QUATTROCCHI KWOK
ARCHITECTS

LIBERTY HIGH SCHOOL
NEW CLASSROOMS

Bid Clarification 02

8/16/2022

DSA File Number: 07-H4
DSA Application Number: 01-119994
PTN: 61721-83

Owner:
Liberty Union High School District
20 Oak Street
Brentwood, CA 94513

Architect:
Quattrocchi Kwok Architects
636 Fifth Street
Santa Rosa, California 95404
P:707.576.0829

To: Prospective Bidders

The following changes, modifications and additions to Project Manual and Drawings described below are made a part thereof and are subject to all of the requirements thereof as if originally specified.

The Bidder must acknowledge receipt of the Bid Clarification in the space provided on the Bid Form; failure to do so may subject the Bidder to disqualification.
Note that there are no revisions to the scope of work and this is not considered a substantive change.

Table of Contents – Bid Clarification 02

This Bid Clarification consists of 8 pages and the attachments as listed below dated August 16, 2022.

Deleted Text is shown in ~~strikeout type.~~

Added Text is shown in ***bold italicized type.***

ATTACHMENTS:

Project Manual
Section 10 2800 Toilet Accessories
Section 22 0000 Plumbing

Drawings: (30X42)
None.

BC Drawings (8.5 inch by 11 inch & 11 inch by 17 inch)**:**
None.

Project Record
Prequalified Contractors 8/15/2022
Asbestos Survey Building B
Asbestos Survey Building C

End of Table of Contents

A. CHANGES TO PREVIOUS BID CLARIFICATIONS

Item No. 2. 01
Prequalified Contractors denoted Bid Clarification 02 supersedes and replaces previously published document.

Item No. 2. 02
Asbestos Survey Build B denoted Bid Clarification 02 supersedes and replaces previously published document.

Item No. 2. 03
Asbestos Survey Build C denoted Bid Clarification 02 supersedes and replaces previously published document.

B. CHANGES TO THE BIDDING AND CONTRACT REQUIREMENTS

C. CHANGES/ ADDITIONS TO THE SPECIFICATIONS

Item No. 2. 04
Section 10 2800 Toilet Accessories denoted Bid Clarification 02 supersedes and replaces previously published document.

Item No. 2. 05
Section 22 0000 Plumbing denoted Bid Clarification 02 supersedes and replaces previously published document.

D. CHANGES/ ADDITIONS TO THE DRAWINGS

None.

E. BIDDERS QUESTIONS

Item No. 2. 06
Q: Bid Clarification 01 Pre-bid Agenda states that RFI are due 7 working days prior to bid opening (which would be Tuesday 8/16/22). This is what was stated at the pre-bid meeting as well.

Instructions to Bidders Item 9, Page 7 states that RFI are due 6 days prior to bid opening (which would be Friday 8/19/22).

Please let us know which is correct.

A Questions will be allowed until 8/19/2022 at 5:00. All other questions will be returned noted to bid the documents as is.

Item No. 2. 07
Q: Will the District accept the use of an XS insurance policy to support the higher underlying limits for Auto liability & General liability?

A Yes

Item No. 2. 08
Q: Will the General Contractor need to carry a Professional Liability insurance policy?

A Yes, per paragraph A. below

A. Professional Liability Insurance: If Contractor's/Subcontractor's work requires design and/or design-assist services, or Contractor/Subcontractor performs professional services of any kind, Contractor/Subcontractor shall purchase and maintain, at its sole cost and expense, Professional Liability (Errors and Omissions) insurance for all professional services provided. This Professional Liability insurance shall include full prior acts coverage sufficient to cover the services under this agreement, with the following minimum limits of liability:

$1,000,000 per Claim/Annual Aggregate

Deductible or self-insured retention amount must not be greater than $100,000 per claim, including coverage of contractual liability.

Professional Liability Insurance is to be maintained during the term of the contract and for so long as the insurance is reasonably available as provided herein, for a period of ten (10) years after completion of the services.

Item No. 2. 09
Q: Section 10 22 39: Paragraph 2.02.J. notes "Pocket Enclosures" which typically refer to pocket doors, but none appear to be shown in the drawings. Please confirm pocket enclosures are not required.

A Pocket enclosures flanking the operable folding partition in Classrooms A101 and A102 are required.

Item No. 2. 10
Q: Section 06 4100 – Architectural Wood Casework paragraph 2.08-A Countertop references section 12 3600 for Countertops. This section is not in the spec book. Please provide a spec section for the countertops on the Architectural Wood Casework

A Will be included in Addendum 01

Item No. 2. 11
Q: In Section 08 8000 Glazing – Per the spec paragraph 1.05L.2 – it is called out for one (1) extra IG Unit per size and type. On previous project, this extra piece of ended up not being needed and a credit was provided. Can it be confirmed if the extra piece of glass will be required?

A The requirement for an extra piece of glass has been waived.

Item No. 2. 12
Q: Section 09 6500 paragraph 3.02/B mentions "Water Vapor Emission Control Coating as specified in Section 07 2633. That section is not in the specification book. Is there a vapor emission control coating on this project? If so, please provide a specification section.

A Will be included in Addendum 01

Item No. 2. 13
Q: Section 10 22 39: Detail S-A5.2 shows approx. 1'-2" threaded rods support the operable partition track. No seismic bracing is indicated. Engineering is not a noted requirement for this scope. Please confirm that Detail S-A5.2 has been reviewed by the SEOR and that seismic bracing is not required for the operable partition track.

A The operable partition track was meant to be locked in side-to-side by the soffit framing, with bracing from the soffit up into the structure. In this case, there shouldn't be a need for separate seismic bracing just for the track.

Item No. 2. 14
Q: Section 10 22 39: Paragraph 2.02.H. calls for a Hytex Rib acoustical, non-woven needle punch fabric finish. However elevations on sheet A-A7.1 note a TAC2 finish on the operable partitions, which is a Carnegie Xorel fabric finish. Please confirm which is required.

A Carnegie Xorel fabric finish as indicated by TAC2 on Interior Elevations is the intended wall covering to be used on the operable folding partition.

Item No. 2. 15
Q: Section 10 22 39: Paragraph 2.02.J. notes "Pocket Enclosures" which typically refer to pocket doors, but none appear to be shown in the drawings. Please confirm pocket enclosures are not required.

A Pocket enclosures flanking the operable folding partition in Classrooms A101 and A102 are required.

Item No. 2. 16
Q: Spec section 10 2800 does not list model, or unit types for the following restroom accessories call out on the plans; toilet paper dispensers, seat cover dispensers, soap dispensers, mop racks sanitary napkin vendors. Some of these may be OFCI. Can we please have model numbers and confirm the responsibility of the accessories.

A See Changes to Specifications

Item No. 2. 17
Q: Spec section 10213 calls out solid color reinforced partitions. However on A8.3 under the finishes the partitions are called out as Scranton. Can we please confirm the manufacturer

as solid color reinforced partitions are not provided by Scranton.

A Toilet partitions are to be solid color reinforced partitions manufactured by Bobrick as per Spec 10 2113. Finish Schedule on A-8.3 to be updated to match Specification.

Item No. 2. 18

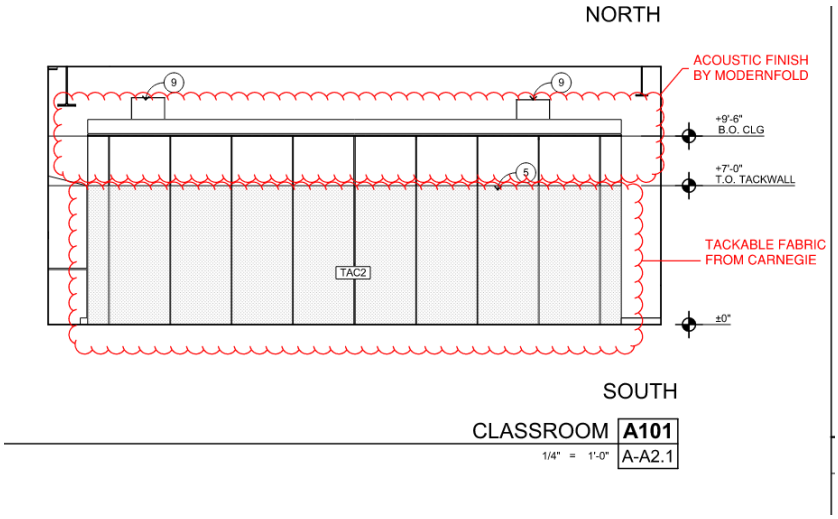
Q: Specifications 10 2239 2.02 A.1 calls out tackboard finish. Mofernfold';s standard cork tack board option places a cork panel undereath the finish, in this case carpet per 10 2239 2.02 H. The elevation South for Classroom A101 shows the finish to be TAC2 and per the schedule that finish to be Carnegie Xorel-Meteor 6427-711 white.

A Carnegie Xorel fabric is surfaced applied onto the typical Modernfold finish. There is no additional tack "board" assembly installed on the panels.

Item No. 2. 19

Q: Please confirm the height of the tack boards. Elevation South for Classroom A101 shows the tackboard to begin at the bottom of the penel and stop at 7'-0" high. Modernfold's standard cork tackboards are either 4' h(igh) markerboards with rim or full height as they run under the finish.

A The height of the tack boards are as indicated on the drawings to be 7'-0". To clarify, these are not the typical Modernfold Tack "boards" but rather the Carnegie Xorel fabric that is applied onto the typical Modernfold finish.



Item No. 2. 20

Q: Please confirm if the surface finish is a single color for the full height of the panel as appears to be the case in the elevation South for Classroom A101.

A Yes, As indicated by elevation

Item No. 2. 21
Q: Section 12 3553.19, Item 2.02B indicates that the science counter tops are Trespa (solid phenolic.) Item 2.03D indicates that the tops are to be epoxy resin with a marine edge. Finish Schedule A8.3 calls for black epoxy resin tops as manufactured by Trespa. The surface finish called out on the schedule (Crystal) is a Trespa finish. The interior elevations show epoxy resin. Please clarify intent.

A Countertops in the science room should be epoxy resin w/ marine edge.

Item No. 2. 22
Q: In review of the Existing Conditions sheet, C1.0, missing are elevations of the ground and building slabs. Can that information or a Topographic Survey be provided?

A See changes to drawings

Item No. 2. 23
Q: On Page C-1.0 'Existing Conditions/Demo' there are eight (8) AC units that are to be protected. You have extensive demo, grading and underground work to be done between the buildings in these area's. Please advise.

A The revised sheet C-1.0 shows these units to be removed.

Item No. 2. 24

Q: A-B7.3 – Indicates sanitary napkin vendors at the non ADA stalls. Can we please have a model number for this unit.

A See Changes to Specifications

Item No. 2. 25

Q: A-A7.10/A-B7.3 – Toilet accessory Schedule is calling out unit E as a recessed toilet seat cover. However, in 10 2800 2.04 E calls these out as surface mount. Can you confirm the mounting style?

A See Changes to Specifications

Item No. 2. 26
Q: Storefront – On Sheet A8.2 (Window Schedule), the note at the top of the page states that all Aluminum framing is to be 2"x4 ½" UON. The details show a 2"x6:" SF System, as well as the specifications call out for a 2"x 6" SF System. Please clarify which is preferred.

A The storefont should be 2"x6" to match the new Administration building next door

Item No. 2. 27
Q: Sheet A8.3 - Storefront Finish. The spec calls for a Clear I Anodized Finish, but also note(s) Color to be selected from manufacturers' full range of colors. The finish schedule (Sheet A8.3), under

Aluminum Openings, call out for a Bronze Anodized finish. There is a price difference between Clear & Anodized, as well as Paint. Please confirm what is desired.

A: Clear Anodized per the finish schedule

Item No. 2. 28

Q: Detail 9/A10.3 a, b, & c title "Manufactured Tackable Panels" is referenced on pages A-A7.1-9. Interior elevations for TAC 1 & 2. He details appear to be wall covering installed over drywall. Is that correct? If not please provide a specification for Manufactured Tackable Panels

A Yes. The Xorel product is meant to be installed direct to the drywall. See manufacturers wall application instructions for more info.

Item No. 2. 29

Q: Are there any new bike lockers in the project?

A Yes, Please refer to sheet L1.0 and L1.2.

END OF BID CLARIFICATION

SECTION 10 2800
TOILET ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Commercial toilet accessories.

B. Diaper changing stations.

C. Installation of Owner furnished accessories.

1.02 RELATED REQUIREMENTS

A. Pertinent sections specifying concealed supports and blocking for accessories, including in wall framing and plates, above ceiling framing, and locations required.

