to plot and diagram time-current-characteristic curves and report recommended settings and ratings of all overcurrent protective devices. The study shall include arcing faults, simultaneous faults, explicit negative sequence, and mutual coupling in zero sequence as deemed necessary by the engineer.

26-5. LIGHT FIXTURES, LAMPS, BALLASTS.

1. Light fixtures shown on the electrical drawings represent general arrangements only. Refer to architectural drawings for more exact locations or specific directions. Coordinate locations with all other trades before installation to avoid conflicts. Light fixture locations in mechanical rooms shall be coordinated with final installed piping and ductwork layouts.

2. Light fixtures.

Light fixtures as scheduled on drawings shall be furnished complete with lamps and ballasts or drivers. Provide all material and labor to securely hang fixtures, clean them, and make them completely ready for use. Provide all accessories necessary for a complete and operating installation. Provide proper trim to fit each ceiling condition actually encountered. When required to do so, provide additional approved supports connected to structure to conform to UBC 25-231 seismic requirements. Through-wiring of fixtures is not allowed except for fluorescent channels or as manufactured for the purpose. Each recessed troffer fixture must be connected by a whip (maximum 6' long) to a junction box.

3. LED Luminaire Requirements

- a. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- b. NRTL Compliance: Luminaires shall be listed and labeled by an NRTL.
- c. Recessed Fixtures: Comply with NEMA LE 4.
 1. CRI of minimum 85. CCT of 4000 K nominal.
 2. Minimum rated life of 60,000 hours at 78% lumen output.
 3. Lamps dimmable as scheduled.
 4. Internal driver.
 5. Nominal Operating Voltage: 120 V ac or 277 V ac as applicable.
 - f. Lens Thickness for lensed troffers: At least .095 minimum unless otherwise indicated.
 7. Housings: as indicated by the basis-of-design products.
- d. Strip Light
 1. Minimum lumens as scheduled. Minimum allowable efficacy of 97 lumens per watt or as scheduled.
 2. Integral junction box with conduit fittings.
 3. Ribbed acrylic lens
- e. Surface Mount, Linear.
 - Minimum lumens as scheduled. Minimum allowable efficacy of 82 lumens per watt or as scheduled.
 - Integral junction box with conduit fittings.
- f. Warranty Period: five years from date of completion.

LED power supplies and dimming modules shall be matched to the lighting product by the manufacturer. Power supplies shall have protection against open circuit, short circuit, overload, overheating, and transient surge conditions and meet the highest industry standards. Outputs shall be UL Class 2. Dimming shall be full range (nominal) where feasible, and dimming equipment shall be as recommended by the manufacturer. LED sources shall have the efficacy and color specified, be compliant with the latest applicable iteration of IESNA LM-70 AND LM-79, have a DOE lighting fact sheet available, and be listed for the use.

26-6. MISCELLANEOUS ELECTRICAL

1. Wiring of mechanical equipment.

Furnish and install all power wiring and all line voltage control or interlock wiring of all units, pumps, fans, water heaters, air handlers, kitchen equipment, power supplies, and other equipment, appliances, and systems as specified or as scheduled elsewhere in the documents or otherwise indicated or inferred by the body of drawings. Connect per manufacturer's wiring diagrams to be furnished with equipment. Furnish and install all loose disconnects and starters needed or required. After installation the contractor shall verify that each motor load has the correct phase rotation and permanently indicate the rotation on the equipment or it's controller or disconnect. This contractor shall verify the actual wire sizing amps for mechanical equipment from the equipment nameplate; electrical installation shall be based on actual required amperages, which may vary from the wire and equipment sizes shown on the drawings. Properly sized electrical wiring and equipment shall be furnished without extra cost to the contract. The contractor shall notify the architect of all changes to be made in the electrical installation due to equipment variances so that the impact on the feeders, panels, fuses, and breaker sizes can be checked prior to the installation. This contractor shall be responsible for coordinating with the mechanical, refrigeration, and plumbing contractors to verify the actual wire sizing amps and correct sizes of all overload heaters and the like for all equipment.