B. Section 10 2113 - Reinforced Composite Toilet Compartments

C. Divisions 22 and 26: Pertinent sections specifying plumbing and electrical work.

1.03 REFERENCE STANDARDS

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

B. C.C.R., Title 24, Part 2, California Building Code for accessibility standards.

C. Manufacturer's recommendations and specifications.

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

E. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

F. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.

G. ASTM C1036 - Standard Specification for Flat Glass.

H. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror.

I. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use.

1.04 SUBMITTALS

A. See Section 01 3300 - Submittals, for submittal procedures.

B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

1.05 COORDINATION

A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Commercial Toilet, Shower, and Bath Accessories:
   1. Bobrick Washroom Equipment, Inc.
   2. American Specialties, Inc: www.americanspecialties.com.
   3. Bradley Corporation: www.bradleycorp.com/#sle.
   4. Tubular Specialties Manufacturing, "TSM".
   5. Substitutions: Section 01 6000 - Product Requirements.

B. Diaper Changing Stations:
   1. Max-Ability, Inc; Pressalit: www.max-ability.com.
   2. Substitutions: 01 6000 - Product Requirements.

C. Provide products of each category type by single manufacturer.

2.02 MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
   1. Grind welded joints smooth.
   2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.

B. Keys: Provide two keys for each accessory to Owner; master key lockable accessories.

C. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.

D. Adhesive: Two component epoxy type, waterproof.

E. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

2.03 FINISHES

A. Stainless Steel: Satin finish, unless otherwise noted.

B. Back paint components where contact is made with building finishes to prevent electrolysis.

2.04 Commercial Toilet Accessories

A. Toilet Paper Dispenser: Double roll, recessed, stainless steel unit with pivot hinge, tumbler lock.
   1. Products:
      a. BOBRICK: B-4388 ConturaSeries Recessed Multi-Roll Toilet Tissue Dispenser.
      b. Substitutions: Section 01 6000 - Product Requirements.

B. Paper Towel Dispenser: Folded paper type, stainless steel, fully-recessed, with viewing slots on sides as refill indicator and tumbler lock.
   1. Capacity: 300 C-fold minimum.
   2. Products:
      a. Bobrick, B-35903: TrimLineSeries Recessed Paper Towel Dispenser.
      b. Substitutions: Section 01 6000 - Product Requirements.

C. Soap Dispenser: Liquid soap dispenser, wall-mounted, surface, with stainless steel cover and horizontal stainless steel tank and working parts; push type soap valve, check valve, and window gauge refill indicator, tumbler lock.
   1. Minimum Capacity: 40 ounces.

2. Products:
   a. Bobrick B-4112 ConturaSeries, Surface-Mounted Soap Dispenser.
   b. Substitutions: Section 01 6000 - Product Requirements.

D. Mirrors: Stainless steel framed, 1/4 inch thick annealed float glass; ASTM C1036.
1. Size: as indicated.
2. Frame: 0.05 inchangle shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.
3. Product: B-2908 manufactured by Bobrick.

E. Seat Cover Dispenser: Stainless steel, recessed, reloading by concealed opening at base, tumbler lock.
1. Minimum capacity: 250 seat covers.
2. Products:
   a. Bobrick B-3013 TrimLineSeries, Recessed Seat Cover Dispenser.
   b. Substitutions: Section 01 6000 - Product Requirements.

F. Grab Bars: Stainless steel, 1-1/4 min. to 2 max. inches outside diameter, minimum 0.05 inch wall thickness, concealed flange mounting; 1-1/2 inches clearance between wall and inside of grab bar.
1. Conform to CBC accessiblity requirements and referenced standards, support vertical loading of 400 pounds and horizontal loading of 250 pounds per CBC 11B-609.8, applied at any portion of the bar.
2. Length and configuration: As indicated on drawings.
3. Product: B5806 manufactured by Bobrick.

G. Combination Sanitary Napkin/Tampon Dispenser: Stainless steel, recessed, push button, mechanically operated, ADA compliant operation with one hand, not requiring tight grasping or pinching or twisting of the wrist..
1. Door: Seamless 0.05 inch door with returned edges and tumbler lock.
2. Cabinet: Fully welded, 0.03 inch thick sheet.
3. Operation: No charge; no coin slots.
4. Identify dispensers slots without using brand names.
5. Minimum capacity: 20 napkins and 30 tampons.
6. Products:
   a. Bobrick B-4706C ConturaSeries, Recessed Napkin/Tampon Vendor, Free.
   b. Substitutions: Section 01 6000 - Product Requirements.

H. Sanitary Napkin Disposal Unit: Stainless steel, semi-recessed, self-closing door, locking bottom panel with full-length stainless steel piano-type hinge, removable receptacle.
1. Product: B-353, manufactured by Bobrick.
2. Product: 4722-10-15 manufactured by Bradley.

I. Coat Hooks: Doors of single occupancy toilet rooms. Stainless steel, bright polished finish, Bobrick B-682, 6-1/4 inch high, projection 3 inches.
1. Mount coat hooks at 48" above finish floor in single occupancy toilet rooms and accessible stalls.

2.05 Diaper Changing Stations

A. Diaper Changing Station: Wall-mounted folding diaper changing station for use in commercial toilet facilities, meeting or exceeding ASTM F2285.
1. Mounting: Surface.
2. Color: Gray.
3. Products:

a. Max-Ability Pressalit Care 3000 Fixed Height Adult Changing Table Specifications.
b. Substitutions: 01 6000 - Product Requirements.

2.06 UTILITY ROOM ACCESSORIES

A. Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, hat-shaped channel.
1. Holders: Three spring-loaded rubber cam holders.
2. Length: 36 inches.
3. Products:
a. Bobrick B-223, Mop and Broom Holder.
b. Substitutions: Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation. Conform to referenced standards and applicable codes.

C. Verify that field measurements are as indicated on drawings.

3.02 PREPARATION

A. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights and Locations: As required by accessibility regulations and as indicated on drawings

END OF SECTION

SECTION 22 0000

PLUMBING

PART 1 GENERAL

1.01 SUMMARY

A. Section includes furnishing, fabrication, and installation of complete plumbing systems as indicated on the Drawings. Plumbing work includes, but is not necessarily limited to, the following items:
   1. A complete system of soil, drain, waste, vent, and sanitary sewer piping and structures, including provisions for mechanical equipment drainage; and connection of same to site sanitary sewers, located approximately as indicated on the Drawings.
   2. Cold water distribution system, complete, from points of contact with site domestic water systems (located approximately as indicated on the Drawings) to all plumbing fixtures, mechanical equipment, building specialties, and Owner supplied equipment scheduled for service on the Drawings.
   3. Hot water distribution system, complete, from serving water heaters and/or points of contact with site domestic hot water, to all plumbing fixtures, mechanical equipment, building specialties, and Owner supplied equipment scheduled for service on the Drawings.
   4. All plumbing fixtures and trim as scheduled on the Drawings, inclusive of setting of fixtures and connections to drainage and water supply systems.
   5. Flashing of all plumbing pipe penetrations through exterior walls, roofs, and foundations. Sheet metal and lead flashings for pipe penetrations through roofs shall be furnished by the Plumbing Contractor and installed by the appropriate Roofing Contractor.
   6. Excavation and backfill as required for the work of this Section in conformity with Division 31 of the specifications.
   7. Rough in and connection of all fixtures and equipment furnished by the Owner and/or Tenant.
   8. Final connection of water and natural gas to equipment furnished under other Sections.
   9. Pipe wrapping and insulation.
   10. Condensate drainage piping and connections from points of attachment to equipment to indirect waste locations, as noted on the Drawings.
   11. Protection of all piping specified herein and/or shown on the Drawings, from freezing. Buried piping shall be a minimum of 12" below the local frost line. Piping above grade in unconditioned areas shall be insulated.
   12. Testing and adjusting of all piping systems and equipment herein specified.
   13. Sterilization of domestic water systems.

1.02 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. Sealants, firestopping, sheet metal flashing and trim: Division 07.

B. Sheet Metal Storm Water Leaders, Downspouts, and Gutters: Division 07.

C. Basic electrical requirements, line voltage wiring: Division 26 - Electrical.

D. Finish painting: Division 09.

E. Excavation and Backfill: Division 31

F. Concrete and Grout: Division 03, Cast in Place Concrete Section

G. The Contractor shall provide all supervision, labor, materials, transportation, equipment, hauling and services necessary for a complete and operational system, unless otherwise noted. Anything accepted as standard trade practice reasonably incidental to the completion of the plumbing systems, such as offsets, fittings, etc., even though not specifically shown on Drawings or indicated in Specifications, shall be furnished without additional cost to the Owner. The Contractor shall understand that the work herein described shall be complete in every detail, notwithstanding every item necessarily involved is not particularly mentioned, and the Contractor shall be held to provide all labor and material necessary for the entire completion of the work.

1.03 QUALITY ASSURANCE

A. Regulatory compliance: All work performed under this Section shall comply with the latest currently adopted editions of all codes and regulations and all requirements of all Authorities having Jurisdiction.

B. All work shall be done in conformity with all applicable local and state safety codes, ordinances and regulations. Additionally, all work shall conform to the latest editions of the following codes and standards:
1. California Mechanical Code
2. California Plumbing Code
3. California Building Code
4. California Fire Code
5. California Green Building Code
6. California Electric Code
7. California Code of Regulations, including Titles 8, 17, 19, 20, 21, 24, and 27
8. NSF/ANSI 61 Standard, *Drinking Water System Components - Health Effects* for fixture materials that will be in contact with potable water.
9. AB 1953, Amendments to Section 116875 of the Health and Safety Code relating to lead plumbing.

C. Comply with all ADA and California Title 24 requirements for disabled access.

D. Comply with the Safety Orders issued by Cal-OSHA and any other safety regulations of the State of California and any districts having jurisdictional authority

E. Seismic construction and restraints shall be in accordance with the requirements of the California Building Code and Title 17 and Title 24 of the California Code of Regulations. All equipment mounts, isolators, and hanging systems must meet DSA approval requirements.

F. Minimum requirements: The requirements of these are the minimum that will be allowed unless such requirements are exceeded by applicable codes or regulations, in which the regulatory codes or regulation requirements shall govern.

G. When the Contract Documents call for materials or construction of a higher standard than is required by the above, the Contract Document requirements shall take precedence over the requirements of the said laws, rules, and/or regulations, accepting that nothing in the Contract Documents shall be interpreted as permitting work in violation of said laws, rules, and/or regulations. The Contractor shall furnish any additional materials and/or labor as may be required for compliance with these laws, rules, and/or regulations though such materials and/or labor are not specifically set forth in the Contract Documents, with no additional charges to Owner.

1.04 SUBMITTALS

A. All submittals shall be submitted per the General Conditions and Division 01 Sections.
   1. Product Data: for each type of product.
      a. Submit cut sheets for each plumbing fixture. Include selected fixture and trim, fittings, accessories, appliances, appurtenances, equipment, and supports and indicate materials and finishes, dimensions, construction details, and flow control rates for each fixture indicated.
      b. Submit manufacturer's product data for all plumbing piping, fittings, materials, and equipment.
   2. Shop Drawings:
      a. Prepare complete consolidated and coordinated layout drawings for all new systems, and for existing systems that are in the same areas. Shop drawings shall be prepared using AutoCAD 2014 or newer and shall be drawn at a minimum ¼" = 1' - 0" scale. Sections, details, and diagrams shall be to required scales for specified areas. Include diagrams for all piping, and power, signal and control wiring.
      b. Complete and detailed shop drawings shall be maintained throughout the coordination and construction phase, indicating all equipment and trades' work clearly. All equipment including piping, etc. shall clearly identify both top and bottom elevations as well as distances from equipment to established building lines. Coordinate with other trades and field conditions and show dimensions and details including building construction and access for servicing.
      c. Use of contract documents for shop drawings is not acceptable.
      d. Submit shop drawings to Architect for approval, prior to fabrication or installation of any work. Do not install equipment or piping until layout drawings have been approved. Any work installed without prior shop drawing approval shall be removed at the Contractor's expense.
   3. Welding
      a. Before any welding is performed, the contractor shall submit to the Architect, copies of any welding procedure specifications and their supporting procedure qualification records for review and acceptance. Copies of welder qualification records shall be made available for review to the owner or his representative at the construction site.
      b. Welding certificates
   4. As-Built Drawings
      a. A complete set of Contract Drawings shall be maintained at the work site, and all changes in the work shall be recorded on this set on a daily basis. In addition to changes made during course of work, show the following:
         1) Exact location, type and function of concealed valves and controllers.
         2) Exact size, elevations and location of underground and under floor piping.
      b. Submit to Architect for final approval.
   5. Operation & Maintenance Data
      a. Contractor shall provide all operating and maintenance instructions provided by the manufacturer, describing proper operation and maintenance of any equipment and devices installed. Operating and maintenance instructions shall cover maintenance, adjustment, and operation of each piece of apparatus, including preventative maintenance schedule and procedures.
      b. Contractor shall also provide a parts list of all equipment and component parts for all equipment under this Section. The equipment list shall include manufacturer's name, model number, and local representative, service facilities and normal channel of supply for each item.

c. Also include the following:
   1) Manufacturer's certified shop drawings, and lubrication charts and data. Mark each sheet with equipment identification number and actual installed condition or system and location of installation. Specifically identify which options are provided.
   2) Recommend preventative maintenance schedule and procedures.
   3) Provide copy of valve schedules for each piping system.
   4) Provide copy of equipment label schedule.

B. Submit data to the Architect for approval. Final acceptance of the work will not be made until a satisfactory submission of this material is received and approved by the Architect.

1.05 LICENSES, PERMITS, FEES

A. The Contractors for this Division of work shall provide, procure and pay for all licenses, permits, fees, etc. as required to carry on and complete their work.

1.06 ACCURACY OF DATA

A. The data given herein and on the Drawings are as exact as could be reasonably secured, but absolute accuracy is not guaranteed. Exact locations, distances, elevations, etc. will be governed by shop drawings, the building itself, and actual field conditions.

1.07 UTILITY CONNECTIONS

A. Arrange for all utility connections, determine their exact requirements, and pay all costs incurred.

B. Send proper notices, make necessary arrangements, and perform other services required for care and maintenance of all utilities and assume all responsibility concerning same. Observe all rules and regulations of the respective utilities in executing the work.

1.08 DAMAGE BY LEAKS

A. Contractor shall be responsible for any damage to work of other Contractors that is caused by leaks in any temporary or permanent piping systems due to pipe rupture, disconnected pipes or fittings, or by overflow of equipment.

1.09 COORDINATION

A. All work shall be coordinated with water, gas, sanitary sewer, and other services on the site. The locations of points of connection to the site services shall be confirmed prior to commencement of any and all work required under this Section of the Specifications.

B. Coordinate roughing-in and final plumbing fixture locations and verify that fixtures can be installed to comply with original design and referenced standards.

1.10 COOPERATION WITH OTHER TRADES

A. Cooperate fully with other trades doing work on the project as may be necessary for the proper completion of the project. Refer to the Structural, Plumbing, and Electrical Drawings for details of the building structure and equipment installation that will tend to overlap, conflict with, or require coordination with the work of this Section, and schedule this work accordingly.

B. Priority of right of way in space shall be as follows, in decreasing order of authority:
   1. Electrical lights, electrical panels and drain piping.
   2. Ductwork.
   3. Fire protection piping, domestic hot water, domestic cold water and condenser water piping.

C. Any work done without regard for other trades shall be moved, replaced, or redone as required, without extra charges to Owner.

1.11 LICENSING REQUIREMENTS

A. All plumbing systems shall be installed by a C-36 Plumbing Contractor. Plumbing systems include: waste removal and connection of on-site waste disposal systems; piping, storage tanks, and venting for supply of gases and liquids for any purpose; all gas appliances, flues, and gas connections; water and gas piping from the owner's side of utility meter to the structure or fixed works; installation of any type of equipment to heat water or fluids to a suitable temperature; and maintenance and replacement of the items described above, including health and safety devices.

PART 2 PRODUCTS

2.01 PIPE, FITTINGS

A. General
   1. Tracer wire shall be installed with all non-metallic piping below grade. Tracer wire shall be solid core copper, 14-gauge minimum, lain continuously along pipes. Wire shall be "ty-wrapped" to pipe at eight feet (8' o.c.) on center. Tracer wire shall terminate in concrete access boxes at the beginning and terminal ends of the buried pipe.
   2. All accessible pipe 2" and smaller shall be threaded. Fittings for threaded pipe shall be 150-lb. malleable iron, screwed and banded.
   3. Vent piping shall have vandal resistant mushroom vent caps.
   4. At penetrations through building walls, provide "Link Seal" around pipe.

B. Below Grade Soil, Waste, Drain, and Vent Piping
   1. Below grade piping shall be of standard weight, no-hub cast iron soil pipe and fittings and shall conform to the requirements of CISPI Standard 301 and ASTM A 888 (latest editions). All pipe and fittings shall be manufactured in the United States and shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute® and listed by NSF® International. Approved manufacturers: AB&I, Charlotte, Tyler Pipe.
   2. Hubless couplings shall be composed of stainless-steel shields, clamp assemblies and elastomeric sealing sleeve conforming to CISPI Standard 310, latest edition. Heavy/Medium duty no-hub couplings shall conform to the requirements of ASTM 1540. Hubless coupling gaskets shall conform to ASTM C564. Couplings 1-1/2" through 4" shall have 4 bands.
      a. Piping 2" and smaller: Heavy/Medium duty no-hub couplings. Anaco/Husky "HD 2000", Ideal-Tridon Heavy Duty HD, Charlotte Heavy Duty "MD" or Mission "Heavyweight".
      b. Piping 2 ½" and larger: Heavy/Super Duty type: Husky SD 4000, Ideal Super Heavy Duty HD, or Charlotte Heavy Duty HD.
      c. Couplings shall be installed in accordance with manufacturer's installation instructions and local code requirements and shall be tightened using a calibrated torque wrench pre-set at 80-inch pounds to accommodate the 305 stainless steel hex head screw.

3. If the native soil on this project is found to be of the highly corrosive nature, no steel or cast iron pipe shall be used below grade.
   a. PVC Schedule 40 solid wall pipe and DWV fitting system: Pipe and fittings shall be manufactured from PVC compound with a cell class of 12454 per ASTM D 1784 and conform with National Sanitation Foundation (NSF) standard 14. Pipe shall be iron pipe size (IPS) conforming to ASTM D 1785 and ASTM D 2665. Injection molded fittings shall conform to ASTM D 2665. Fabricated fittings shall conform to ASTM F 1866.
   b. Joints shall be made in a two-step process with primer conforming to ASTM F656 and solvent cement conforming to ASTM D2564.

C. Above Grade Soil, Waste, Drain, and Vent Piping
1. All wase, vent, sewer, and storm lines above grade shall be of standard weight, no-hub cast iron soil pipe and fittings and shall conform to the requirements of CISPI Standard 301 and ASTM A 888 (latest editions). All pipe and fittings shall be manufactured in the United States and shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute® and listed by NSF® International. Approved manufacturers: AB&I, Charlotte and Tyler Pipe.
2. Hubless couplings shall be composed of stainless-steel shields, clamp assemblies and elastomeric sealing sleeve conforming to CISPI Standard 310, latest edition. Heavy/Medium duty no-hub couplings shall conform to the requirements of ASTM 1540. Hubless coupling gaskets shall conform to ASTM C564. Couplings 1-1/2" through 4" shall have 4 bands.
   a. Piping 2" and smaller: Standard no-hub couplings. Anaco "No Hub", Tyler Pipe "Standard", or Mission "Standard".
   b. Piping 2½" and larger: Anaco/Husky "HD 2000", Ideal-Tridon Heavy Duty "HD", Charlotte Heavy Duty "MD" or Mission "Heavyweight".
   c. Couplings shall be installed in accordance with manufacturer's installation instructions and local code requirements. The clamps shall be tightened using a calibrated wrench torqued to 80- inch pounds.
3. At the option of this Contractor, all soil, waste, and vent piping above ground may be DWV copper, with wrought copper fittings, with "Stay-Safe 50" lead free solder or equal, and a suitable non-corrosive flux.

Commented [A1]: HOSPITALS SHALL USE HUSKY SC 4000 OR IDEAL SUPER HEAVY DUTY ONLY

D. Natural Gas Pipe Above Grade:
1. Above grade piping shall be Schedule 40, black steel. ASTM A53, electric resistance welded or seamless, Grade B
   a. All concealed pipe and all pipe 2½" and larger shall be welded. Fittings for welded pipe shall be seamless steel, weld neck.
   b. All accessible pipe 2" and smaller shall be threaded. Fittings for threaded pipe shall be 150-lb. malleable iron, screwed and banded.
2. Piping exposed to weather: Schedule 40 galvanized steel pipe and fittings. All exposed threads shall be primed with one coat of rust inhibiting paint.
3. Pipes below grade inside buildings shall be Type K, soft annealed copper tubing with no joints below slabs. Pipes shall be sleeved with 20-mil plastic sheathing.

E. Below Grade Natural Gas Pipe:
1. Below grade Performance Pipe, "DriscoPlex 6500" PE 2708 medium density polyethylene pipe (MDPE) and fittings for underground gas distribution systems or approved equal.
2. The pipe and fitting manufacturer shall be ISO Certified in accordance with the current edition of ISO 9001 and a documented quality management system that defines product specifications and manufacturing and quality assurance procedures that assure conformance with customer and applicable regulatory requirements.

3. A licensed and bonded Contractor shall perform all underground gas distribution piping construction work. The Contractor shall secure all necessary permits before commencing construction.
4. MDPE materials used for the manufacture of polyethylene pipe and fittings shall be PE 2708 (PE2406) medium density polyethylene meeting cell classification 234373E per ASTM D 3350; and shall be Listed in Plastic Pipe Institute TR-4 with standard grade HDB ratings of 1600 psi at 73°F and 1000 psi at 140°F. All MDPE pipe and fittings materials shall be yellow in color.
5. Include tracer wire (yellow insulated No. 18 AWG).
6. Polyethylene Pipe
    a. Pipe shall be manufactured and tested in accordance with ASTM D 2513 incorporated by reference in 49 CFR Part 192.
    b. Pipe should be marked with a 1-Dimension bar code and a 16-Digit alpha numeric code that identifies the manufacturer, production run number, date of manufacture, pipe type and material grade per ASTM F 2897.
7. Polyethylene Fittings.
    a. Polyethylene fittings shall be manufactured and tested in accordance with ASTM D 2513 incorporated by reference in 49 CFR Part 192.
    b. Fittings should be marked with a 2-Dimension Data Matrix code that identifies the manufacturer, production run number, date of manufacture, fitting type and material grade per ASTM F 2897
8. Compliance Tests.
    a. The manufacturer shall certify the inspection and testing of the materials and products. In case of conflict with manufacturer's certifications, the contractor, project engineer or operator may request retesting by the manufacturer or have retests performed by an outside testing service. All retesting shall be at the requestor's expense and shall be performed in accordance with the specifications.
9. Heat Fusion Joining:
    a. Butt, socket, and saddle fusion joints in polyethylene gas piping shall be made using procedures that have been qualified and approved by the Operator in accordance with Title 49, CFR, and Part 192.283.
    b. In accordance with CFR. 49, part 192, Section 192.285, the operator shall ensure that all persons making heat fusion joints have been qualified to make joints in accordance with the operator’s approved qualified fusion procedures. The operator shall maintain records of qualified personnel and shall certify that qualification training was received not more than 12 months before commencing construction. The contractor shall ensure that all persons making heat fusion joints are qualified in accordance with this section.
    c. The manufacturer shall offer qualified fusion procedures and training materials for the use of the operator.
    d. Butt Fusion of Unlike Wall Thickness. Butt fusion shall be performed between pipe ends or pipe ends and fitting outlets that have the same outside diameter and are not different in wall thickness by more than one standard DR, for example, SDR 9 (9.3, 9.33) to SDR 11 (11.5) or SDR 11 (11.5) to SDR 13.5. Transitions between unlike wall thickness greater than one SDR shall be made with a transition nipple (a short length of the heavier wall pipe with one end machined to the lighter wall) or by mechanical means or electrofusion. Standard DR’s for polyethylene pipe are 7.3, 9, 11, 13.5, 17 and 21.
10. Joining by Other Means:
    a. Polyethylene gas pipe and fittings may be joined together or to other materials by transition fittings, fully restrained mechanical couplings or electrofusion. These devices shall be designed for joining polyethylene to another material and shall be approved by the operator for use in his gas distribution system. When joining by other

means, the installation instructions of the joining device manufacturer shall be observed.

b. When mechanical OD compression couplings are used, polyethylene gas pipe shall be reinforced with a stiffener in the pipe bore. Stiffeners shall be properly sized for the diameter and wall thickness of polyethylene pipe being joined. For service pipe connections, the stiffener length shall match the pipe end penetration depth into the coupling.