2. Temperature control.

Temperature control wiring is specified under Division 23. When indicated in those specifications, include the control wiring in the electrical work. Where responsibility for the work is not assigned to others, it shall be a part of the electrical contract.

3 Telecommunications systems. Telecommunications and audio/visual work (inclusive of voice and data applications) is part of this contract to the extent indicated on the plans. When referenced on the plan, Cat6 cable shall be 350MHz tested cable installed per the current iteration of TIA/EIA 568 series standards and installed and tested per the latest iteration of NECA/BICSI 568. Contractor shall provide all outlet boxes, stubs, sleeves, backboards, wiring, patch panels, jacks, trim plates, identification, testing, mapping, and the like as required to accommodate the work indicated on the plans and as needed to support systems specified elsewhere. See plan for additional requirements. Owner's specific requirements: Technology identification protocols

4. Time switches.

Provide time switches with number and type of contacts, sequence, and voltage necessary to accommodate the work. Time switches for exterior lighting control shall be electronic digital astronomic type with manual bypass switch, suitable NEMA enclosure, and battery backup. Provide photocells, contactors, relays, or other controls as required or as indicated. Master lighting controls shall be as specified on the plans; wallbox timers and other controls shall be as scheduled in the symbols legend.

5. Contactors.

Contactors for use with time switches for remote-controlled installations shall be NEMA types, electrically or mechanically held as applicable, and rated for the tungsten or ballast loads indicated. Contactors may be integrated into the respective controlling panelboards at contractor's option.

6. Miscellaneous equipment and connections when applicable.

Provide line voltage interlock wiring of elevator shunt trip breaker and elevator recall as required, and interlock wiring of motors as directed on the mechanical and plumbing drawings. Provide final power hook-ups to furniture panels; extend telecom wiring into furniture panels and terminate at jacks mounted into modular outlets furnished by others. Where applicable, provide empty whips as required by other contractors when installing an empty conduit system for wiring by others.

7. Fire alarm.

The electrical contractor shall include all costs associated with fire alarm work that may be required by the International Fire Code and compliant with NFPA 72 and 70 by reference, and specific local practices as directed by the AHJ. Provide all new devices and equipment for new systems. The contractor shall include all submittals to the AHJ as locally required, as well as all equipment, devices, raceways, outlet boxes, special backboxes, stub-ups, sleeves, wiring, power hook-ups, and any other anecdotal materials and labor necessary to support the work. Coordinate with the owner and AHJ. All NEW fire alarm raceways and outlet boxes shall be identified by a red finish. Job practices shall conform to NECA 305-2010, Standard for Fire Alarm Job Practices.

8. Submittals.

a. In addition to Division 1, as applicable, submit for review product data for fixtures, lamps, utility metering equipment, distribution equipment (panels, transformers, and the like), overcurrent devices, loose starters, contactors, and disconnects, branch devices and trim plates, any product substituted for specified, and any product accepted during a "value engineering" process. Provide quantities as stipulated in Division 1, but no fewer than six sets. Submit shop or assembly drawings prior to

distribution to field personnel. Electronic submittals are acceptable if approved by the owner and/or architect.

b. Submittals shall be made at the outset of the project and subsequent product releases scheduled in a timely manner. The contractor shall act promptly to determine lead times and accommodate product availability. The contractor shall prepare a list of released products and delivery dates coordinated with the project construction schedule for distribution to the architect, owner, and project manager. Advise the architect immediately of specified or needed products being unavailable or discontinued; any project delays or additional costs resulting from the contractor's neglect of this responsibility shall be at the cost of the contractor.

c. Provide close-out documents as stipulated by Division 1, but not less than all owner's manuals, certifications, and warranties. **PROVIDE COMPLETE DIMENSIONED AS-BUILT DRAWINGS.** Include installation instructions shipped with equipment.

9. Attic stock.

Provide to the owner's stock 10% (or at least one) of each L.E.D. driver or power supply used, and 10% (or at least one) spare lens for each lensed fixture type used. Provide at least three of each fuse type used.

END OF SECTION 260100