F. Hot, Cold & Tempered Water Piping:
1. All domestic hot, cold and tempered water piping 3" and smaller shall be Type L hard temper copper pipe, ASTM B88 with wrought copper or cast brass solder joint fittings. Pipe shall be NSF 61 Certified and bear the NSF Certification mark. Mueller Streamline, Cerro Flow, or equal.
2. All joints shall be made up with lead free solder. A suitable non-corrosive flux shall be used at all joints.
   a. Solder: ASTM B32. Harris "Staysafe Bridgit", Lucas Milhaupt "Silvabrite 100", or equal.
   b. Flux: ASTM B813. Oatey Jel Flux, LA-CO Regular Soldering Flux, or equal.
3. Press fittings shall also be acceptable:
   a. Viega "Copper Press" or Nibco "Press System" fittings or approved equal. Copper and copper alloy press fittings shall conform to material requirements of ASME B16.18 or ASME B16.22 and performance criteria of IAPMO PS 117. Sealing elements for press fittings shall be EPDM. Sealing elements shall be factory installed or an alternative supplied by fitting manufacturer. Press end shall have SC (Smart Connect) feature design (leakage path).
4. Pipes below grade inside buildings shall be soft copper, Type L or K, with no joints below slabs. Pipes shall be sleeved with 20-mil plastic sheathing.

G. Condensate Drainage Pipe and indirect waste piping: Anvil, Mueller, Watts, or equal.
   a. 1 ¼ inch and larger shall be type DWV drawn temper seamless copper tube, ASTM B 306.
   b. 1 inch and smaller shall be type M, drawn temper, seamless copper tube, ASTM B 88.
      1) Drainage fittings shall be ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings. 1 ¼ inches & smaller, standard pressure fittings.
      2) Solder shall be ASTM B 32, lead free with ASTM B 813, water-flushable flux.
2. Acidic condensate drainage pipe shall be Schedule 40 CPVC & fittings.

2.02 UNIONS

A. Unions or flanges shall be furnished and installed at each threaded connection to all equipment or valves. The unions shall be located so that the piping can be easily disconnected for removal of the equipment, tank, or valve, and shall be of the type specified in the following:
1. Steel pipe: Class 150, malleable iron, ground joint: Anvil Figure 463, Stockham, or equal. ASME B16.39.
2. Copper pipe: cast copper alloy, soldered joint: Nibco series 633 or 733, Mueller Streamline, or equal. MSS SP-123
3. Dielectric: lead free, Watts, Jomar, or equal. ASSE 1079

2.03 DIELECTRIC FITTINGS

A. Precision Plumbing Products, "Clear Flow" series, threaded dielectric fittings, sizes 19100P thru 19195P.

B. Dielectric fittings shall have zinc electroplated steel casing, and NSF/FDA listed lining. Fittings shall meet the requirements of ASTM standard F1545 for continuous use at temperatures up to 225°F (- +5°F) and for pressures up to 300 psi, and shall achieve a dielectric waterway in all potable water applications

2.04 VALVES, SPECIALTIES

A. General Requirements:
1. All valves, except pressure reducing and control valves, shall be the same size as the pipe to which they are installed.
2. All valves of a particular type and size range shall be the product of one manufacturer.
3. Valve body materials shall be compatible with piping system materials.
4. Provide a union immediately downstream from each valve, unless the valve is flanged.
5. All valves shall be installed with the stem 45 degrees above horizontal, if possible. In no case shall the stem be installed below horizontal.
6. Where insulation is indicated, install extended stem valves arranged in proper manner to receive insulation.
7. Removable insulation jackets shall be provided on all valves.

B. Ball Valves
1. Threaded: Nibco T-685-80-LF, Watts LFB-6080, or KITZ 858; lead-free, bronze alloy, 2-piece body, full port, blowout proof stem; MSS SP-110; NSF/ANSI-61-8 and NSF/ANSI-372 compliant; 600 PSI non-shock cold working pressure.
2. Solder: Nibco S-685-80-LF, Watts LFB-6081, or KITZ 859; lead-free, bronze alloy, 2-piece body, full port, blowout proof stem; MSS SP-110; NSF/ANSI-61-8 and NSF/ANSI-372.

C. Gate Valves:
1. 3" and smaller shall be Nibco T134, Stockham B-120, KITZ 42T; bronze body, union bonnet, rising stem, solid wedge, 150 lb. with wheel handle.
2. Larger than 3" shall be Nibco F-617-0 or KITZ 72; iron body, bolted bonnet, outside screw and yoke, solid wedge, 125 lb. with wheel handle.

D. Lift Check Valves (vertical): Nibco T-480-Y-LFor KITZ 836; bronze body, inline lift type, Teflon seat, and discs, spring actuated, 125 lb.

E. Swing Check Valves (horizontal): Nibco T-413-Y-LF, Stockham B-345, or KITZ 822T; bronze body, Y-pattern swing-type, rated 200 PSI non-shock CWP. Body, bonnet, and disc hanger shall be of lead-free dezincification-resistant material and TFE seat disc. Valve ends shall be threaded type. Valves shall be 3rd party certified to Annex G of NSF/ANSI 61.

F. Circuit Setters: ITT Bell & Gossett, Circuit Setter Plus series, Model CB, calibrated balance valves with NPT and solder connections. Valves shall be designed to allow installing contractor to pre-set balance points for proportional system balance prior to system start-up. All valves ½" to 3" pipe size to be of bronze body/brass ball construction with glass and carbon filled TFE seat rings. Valves to have differential pressure read-out ports across valve seat area. Read-out ports shall be fitted with internal EPT inserts and check valves. Valve bodies to have 1/4" NPT tapped drain/purge port. Valves shall have memory stop feature to allow valve to be closed for service and then reopened to set point without disturbing balance position. All valves to have calibrated nameplates to assure specific valve settings. Valves shall be designed for positive shut-off.

G. Water Heater Relief Valves: ASME rated and stamped for combination temperature-and-pressure relief valves, ANSI Z21.22 compliant. Include relieving capacity at least as great as heat input and include pressure setting less than domestic water heater working pressure

rating. Select relief valve with sensing element that extends into tank. Watts, Cash Acme or approved equal. Set at 125 psi and 210°F.

H. Water Pressure Regulating Valves: Zurn Wilkins 500XLYSBR series or approved equal. Cast bronze valve body, stem and & plunger, stainless steel fasteners, strainer screen and seat. Meets NSF61. Install where pressure to building exceeds 70 psi.

I. Gas Shut-off Valves:
1. At Building Service: Homestead Fig. 601, pressure Class 125 lubricated plug valve, cast iron, lever handle, 200 lb., leak and hydro tested. Install Pacific Seismic earthquake sensitive valve, 300 series, seismic actuated automatic shut off valve at meter (or entrance to building if not new construction). Brace per manufacturer's instructions.
2. At Connection to Equipment:
   a. Jomar T-203 or approved equal gas ball valves, 2-piece design, threaded connection; 2 "Viton" o-rings; 1/8-inch side tap; leakproof stem; removable plug. Provide with AGA certified stainless steel flex connection 12" max. Metraflex or equal.

J. Gas Pressure Regulators: Pietro Fiorentini "Governor" series, standard model; ANSI Z21.80 compliant or equal Maxitrol. Regulators shall be sized for full gas capacity of equipment as scheduled on the Drawings. Inlet and outlet pressure shall be field verified. Regulators installed indoors shall have relief opening piped to outdoors. Size relief pipe in accordance with ANSI Z223.1 "National Fuel Gas Code".

K. Gas Service Line Risers: Elster Perfection anodeless service line risers and transition fittings or equal.

L. Gas Solenoid Valves: ASCO Red Hat series 8215 or series 8030 electric gas shut-off solenoid valve; normally closed; close on power failure, AC-powered with brass body. 120 volts

M. Thermostatic Mixing Valves: Watts LFMMV series or approved equal. The mixing valve shall be installed on the hot water supply to fixture. The valve shall be ASSE 1017, ASSE 1069, ASSE 1070 and IAPMO cUPC listed. It shall have a lead-free cast copper silicon alloy body. The valve shall include integral filter washers and check valves and an adjustment cap with locking feature.

N. Backflow Preventers (Where shown on the Drawings or required by local code):
1. Atmospheric type: Wilkins #35 series or equal
2. Pressure type: Wilkins #720A series or equal
3. Reduced pressure type: (main cold-water line)
   a. ¼" to 2" – Zurn Wilkins #975-XLMS series, or equal
   b. 2½" to 10" – Zurn Wilkins #375 series, or equal

2.05 HOSE BIBBS

A. Provide (1) hose bibb in all toilet rooms equipped with a floor drain. Hose bibb shall be 24" above finished floor, adjacent to or in between lavatories.
1. HB-1 (interior hose bibbs): Chicago No. 387-E27CP, wall mounted, chrome plated inside sill fitting; full flow, inline vacuum breaker with hose thread outlet; tee handle with square tapered broach; ¾" NPT female thread inlet. Slow compression rebuildable cartridge; slip wall flange. Provide a Chicago No. 1771ABCP loose key stop at each hose bibb.
2. HB-2 (exterior hose bibbs): Woodford model 24 anti syphon wall faucet with with vacuum breaker
3. HB-3 (roof hydrant): Woodford model RHY-1-MS; freeze-proof; with 3/4" brass hose nozzle, cast iron hydrant support with under deck flange and mounting bolts

2.06 ROOF DRAINS

A. RD (combination roof drain/overflow drain): Jay R Smith, Figure 1850Y-CID or equal Mifab R1270-A5" diameter roof and overflow drain combination. Dura-Coated cast iron body, double deck plate with securing holes, combination membrane flashing clamp/gravel guards, external water dam for overflow drain, and cast iron dome.

B. CR-1 (condensate receiver): Jay R. Smith Figure #3960 "Roof-ceptor" indirect waste drain; 7 ¼" top, "Duco" cast iron receptor with solid water dam and dome bottom strainer secured with stainless steel vandal proof screws.

2.07 FLOOR DRAINS

A. Floor Drains: Drains in membrane dampproofed floors shall have flashing flange and membrane clamp. Drains in sheet vinyl floors shall have a 14" square latex flange.
   1. FD-1: Watts FD-100-M cast iron floor drain with anchor flange, reversible clamping collar with primary & secondary weepholes, adjustable square 6" x 6" heel proof nickel bronze strainer, no hub outlet, and trap primer tapping; 3" pipe size or equal Jay R Smith.

2.08 TRAP PRIMERS

A. Trap primers shall be installed for all floor drains as follows:
   1. Trap primers shall be Precision Plumbing Products model PR-500 (automatic) or P2-500 (adjustable), Mifab M2-5000-NPB, or equal. Trap Primers shall be pressure drop activated and be of all brass construction including a brass body with ½" male NPS inlet and ½" female NPT discharge. Internal components shall consist of a #60 stainless steel debris screen, brass piston and brass discharge jet. Lubricated O-rings shall be EPDM E70. Adjustable model shall have stainless steel adjustment screw.
   2. Trap primers shall be installed on fresh cold-water lines of 1 ½" diameter or less and shall be located where they will be subjected to frequent pressure drops of at least 10 psi. Install with shut off valve and access doors in Janitor's closets, Mechanical Rooms and other areas not served by, or in close proximity to, flushometer valve operated water closets.
   3. Working pressure shall be 20 to 80 psig.

2.09 CLEANOUTS

A. Cleanouts in membrane dampproofed floors shall have flashing flange and membrane clamps. Plugs shall be bronze, with cast iron body ferrule for cast iron pipe.

B. Floor Cleanouts (FCO): Zurn Z1400, Mifab C1100-R-3, or Watts CO-200-5, adjustable floor cleanout, Dura-Coated cast iron body with gas and water-tight ABS tapered thread plug, and round scoriated cast-iron extra heavy duty secured top, adjustable to finished floor.

C. Grade (COTG): Watts CO-300-MF, Mifab C1300-MF-4, Zurn Z1474-N, Jay R Smith, heavy-duty cleanout housing with internal cleanout, Dura-Coated cast iron body with integral anchor flange, secured scoriated cover with lifting device. Cleanouts in un-paved areas shall be set in 18" x 18" x 14" concrete pads.

D. Accessible:
   1. Cast iron pipe: Watts CO-380, Zurn Z1440-BP, Mifab C1450, or equal Jay R Smith, cleanout ferrule with Dura-Coated cast-iron body with gas and water-tight, bronze tapered thread plug
   2. Steel pipe: Zurn Z1470-A, Mifab C1430, or equal Jay R Smith, countersunk bronze cleanout plug with raised head.
   3. Copper tubing: Nibco figure 816 or 817.

E. Wall Cleanouts (WCO):
   1. Copper tubing: Nibco figure 816 or 817 with Zurn ZANB1462-6 square, smooth nickel bronze secured wall access panel and frame with beveled edge and anchor lugs for over wall installation
   2. Cast iron pipe: with Zurn Z1441VP, dura-coated with gas and water-tight bronze, tapered thread plug, and round stainless steel access cover with vandal proof securing screw
   3. Steel pipe: with Zurn ZS1468, round stainless-steel wall access cover, complete with securing screw and bronze raised hex head plug.

2.10 SLEEVES, WALL PLATES

A. Service pipe through exterior walls, roofs; interior walls, ceilings: Sioux Chief or approved equal wall and ceiling plates; chrome plated at finished rooms.

B. Pipes through, under footings: 18-gauge iron sleeves, two diameters larger than pipe, cast in concrete, annular space filled with mastic or plastic bituminous cement.

C. Pipes through floors, interior concrete walls, and through fire rated walls and smoke stop partitions: 18-gauge iron sleeves, two diameters larger than pipe, annular space filled with 3M Brand Fire Barrier CP-25 caulk.

D. Pipes through fire rated walls shall be protected with fire retardant mastic as detailed on the drawings. Installation shall be in full accordance with the requirements of the UL system number.

2.11 SHOCK ABSORBERS

A. Jay R Smith "Hydrotrols" series 5000 (Figures 5005 to 5050), or equal Mifab or Watts, stainless steel water hammer arrestors. Install at all solenoid, remote operated, or quick closing valves and at each plumbing fixture. Install on both hot and cold-water branch lines in an upright position, as close as possible to the valve being served. Sizes and locations as indicated on Drawings.

B. Install with shut-off valve and access door at all flush valves or other automatic valves.

2.12 ACCESS DOORS

A. Where construction is not inherently accessible, provide adequately sized and conveniently located access doors in ceilings, walls, and furring for access to controls and for servicing valves, equipment, etc.

B. Access doors shall be flush, prime coated steel except for tiled surfaces, and screwdriver operated latch/locks, except for fire-rated. Minimum size shall be 12" x 12". Provide larger sizes where required.
   1. Fire Rated walls and ceilings: Milcor style UFR, Karp style KRP, Mifab MPFR, or approved equal, U.L. Class B, 1½ hour rated, 20-gauge steel door; 16-gauge steel frame; insulated, self-closing, continuous piano hinge; keyed paddle latch, interior latch release.
   2. Drywall ceilings or walls: Milcor style DW, Karp style KDW, Mifab MDW, or approved equal, drywall bead; 16-gauge steel frame & door or 16-gauge steel frame & 14-gauge steel door; concealed spring hinge
   3. Masonry walls: Milcor style M, Karp style DSC-214M, Mifab UA, or approved equal, 16-gauge steel frame & door or 16-gauge steel frame & 14-gauge steel door; spring loaded hinge

4. Tiled walls and ceilings: Milcor style MS, Karp style DSC-214M(S), or approved equal, 16-gauge stainless steel frame & door or 16-gauge stainless steel frame & 14-gauge stainless steel door; satin finish; spring loaded hinge
5. Plastered walls and ceilings: Milcor style K, Karp style DSC-214PL, Mifab CAD-FL-Pl, or approved equal, 16-gauge steel frame; 14-gauge steel door; casing bead; concealed spring hinge or continuous piano hinge

C. Doors shall be delivered to the General Contractor for installation.

2.13 HANGERS, SUPPORTS

A. All piping shall be supported with Superstrut, B-Line, Anvil, Mifab, or approved equal pipe hangers and supports. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with shield for insulated piping.

B. Hangers and supports shall be designed and manufactured in conformance with ANSI/MSS SP-58. Selection and application shall be in accordance with ANSI/MSS SP-69.

C. All hangers shall be electro-chromate or corrosion resistant finished. Hanger rods shall have electro-galvanized finish.

D. Roof top pipe supports
1. MiFab "C-Port" series or B-Line "Dura-Block" or approved equal.
   a. Model C rubber support series with galvanized channel.
   b. Seismic: Model CZ rubber base with galvanized channel

E. Seismic hanger rod stiffeners: B-Line SC-228, Anvil AS 3500 or equal

F. Copper tubing:
1. B-Line 3690, Superstrut C-711 or Anvil Figure 67 "J" pipe hangers or approved equal, complete with isolator.
2. Isolators: B-Line "Vibra Cushion" B1999, Type L & K for copper tubing, Superstrut C-716 isolator for copper, Anvil Figure CT-769 or approved equal

G. Insulated pipe:
1. Hangers: B-Line 3690 "J" pipe hanger, Superstrut C -711 or Anvil Figure 67 fitted to outside of insulation or equal
2. Pipe Shields: B-Line 3151 insulation protection shield, Superstrut C-790, or Anvil Figure 167 or equal

H. Channel: B-Line B22, Superstrut A 1200, Anvil AS 200 or approved equal.

I. Trapeze hangers: Grouped pipes may be supported by channel bolted to rods.

J. Point of support connectors:
1. Wood construction:
   a. Stationary pipes: B-Line B3060, Superstrut 540 or Anvil Figure 206 side beam hanger clip or approved equal
   b. Pipes subject to movement: B-Line B-756 or Superstrut S-541 beam clamp swing connector or approved equal
2. New concrete construction: B-Line B2501 light duty spot inserts or Superstrut 452-TB spot inserts or approved equal.
3. Existing concrete construction: Phillips “Red-Head” 3-piece concrete anchors or Hilti “Quik-Bolt”, drilled-in, concrete anchors.
4. Steel beams: Superstrut Series 500 beam brackets or equal.
5. Plywood decks: machine bolts, nuts and washers.

K. Vertical pipe risers:
   1. Riser clamps: Superstrut C-720 extension riser clamps anchored to construction
      a. Bare cold-water pipe: Superstrut C-720P, PVC coated to prevent corrosion

L. Cable Bracing: Cables shall be pre-stretched galvanized 7x19 strand core aircraft cable, with no limit to their installed length. Cables meet the following specifications: MIL-DTL-83420M with Amendment 2, Type 1 non-jacketed cable.

M. Water Heater Restraint
   1. Water Heater platform:
      a. Wall mounted water heaters up to 20 gallons shall be supported by HoldRite "Quick Stand", #30-SWHP-WM, wall mounted equipment platform or equal. Constructed of galvanized steel with watertight corners, welded steel drain body, and a built-in drain pan.
   2. Water heater strap restraints
      a. Holdrite "Quick Strap" #QS-50 for water heaters up to 80 gallons
      b. Expansion tanks shall be restrained with Holdrite "Quick Strap" expansion tank bracket #QS-U.

2.14 PIPE INSULATION

A. Insulate all hot water supply piping, all hot water return piping, all tempered water supply piping and all tempered water return piping with Johns Manville "Micro-Lok HP", or equal, rigid fiberglass one-piece pipe insulation or Knauf Insulation "Earthwool 1000°" or "Earthwool Redi-Klad 1000°" rigid glass mineral wool one-piece pipe insulation, or approved equal.

B. All insulation shall have composite (insulation, jacket, tape seal, and adhesive used to adhere the jacket to the insulation) Fire and Smoke Hazard ratings as tested under Procedure ASTM E 84 and NFPA 255 or UL 723, not exceeding: Flame Spread - 25, Smoke Developed - 50. PVC fitting covers, jacketing and accessories such as adhesives, mastics, cements, and cloth for fittings should have the same component ratings.

C. Pipe covering shall have factory applied All Service Jackets (ASJ). Jackets shall be constructed of high density, white kraft bonded to aluminum foil with fiber glass yarn, with a pressure sensitive closure system, or of aluminum foil reinforced with a glass scrim bonded to a kraft paper interleaving with an outer film layer leaving no exposed paper. Adhesives or staples shall not be required to seal the jacket and butt strips.

D. Fittings, valves and flanges shall be covered with Manville "Zeston 2000" insulated PVC fitting covers and Hi-Lo Temp insulation inserts or Knauf "Proto LoSmoke". Insulation for all exposed piping and all piping in crawl spaces shall be covered with "Zeston" PVC jacketing. PVC jackets shall be 20 mils thick and shall be bonded with "Zeston Perma-Weld" adhesive. In crawl spaces, Knauf "Earthwool RediKlad 1000°" pipe covering shall serve as an acceptable alternate to standard pipe covering and PVC.

E. All piping exposed to the weather shall be finished with aluminum jacketing with a laminated moisture retarder or "Earthwool RediKlad 1000°" with "Venture Clad" embossed jacket. Aluminum jacketing shall be overlapped 2 to 3 inches and held in place with stainless steel bands to form a weather tight system. Elbows and tees shall be fitted with matching aluminum fitting covers. Other fittings in metal-jacketed systems shall be finished with conventional weather-resistant insulating materials with painted aluminum finish.

F. Inserts shall be installed at outside hangers. Inserts between the pipe and pipe hangers shall consist of rigid pipe insulation of thickness equal to the adjoining insulation. Inserts shall not

be less than 10" long for pipe sizes up to 2 ½" and not less than 12" long for pipes larger than 2 ½".

G. Metal shields shall be applied between hangers or supports and the pipe insulation. Shields shall be formed to fit the insulation and shall extend up to the centerline of the pipe and the length specified for hanger inserts.

H. Insulation thickness shall conform to Title 24, Part 6 requirements. as indicated in the following table:

FLUID TEMPERATURE RANGE (°F)	CONDUCTIVITY RANGE (in Btu-inch per hour per square foot per °F)	INSULATION MEAN RATING TEMPERATURE (°F)	NOMINAL PIPE DIAMETER (in inches)				
			1 and less	1 to <1.5	1.5 to < 4	4 to < 8	8 and larger
			INSULATION THICKNESS REQUIRED (in inches)				
Space heating, hot water systems (steam, steam condensate, and hot water) and service water heating systems							
Above 350	0.32-0.34	250	4.5	5.0	5.0	5.0	5.0
251-350	0.29-0.31	200	3.0	4.0	4.5	4.5	4.5
201-250	0.27-0.30	150	2.5	2.5	2.5	3.0	3.0
141-200	0.25-0.29	125	1.5	1.5	2.0	2.0	2.0
105-140	0.22-0.28	100	1.0	1.5	1.5	1.5	1.5

I. All domestic water piping below grade shall be insulated with Dow Trymer-2000. Pipes shall be sleeved with 30 mil PVC jacket, with glued joints

2.15 VALVE BOXES

A. Valve boxes, where shown on Drawings, shall be Oldcastle Infrastructure "Christy" concrete utility and valve boxes or equal. High density reinforced concrete box with non-settling shoulders positioned to maintain grade and facilitate backfilling. Etched polypropylene face anchored in concrete and ultra-violet inhibitor. Contractor shall select boxes depending on size and type needed. Index all covers "GAS" or "WATER" as required for service.

2.16 THERMOMETERS

A. Weksler "Adjust-Angle", or equivalent Weiss, with separable sockets and 6" minimum scale reading 30-240°F.

2.17 PRESSURE GAUGES

A. Pressure gauges shall be Trerice No. 600CB or approved equal. Pressure gauges shall be of the 4 ½"dial size with flangeless cast aluminum case, stainless steel friction ring and glass window. Movement shall be brass with a bourdon tube and brass socket. Dial face shall be white with black graduations and markings. Pointer shall be friction adjustable type. Accuracy shall be + 1% of scale range, ASME B40.100 Grade 1A.

B. Range of gauges shall be not more than the operating range x 1.5. The proper range will be selected so that the average operating pressure falls approximately in the middle of the scale selected.

C. A gauge cock shall be supplied at each gauge connection.

D. Gauges on any service where pressure surges or pulsations are possible shall be provided with pressure snubbers.

2.18 FIXTURES

A. The quantity and location of fixtures shall be taken from the Architectural and Plumbing drawings. Provide adequate supports and all standard trim normally furnished for fixtures. All enamel shall be acid resisting. Traps, unless otherwise noted shall be 17 gage brass tubing, chrome plated when exposed.

B. Submit catalog cut-sheets on all fixtures.

C. Except as otherwise shown, provide ¼" steel backing plates, 36" wide by 12" high minimum size, secured to a minimum of three studs by welding, or with ¼" x 2½" lag screws for all wall hung fixtures for which no other means of support is specified.

D. Stops and supplies: Provide stops for all fixtures. Unless otherwise specified, stops exposed at lavatories and similar fixtures shall be Chicago #1016ABCP chrome plated, loose key. Concealed stops shall be Chicago #1771ABCP.

E. All plumbing fixtures providing domestic water shall comply with AB 1953, lead free. This includes, but is not limited to, lavatory faucets, sink faucets, shower valves, emergency showers, hose bibbs, and drinking fountains.

F. All fixtures shall be standard white color, except as noted.

G. All vitreous china fixtures shall be American Standard (District Standard).

H. Accessibility
1. Plumbing fixtures and accessories provided in a toilet room or bathing room required to comply with CBC Section 11B-213.2 shall comply with CBC Section 11B-213.3.
2. Accessible plumbing fixtures shall comply with all the requirements in CBC Division 6.
3. Clearance around accessible water closets and in toilet compartments shall be 60 inches minimum measured perpendicular from the side wall and 56 inches minimum measured perpendicular from the rear wall per CBC Section 11B-604.3.1.
4. Heights and location of all accessible fixtures shall be mounted according to CBC Sections 11B-602 through 11B-612.
5. Accessible fixture controls shall comply with CBC Sections 11B-602.3 for drinking fountains, 11b-604.6 for water closets, 11B-604.9.5 for children's water closets, 11B-605.4 for urinals; 11B-606.4 for lavatories and sinks, 11B-607.5 for bathtubs, 11B-608.5 for showers, and 11B-611.3 for washing machines and clothes dryers.
6. Accessible lavatories and sinks shall be mounted with the front of the higher of the rim or counter surface 34" maximum above the finish floor or ground. Depth of lavatories or sinks shall not interfere with knee and toe clearance provided in accordance with CBC Section 11B-306 when a forward approach is required. CBC Sections 11B-606.3 and 11B-606.7.
7. Water supply and drain pipes under accessible lavatories and sinks shall be insulated or otherwise configured to protect against contact. There shall be no sharp or abrasive surfaces under accessible lavatories and sinks. CBC Section 11B-606.5.
8. Effective March 1, 2017, all single-user toilet facilities shall be identified as Gender Neutral facilities by a door symbol that complies with CBC Sections 11B-216.8 and 11B-703.2.6. No pictogram, text or braille is required on the symbol. If tactile jamb signage is provided, the signage shall comply with the appropriate technical requirements of CBC Section 11B-703.

Examples of appropriate designations are "ALL GENDER RESTROOM", "RESTROOM" or "UNISEX RESTROOM". This image represents the required door symbol. 

I. Fixtures

1. **P-1 - WATER CLOSET**
   a. Fixture: American Standard #3351.101 "Afwall Millennium FloWise" series; wall mounted; vitreous china; elongated bowl; top spud; with antimicrobial surface; 1.28 gpf. See Architectural Drawings for mounting height.
   b. Flush Valve: Sloan "Royal" #111-1.28 or equal; manual, exposed; 1.28 gpf.
   c. Seat: Olsonite #95SSCT or equal; extra heavy duty; elongated; open front; modified open back; contoured extra wide shape; integral bumpers; ; STA-TITE fastening system; check hinge; white.
   d. Carrier: Zurn #Z-1201 or Z-1202-N-XH, "EZ carry" extra-heavy-duty, high performance, adjustable, siphon jet, no-hub connections, 750-lb. maximum static load.

2. **P-1A - WATER CLOSET (ADA)**
   e. Fixture: American Standard #3351.101 "Afwall Millennium FloWise" series; wall mounted; vitreous china; elongated bowl; ADA compliant; top spud; antimicrobial surface; 1.28 gpf. See Architectural Drawings for mounting height.
   f. Flush Valve: Sloan "Royal" #111-1.28 or equal; ADA compliant; manual, exposed; 1.28 gpf. Install the flush valve lever on the wide side of the ADA water closet enclosures.
   g. Seat: Olsonite #95SSCT or equal; extra heavy duty; elongated; open front; modified open back; contoured extra wide shape; integral bumpers; ; STA-TITE fastening system; check hinge; white.
   h. Carrier: Zurn #Z-1201 or Z-1202-N-XH, "EZ carry" extra-heavy-duty, high performance, adjustable, siphon jet, no-hub connections, 750-lb. maximum static load.

3. **P-1B - WATER CLOSET (ADA)**
   i. Fixture: American Standard #3461.001 "Madera FloWise 16 ½ height" series; floor mounted; elongated bowl; antimicrobial surface; siphon jet, ADA compliant; top spud; 1.28 gpf.
   j. Flush Valve: Sloan "Royal" #111-1.28 or equal; ADA compliant; manual, exposed; 1.28 gpf. Install the flush valve lever on the wide side of the ADA water closet enclosures.
   k. Seat: Olsonite #95SSCT or equal; extra heavy duty; elongated; open front; modified open back; contoured extra wide shape; integral bumpers; ; STA-TITE fastening system; check hinge; white.

4. **P-2 - LAVATORY (ADA)**
   a. Fixture: American Standard #0355.012 "Lucerne" series; vitreous china; 20-1/2" x 18-1/4"; 4" centers; See Architectural Drawings for mounting height.
   b. Faucet: Chicago #3400-ABCP; deck mounted; metering; 4" centers; non-aerating laminar spray; 0.5 gpm (CW only)

c. Drain: McGuire #155A; heavy cast brass open grid PO plug; 1-1/4" x 6" 17GA seamless brass tailpiece, brass lock nut, heavy rubber basin washer and fiber friction washer.

d. P-Trap: McGuire #8902C; heavy cast brass 1-1/4 x 1-1/2 adjustable trap with cleanout plug

e. Carrier: Jay R. Smith Figure 0710 or Zurn #Z-1231EZ or equal

5. **P-2A – LAVATORY (ADA)**

a. Fixture: American Standard #0355.012 "Lucerne" series; vitreous china; 20-1/2" x 18-1/4"; 4" centers; See Architectural Drawings for ADA mounting height.

b. Faucet: Chicago #3400-ABCP; deck mounted; metering; 4" centers; non-aerating laminar spray; 0.5 gpm (CW only)

c. P-trap: McGuire #PW2150WC or equal; insulated adjustable trap with cleanout; includes covers for riser, angle stop, and tailpiece, includes pre-wrapped offset drain assembly

f. Carrier: Jay R. Smith Figure 0710 or Zurn #Z-1231EZ or equal

6. **P-2B – LAVATORY (ADA)**

a. Fixture: American Standard #0355.012 "Lucerne" series; vitreous china; 20-1/2" x 18-1/4"; 4" centers; See Architectural Drawings for ADA mounting height.

b. Faucet: Chicago #802-VE2805-665ABCP or equal; metering; 4" integral cast brass spout; vandal proof .5 gpm pressure compensating spray outlet; 1-¾" metering handles with hot and cold index buttons; vandal resistant. (HW/CW)

c. P-Trap: McGuire #PW2150WC or equal; insulated adjustable trap with cleanout; includes covers for riser, angle stop, and tailpiece, includes pre-wrapped offset drain assembly

d. Carrier: Jay R. Smith Figure 0710, Zurn #Z-1231EZ, or equal

7. **P-2C – LAVATORY (ADA)**

a. Fixture: American Standard #0355.012 "Lucerne" series; vitreous china; 20-1/2" x 18-1/4"; 4" centers; See Architectural Drawings for ADA mounting height.

b. Faucet: Chicago #802-VE2805-665ABCP or equal; metering; 4" integral cast brass spout; vandal proof .5 gpm pressure compensating spray outlet; 1-¾" metering handles with hot and cold index buttons; vandal resistant. (HW/CW)

c. P-Trap: McGuire #PW2150WC or equal; insulated adjustable trap with cleanout; includes covers for riser, angle stop, and tailpiece, includes pre-wrapped offset drain assembly

d. Carrier: Watts TCA-411-D, back-to-back, floor mounted, concealed arm or equal

8. **P-3 – URINAL**

a. Fixture: American Standard "Washbrook Flowise" #6590.001EC; wall mounted; vitreous china; 3/4:" top spud; elongated rim; extended sides; antimicrobial surface 0.125 gpf. (See Architectural Drawings for mounting height)

b. Flush Valve: Sloan "Royal" #186-0.125-DBP; manually operated, dual filtered bypass, exposed; single flush; diaphragm type 0.125 gpf

c. Carrier: Jay R. Smith Figure 0634, Zurn Z-1222, or equal

9. **P-3A – URINAL (ADA)**

a. Fixture: American Standard "Washbrook Flowise" #6590.001; wall mounted; vitreous china; 3/4:" top spud; elongated rim; extended sides; 0.125 gpf. (See Architectural Drawings for mounting height)

b. Flush Valve: Sloan "Royal" #186-0.125-DBP; manually operated, dual filtered bypass, exposed; single flush; diaphragm type 0.125 gpf

c. Carrier: Jay R. Smith Figure 0634, Zurn Z-1222, or equal

10. **P-4 - JANITOR SINK**

a Fixture: Florestone "Model 91"; square drop front; galvanized steel flange & stainless-steel protective cap; 24" x 24" x 12"; terrazzo. See Architectural drawings for location.

b. Faucet: Chicago #897-RCF; wall mount; vacuum breaker; pail hook; wall brace; adjustable centers; lever handles; rough chrome finish (HW/CW)

11. **P-5A – SCIENCE CLASSROOM SINK**

a. Fixture: Epoxy sink, integral with counter, by others

b. Faucet: Chicago #928-VR317XKCP; deck mounted; single inlet; wristblade handle; ceramic cartridge; vandal resistant 6" rigid/swing spout with atmospheric vacuum breaker; 10 serration nozzle (CW only)

c. Drain: Orion WA series polypropylene waste assembly

d. P Trap: Orion bottle trap with 1 pint bottle, 1.5" FIP adjustable riser inlet, 1.5" no-hub outlet

12. **P-5B – SCIENCE CLASSROOM SINK (ADA)**

a. Fixture: Epoxy sink, integral with counter, by others

b. Faucet: Chicago #928-VR317XKCP; deck mounted; single inlet; wristblade handle; ceramic cartridge; vandal resistant 6" rigid/swing spout with atmospheric vacuum breaker; 10 serration nozzle, (CW only)

c. Drain: Orion WA series polypropylene waste assembly

d. P Trap: Orion bottle trap with 1 pint bottle, 1.5" FIP adjustable riser inlet, 1.5" no-hub outlet

e. Insulators: Truebro, Plumberex, or equal insulated ADA covers

13. **P-5C –TEACHERS SCIENCE CLASSROOM SINK (ADA)**

a. Fixture: Epoxy sink, integral with counter, by others

b. Faucet: Chicago #930-317XKCP deck mounted, mixing; wristblade handles; ceramic cartridge; 6" rigid/swing spout with atmospheric vacuum breaker; 10 serration nozzle (HW/CW)

c. Drain: Orion WA series polypropylene waste assembly

d. P Trap: Orion bottle trap with 1 pint bottle, 1.5" FIP adjustable riser inlet, 1.5" no-hub outlet

e. Insulators: Truebro, Plumberex, or equal insulated ADA covers

14. **P-5D – PREP ROOM SINK (ADA)**
    a. Fixture: West Star Industries, custom double bowl sink, 63" total width; (1) 23" x 24" x 12"deep bowl; (1) 23"x31"x6 ½" deep ADA compliant bowl; meeting maximum ADA heights/clearances; 1 ½"sanitary roll; 2" high rolled edge; 2" backsplash; type 304 stainless steel; supported on (4) 1 5/8" stainless steel legs cross bracing gussets; adjustable feet; punched for (2) 8" o.c. faucets. Provide insulated pipe covers on ADA side. Drains to be located center rear to accommodate bottle traps.
    b. Faucet: (2) Fisher swing spout faucet with 14" spout; wristblade handles; 1.5 gpm (HW/CW) (provided by West Star).
    c. Drain: Orion WA series polypropylene waste assembly
    d. P Trap: (2) Orion bottle traps with 1 pint bottle, 1.5" FIP adjustable riser inlet, 1.5" no-hub outlet

15. **P-5E SINK (ADA)**
    a. Fixture: Just #DL-ADA-1933-A-GR; double bowl; 19"x 33 "x 4 ½ "; drop-in; self rimming; 18 gauge; type 304 stainless steel; punched for 8" centers; rear center drain.
    b. Faucet: Chicago #201-AGN8AE35-317AB; deck mounted; 8" gooseneck swing spout; 4" wrist blade handles; 1.5 gpm; 8" centers. (CW/HW).
    c. Drain: Just J-ADA35; stainless steel cup strainer with removable stainless steel basket. 1-1/2" O.D. 17 gauge chrome plated brass offset tailpiece system.
    d. P-Trap: Just JT-150; semi-cast trap; with cleanout or McGuire 8903
    e. Insulators: Truebro, Plumberex, or equal insulated ADA covers

16. **P-6 - DRINKING FOUNTAIN & BOTTLE FILLER**
    a. Fixture: Elkay "EZH20" series, model VRCTLDDWSK or equal; vandal resistant bottle filing station & bi-level cooler; non-filtered, non-refrigerated; vandal resistant bubbler; electronic bottle filler button; mechanical front bubbler button; wall-mounted; for indoor/outdoor installation

17. **P-8 – EMERGENCY SHOWER/EYE WASH (ADA)**
    a. Fixture: Guardian #GBF1994 barrier-free safety station with "WideArea" eye/face wash, all stainless steel, (4) spray heads and flip top dust cover, internal flow control, & filter. Includes id sign

18. **GT-1 - GAS TURRET**
    a. Fixture: Chicago Faucets 982-VR909CAGCP; deck mounted; dual ball valves turret @ 90°; built-in check; full flow serrated nozzle; anti-rotational deck pin

2.19 ELECTRIC WATER HEATERS

A. A.O. Smith "Dura-Power" series, model DEL, as scheduled on the Drawings or approved equal. Heater(s) shall be listed by Underwriters' Laboratories. Models shall meet the standby loss requirements of the U.S. Department of energy and current edition of ASHRAE/IES 90.1.

B. Heater(s) shall have 150 psi working pressure and be equipped with extruded high-density anode rod. All internal surfaces of the heater(s) exposed to water shall be glass-lined with an alkaline borosilicate composition that has been fused-to-steel by firing at a temperature range

of 1400°F to 1600°F. Electric heating elements shall be medium watt density with zinc plated copper sheath. Each element shall be controlled by an individually mounted thermostat and high temperature cutoff switch. The outer jacket shall be of backed enamel finish and shall enclose the tank with foam insulation. Electrical junction box with heavy duty terminal block shall be provided. The drain valve shall be located in the front for ease of servicing.

2.20 EXPANSION TANK

A. Amtrol "Therm-X-trol", model ST-12. Tank shall be constructed of steel and have a urethane topcoat finish. The tanks shall have an antimicrobial polypropylene liner, a heavy-duty Butyl NSF/ANSI 61 diaphragm, a projection welded air valve with "InSight™" indicator cap that changes color to indicate tank service, and a patented "Turbulator™" water circulator. The tank shall have a factory pre-charge of 50 PSIG.

2.21 AQUASTAT

A. Bell & Gossett Aquastat, model AQS-1/2 or AQS-3/4. The aquastat shall be UL approved. The thermostat covering shall be epoxy, environmentally sealed, and the thermostatic sensing element, which senses surface temperature of outside diameter of pipe, shall be bimetal.

2.22 CIRCULATION PUMP

A. Grundfos UPS series circulating pump or approved equal.

B. Pumps housing shall be bronze. The motor shall be a 2-pole or 4--pole, squirrel age motor. The stator housing shall be of die-cast aluminum and can be turned to change the position of the terminal box. The rotor can shall be made of stainless steel and have an inspection screw fitted directly at top (except for the small UP N). The radial bearing shall be incorporated in the top of the rotor can.

C. The pump shall have a stainless-steel shaft with two bearings and a hole for lubrication. The rotor shall be attached to the shaft, encapsulated in a stainless-steel cladding. The bearing plate shall be made of stainless steel. The impeller shall be made of composite or stainless steel and have a curved blade. It shall be secured to the shaft by a split cone.

2.23 ELECTRIC WATER HEATERS, TANKLESS

A. Tankless electric water heaters shall be a Chronomite Laboratories, "Instant Flow C-Micro - Low Activation" series, model CM-15L/277, as scheduled on the Drawings or approved equal. Tankless heater shall have vandal resistant cast iron aluminum alloy housing with Celcon plastic waterway and Nichrome heating coils. Temperature shall be controlled by digital microprocessor.

B. Faucet flow controls shall be supplied with each unit.

2.24 PIPE LABELS

A. Pipe labeling shall be in compliance with ANSI/ASME A13.1 2015 "Scheme for the identification of Piping Systems" and ANSI Z535.1 2017 "Safety Color Code". Graphic Products, Brady, or Seton. All piping shall be identified.

B. Submittals
   1. Equipment label schedule: Include a listing of all equipment to be labeled with the proposed content for each label. To be included in maintenance manuals.
   2. Provide valve schedules for each piping system to include in maintenance manuals.

C. Pipe Labels: Preprinted, color-coded, with lettering giving name of the contents (full or abbreviated) and arrows to indicate direction of flow.
   1. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
   2. 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.
   3. 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(s).
   4. Pre-tensioned Labels: Semi-rigid plastic wrap around pipe marker that extends 360º around the pipe at each marker location. The label shall have a ½" strip of adhesive on the inside to further secure the marker.

D. Pipe Label Sizes (per ANSI A13.1 / ASME A13.1-2015 Standards):
   1. For pipes or covering with outside diameter ¾ to 1¼ inches, minimum length of label: 8 inches, minimum height of letters: ½ inch.
   2. For pipes or covering with outside diameter 1½ to 2⅜ inches, minimum length of label: 8 inches, minimum height of letters: ¾ inch.
   3. For pipes or covering with outside diameter 2 ½ to 7⅞ inches, minimum length of label: 12 inches, minimum height of letters: 1¼ inch.

E. Pipe Label Color Schedule: (per ANSI A13.1 / ASME A13.1-2015 Standards)
   a. Potable, Cooling, Boiler Feed and other Water Piping:
      1) Background Color: Green.
      2) Letter Color: White.
   b. Fire Quenching Fluids:
      1) Background Color: Red.
      2) Letter Color: White.
   c. Toxic and Corrosive Fluids
      1) Background Color: Orange.
      2) Letter Color: Black
   d. Flammable and Oxidizing Fluids:
      1) Background Color: Yellow.
      2) Letter Color: Black.
   e. Combustible Fluids:
      1) Background Color: Brown.
      2) Letter Color: White
   f. Compressed Air:
      1) Background Color: Blue.
      2) Letter Color: White.

F. Valve Tags:
   1. For identification and Owner's maintenance records, all valves shall be numbered and identified with brass tags stamped with service abbreviation and sequential number, and pre-drilled holes for attachment hardware, in accordance with Drawings and service performed. Control valves shall be also marked whether normally open (N.O.) or normally closed (N.S.).
   2. Minimum size letters: ¼-inch; numbers ½-inch. Minimum tag size: 1 ½-inch diameter.
   3. Fasteners: Attach to stem or body of valve so that tag is visible but doesn't interfere with the valve operation. Use Brass wire-link chain or beaded chain.
   4. Valve Schedule: For each piping system, on 8 ½" x 11" bond paper, tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), and normal-operating position (open, closed, or modulating). The schedule shall

be, shall be framed and posted in mechanical rooms and a copy provided in the maintenance manual.

G. Equipment
   1. All equipment shall be labeled with 1" high stencils showing identifying mark noted on drawings, and usage.
   2. A printed schedule of all stencils and valve tags used with identification shall be framed and posted in mechanical rooms, at locations as directed. Include a copy of the schedule in Operations and Maintenance data.

H. Equipment Label Schedule: For each item of equipment to be labeled, on 8 ½" x 11" bond paper, tabulate equipment identification number as noted on Drawings, identify where equipment is located, and indicate usage.
   1. A printed schedule of all stencils or nameplates and valve tags used, with identification shall be framed and posted in mechanical rooms, at locations as directed. Include a copy of the schedule in Operations and Maintenance data.

I. Underground Pipe Warning: Provide underground pipe marking tape on all pipes buried beneath the ground. Provide a continuous length of tape 12" below the finished earth surface directly above the buried pipe. Provide a second continuous length of tape 12" above the top of the buried pipe if the top of the pipe is lower than 36" from the top of the finished earth surface. Provide detectable underground tape above all buried pipes on this project. Identify water lines, pipelines, gas lines, steam lines, and sewer lines. The tape shall be resistant to alkaline, acids, and other destructive agents usually found in soil.

2.25 VIBRATION AND SOUND CONTROL

A. Make all necessary provisions to prevent the transmission of vibration to the building structure and the passage of noise from the equipment rooms to other rooms. Provisions shall include vibration isolators for motor driven equipment; flexible pipe connections to motor driven equipment; resilient mounting for piping; sealing off pipe and duct penetrations of walls, floors and ceilings of equipment rooms.

B. All piping which is not isolated from contact with the building by its insulation shall be installed with a manufactured type isolator. Isolators shall be B-Line "Vibra Clamp" and "Vibra Cushion", Super Strut, "Trisolator", or approved equal. Piping shall be installed and supported in a manner to provide for expansion without strains. Guides shall be properly installed to ensure this requirement.

C. Provide pipe and sound isolation for all piping through walls, Acoustoplumb by LSP/Specialty Products, or Holdrite Silencer by Hubbard Enterprises, or approved equal.

PART 3 EXECUTION

3.01 DELIVERY, STORAGE, AND HANDLING

A. Contractor shall be responsible for delivery, storage, protection and placing of all equipment and materials.

B. Contractor shall protect the work and materials from damage during construction. Equipment stored at the jobsite shall be protected from dust, water or other damage, and be covered if equipment is exposed to weather. Protect interiors of new equipment and piping systems against entry of foreign matter. Clean both inside and outside before painting or placing equipment in operation.
   1. Any items damaged shall be repaired or replaced, at no additional cost to the Owner.

C. Cleanliness of Piping and Equipment Systems:
   1. Exercise care in storage and handling of equipment and piping material to be incorporated in the work. Remove debris arising from cutting, threading and welding of piping.
   2. Piping systems shall be flushed, blown or pigged as necessary to deliver clean systems.
   3. Contractor shall be fully responsible for all costs, damage, and delay arising from failure to provide clean systems.

3.02 COOPERATION WITH OTHER TRADES

A. Cooperate fully with other trades doing work on the project as may be necessary for the proper completion of the project. Refer to the Structural, Plumbing, and Electrical Drawings for details of the building structure and equipment installation that will tend to overlap, conflict with, or require coordination with the work of this Section, and schedule this work accordingly.

B. Priority of right of way in space shall be as follows, in decreasing order of authority:
   1. Electrical lights, electrical panels and drain piping.
   2. Ductwork.
   3. Fire protection piping, domestic hot water, domestic cold water and condenser water piping.

C. Any work done without regard for other trades shall be moved, replaced, or redone as required, without extra charges to Owner.

3.03 ACCESSIBILITY

A. Equipment shall be placed, and piping connections made in such a manner that all routine adjustments and maintenance operations may be carried out without inconvenience and so that all code requirements for clearances are maintained.

3.04 INSTALLATION, GENERAL

A. Prior to commencing the work of this Section, Contractor shall inspect the installed work of other trades and verify that their work is sufficiently complete to permit the start of work under this Section and that the finished work will be in complete accordance with the original design. In the event of discrepancy, the Contractor shall immediately notify the Architect and proceed as directed

B. The Contractor shall be held responsible for all existing conditions, whether or not accurately described. No allowance shall subsequently be made on the Contractor's behalf for any error, omission, or extra expense that is due to failure or neglect on the Contractor's part to make such examination and notification.

C. Contractor shall have examined the site, compared it with the Contract Documents, and be satisfied with the conditions under which the work is to be performed. In the event of discrepancy, the Contractor shall notify the Architect and shall proceed as directed.

D. Apply and install all items in accordance with the manufacturer’s written instructions. Refer conflicts between the manufacturer’s instructions and the contract drawings and specifications to the Architect for resolution.

E. Provide all necessary cutting in connection with the work of this Section. No structural members shall be drilled, bored, or notched in a manner that will impair their structural capacity. Cutting or boring of joists or other structural members shall be done only when alternative routing is impossible and only upon written approval of the Architect or DSA.

3.05 EQUIPMENT

A. Equipment shall operate quietly and without objectionable vibration. Such problems, other than from equipment operating at optimum conditions, shall be the Contractor's responsibility and shall be eliminated at the direction of the Architect.

B. Install equipment to provide good appearance, easy access, and adequate space to allow replacement and maintenance. Provide bases, supports, anchor bolts, and other items required to achieve this. Installation shall be level, above moisture level, and adequately braced.

C. Extend ¼" schedule 40 black steel lubrication pipes from hard-to-reach locations to front of equipment or to access doors. Terminate with proper lubrication fittings.

D. Move equipment into building through available openings. Dismantle equipment where necessary to accomplish this. After reassembly, test equipment to verify its satisfactory operating condition.

E. Thoroughly lubricate equipment before operating. Repair of damage resulting from failure to comply with this requirement shall be the Contractor's responsibility.

F. Connections to piping shall be secured and properly aligned and all utility and control connections shall be properly isolated from the building structure by means of vibration isolators and flexible connections. Any equipment not meeting this requirement will be modified and properly reinstalled at no expense to the Owner.

3.06 PAINTING

A. Properly prepare work under this Section to be painted.

B. Painting shall be applied under the Painting section requirements, except preservative and special painting as described herein.

C. Priming as required herein, shall conform to the Painting section requirements and be of a material compatible with paint for finish painting.

D. All equipment and materials shall be cleaned of grease, wax, oil, rust or dirt in preparation for finish painting. Any prime coated surfaces showing signs of rust before being finish painted shall be thoroughly cleaned and a new prime coat applied.

E. Prime paint both sides of flashings prior to installation.

F. Furnish can of touch-up paint with each factory finished piece of equipment.

G. Paint all piping in mechanical rooms. Color as selected by the Architect.

3.07 IDENTIFICATION OF SYSTEMS

A. Piping
   1. 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:
      a. Adjacent to all valves and flanges
      b. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
      c. At both sides of wall or floor penetrations.
      d. Before and after all wall, floor and ceiling penetrations and inaccessible enclosures.
      e. Adjacent to changes in direction.

f. At access doors, manholes, and similar access points that permit view of concealed piping.
g. Near major equipment items and other points of origination and termination.
h. Spaced at maximum intervals of 20 feet along each run. Reduce intervals in areas of congested piping and equipment.
i. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

2. All piping shall be identified.
3. Pipe Label Color Schedule: (per ANSI A13.1 / ASME A13.1-2007)
   a. Potable, Cooling, Boiler Feed and other Water Piping:
      1) Background Color: Green.
      2) Letter Color: White.
   b. Fire Quenching Fluids:
      Background Color: Red.
      Letter Color: White.
   c. Combustible Fluids:
      1) Background Color: Brown.
      2) Letter Color: White
   d. Toxic and Corrosive Fluids
      1) Background Color: Orange.
      2) Letter Color: Black
   e. Flammable Fluids:
      1) Background Color: Yellow.
      2) Letter Color: Black.
   f. Compressed Air:
      1) Background Color: Blue.
      2) Letter Color: White

B. Valves
1. For identification and Owner's maintenance records, all valves shall be numbered and identified with clearly stamped 1¼" diameter brass tags, in accordance with drawings and service performed.
2. Control valves shall be also marked whether normally open (N.O.) or normally closed (N.S.).
3. Affix Underwriter's standard porcelain enameled identification signs to all fire protection sprinkler control valves, drain valves, and flow switches.

C. Equipment
1. All equipment shall be labeled with 1" high stencils showing identifying mark noted on drawings, and usage.
2. Warning signs shall be placed on machines driven by electrical motors that are controlled by fully automatic starters, per California Code of Regulations, Title 8, Subchapter 7 - General Industry Safety Orders, Article 7, Section 3320.

D. A typewritten schedule of all stencils and valve tags used, with identification, shall be framed and posted in mechanical rooms, at locations as directed.

3.08 INSTALLATION, HANGERS AND SUPPORTS

A. Pipe supports shall be spaced according to CPC 2019, Table 313.3 and sufficiently close to support pipes properly without formation of pockets. Hangers shall be installed at ends of mains and branches.

B. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

C. Install lateral bracing with pipe hangers and supports to prevent swaying.

D. Provide resilient mounting for domestic water piping. Thermal insulation may serve as resilient mounting for insulated piping.

E. Suspended water piping shall be anchored with steel struts installed at midpoint of each run.

F. No valve or piece of equipment shall be used to support piping.

G. Install lateral bracing with pipe hangers and supports to prevent swaying. The following table shows maximum lengths of shapes used for sway bracing:

H. 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.

I. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves and flanges, 2-½ inches 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.

J. Installation of piping shall be such that damage cannot result through loading, expansion or contraction of piping. Anchors shall be installed to obtain uniformity of pipe movement.

K. Hanger rod sizes shall be no smaller than 3/8-inch for pipe and tube sizes ½ to 4 inches and ½ inch for sizes 5 - 8 inches.

L. Inserts shall be installed at outside hangers. Inserts between the pipe and pipe hangers shall consist of rigid pipe insulation of thickness equal to the adjoining insulation. Inserts shall not be less than 10" long for pipe sizes up to 2 ½" and not less than 12" long for pipes larger than 2 ½".

M. Metal shields shall be applied between hangers or supports and the pipe insulation. Shields shall be formed to fit the insulation and shall extend up to the centerline of the pipe and the length specified for hanger inserts.

N. All water heaters shall be strapped at upper 1/3 and lower 1/3 of the vertical dimensions of the unit. The lower strap shall be a minimum of 4" from the controls.

O. Metal Pipe-hanger Installation: Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

P. Metal Trapeze Pipe-Hanger Installation: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes

Q. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

R. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

S. Pipe Slopes: Install hangers and supports to provide required pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
   a.

3.09 INSULATION

A. Insulation shall be applied in complete accordance with the manufacturer's published installation instructions. All insulation shall be applied on clean, dry surfaces and shall be

continuous through wall and ceiling openings and sleeves, except where fire stop materials are required.

B. All joints shall be firmly butted together and longitudinal jacket laps and butt strips shall be smoothly secured.

C. Specified adhesives, mastics and coatings shall be applied at the manufacturer's recommended minimum coverage per gallon.

D. Insulation on all cold surfaces must be applied with a continuous, unbroken vapor seal. Hangers, supports, anchors, etc. that are secured directly to cold surfaces must be adequately insulated and vapor sealed to prevent condensation. Seal all pipe terminations with vapor barrier mastic.

E. All surface finishes are to be extended to protect all surfaces, ends and raw edges of insulation.

F. Inserts shall be installed at outside hangers. Inserts between the pipe and pipe hangers shall consist of rigid closed cell pipe insulation of thickness equal to the adjoining insulation. Inserts shall not be less than 12" long for pipe sizes through 2½" and not less than 18" long for pipes larger than 2 ½". Refer to manufacturer's recommendations for densities, sectional length, gauge of metal shield and distance between centering.

G. Galvanized metal shields shall be applied between hangers or supports and the pipe insulation. Shields shall be formed to fit the insulation and shall extend up to the centerline of the pipe and the length specified for hanger inserts less 4" to allow for vapor retarding butt joints on each side of shields.

H. All pipe insulation ends shall be tapered and sealed, regardless of service.

3.10 PIPE WELDING

A. All hot and chilled water, steam and steam condensate, compressed air and vacuum piping shall be installed, examined, inspected, and tested in accordance with the requirements of ASME B31.9, Building Services Piping, current edition.

B. Weld all pipe 2.5 inches and larger. Use the following procedure. All welders must be AWS certified. AWS B2.1 SMAW 6G Pipe Welding Procedure Specifications

Welding process: SMAW	Grove Angle: 60 degrees
Position: 6G Fixed position	Material/Spec: A 106
Weld Progression: Up	Thickness (pipe/tube): Groove (in) .280
Backing: No	Notes: Sch. 40 Pipe
Current/Polarity: DCEP	Filler Metal Class: E6010Rt/E7018F1
Root Opening: 1/16 to 1/8	Other Filler Metal Class: Rt. 1/8, 3/32 Filler

C. Welded joints shall be beveled and butt-welded. Reductions of pipe shall be made with forged steel welding fittings. Branch reductions of two or more pipe sizes smaller than the main, may be Bonney "Weld-O-Let" fittings, or equal. Job fabricated reductions and branches shall not be used. All pipe burrs shall be reamed out. Welding rods shall be as follows, or approved equal:

Pipe Size	Arc Welding	Gas Welding
2" and larger	Fleetweld #5	Oxweld #1 or Page Hi-Test M
1½" and smaller	None	Oxweld #1 or Page Hi-Test M

3.11 BELOW GRADE GAS PIPING INSTALLATION

A. Polyethylene gas distribution piping shall be installed be in accordance with CFR 49, Part 192, Subpart G (mains), Subpart H (service lines), applicable codes and regulations and ASTM D 2774.

B. When delivered, a receiving inspection shall be performed, and any shipping damage shall be reported to the Manufacturer within 7 days.

C. Burial Depth.
1. All polyethylene gas distribution piping shall be installed in accordance with applicable federal, state and local codes and shall have at least 12" of cover in private property, and at least 18 inches of cover in streets and roads.

D. Excavation.
1. Trench excavations shall conform to the Drawings and in accordance with all applicable codes.
2. The Contractor shall remove excess groundwater. Where necessary, trench walls shall be shored or reinforced, and all necessary precautions shall be taken to ensure a safe working environment.

E. Foundation & Bedding.
1. Pipe shall be laid on grade and on a stable foundation. Unstable trench bottom soils shall be removed, and a 6" foundation or bedding of compacted Class I material shall be installed to pipe bottom grade. A trench cut in rock or stony soil shall be excavated to 6" below pipe bottom grade, and brought back to grade with compacted Class I bedding. All ledge rock, boulders and large stones shall be removed.

F. Pipe Handling.
1. Pipe shall be handled in a safe manner that avoids damage to the product. When lifting with slings, only wide fabric choker slings capable of safely carrying the load, shall be used to lift, move, or lower pipe and fittings. Wire rope or chain shall not be used. Slings shall be of sufficient capacity for the load and shall be inspected before use. Worn or damaged equipment shall not be used.

G. Backfilling.
1. Embedment material soil type and particle size shall be in accordance with ASTM D 2774. Embedment shall be placed and compacted to at least 90% Standard Proctor Density in 6" lifts to at least 6" above the pipe crown. During embedment placement and compaction, care shall be taken to ensure that the haunch areas below the pipe springline are completely filled and free of voids.

H. Protection against shear and bending loads
1. In accordance with ASTM D 2774, connections shall be protected where an underground polyethylene branch or service pipe is joined to a branch fitting such as a service saddle, branch saddle or tapping tee on a main pipe, and where pipes enter or exit casings or walls. The area surrounding the connection shall be embedded in properly placed, compacted backfill, preferably in combination with a protective sleeve or other mechanical structural support to protect the polyethylene pipe against shear and bending loads.

I. Final Backfilling.
1. Final backfill shall be placed and compacted to finished grade. Native soils may be used provided the soil is free of debris, stones, boulders, clumps, frozen clods or the like larger than 8" in their largest dimension.

3.12 INSTALLATION, PIPING

A. General

1. Rough in shall proceed as rapidly as general construction will permit. All rough-in shall be complete, at locations verified by Architect and Owner, and tested and inspected prior to installation of concrete, lath, plaster, gypsum wallboard, or other finishes.
2. All piping shall be concealed in finished rooms, installed in furred walls and partitions. Where furred or suspended ceilings occur, piping shall be installed in the concealed space at points adjacent to beams and/or other structural members and coordinated with ductwork and equipment. Where exposed piping occurs, it shall be installed parallel to or at right angles to building walls, unless specifically shown otherwise on the Drawings.
3. Installation of piping shall be such that damage cannot result, through thermal expansion or contraction, to piping, building, or pipe hangers and supports. Anchors shall be installed at midpoints of all runs in main piping for the purpose of localizing pipe expansion or prevention of creepage.
4. All pipe lines shall be installed free from traps and air pockets, true to line and grade, with suitable supports properly spaced. All piping shall be installed without undue stresses and with provision for expansion and contraction.
5. All piping shall be new and free from foreign substances. American standard pipe threads shall be used for IPS threaded work. Joints in threaded piping shall be made up with Teflon tape applied to the male threads only. No screwed pipe joints shall be caulked or packed with rope or other packing materials. Pipe shall be free from tool marks, threads cut accurately with not more than two (2) threads showing beyond fitting. Friction wrenches shall not be used with plated, polished, or soft metal piping. All changes in pipe size shall be made with reducing fitting. Bushings will not be permitted.
6. Protect unattended openings in piping during construction.
7. All copper tubing shall be formed in a workmanlike manner, in accordance with the Pipe and Tube Bending Handbook of the Copper and Brass Research Association. A tube bender giving support to the periphery of the tube shall be used. The tubing shall be protected against flatting or other injury.
8. All copper connections and joints shall be made in accordance with the Copper Tube Handbook, Copper and Brass Research Association. No swaged connections will be permitted. All valves, pumps, and similar equipment shall be connected to copper piping through union or flange adapter fittings.
9. No water or drainage piping shall pass over electrical equipment unless adequate protection is provided to prevent damage by leaks or condensation.
10. Install air vents at all water piping high points when direction of flow is downward.
11. Install sediment drain faucets at all low points.
12. Valves, cocks, etc., shall be installed to allow convenient accessibility and operation.
13. Unions and flanges shall be installed to allow convenient replacement of all equipment and cleaning tubes.
14. A union connection shall be installed downstream from all valves, at equipment connections and at other locations as required or directed.
15. Shut off valves shall be provided in all main services, and where required to permit proper servicing of equipment. Valves of one type shall be of one manufacturer.
16. All valves shall be of the same size as the pipelines in which they are installed, unless specifically sized on the Drawings. All hand controlled line valves shall be ball valves, except where throttling control or frequent operation is required, in which case globe or angle valves shall be used. Globe valves in horizontal lines shall be installed with stem in horizontal to permit line draining. All globe and angle valves shall be installed to close against pressure. Disc valves shall have discs suitable for the services for which they are to be used.

17. All valves shall be accessible and shall not be installed with the stems below the horizontal plane. Provide access panels at walls, ceilings, or floors.
18. Provide prime coated escutcheon plates at all points where exposed piping penetrates finished wall ceilings or floors.

B. Soil, Waste, Vent, Drain Piping:
1. Soil, waste, and vent piping occurring within the building shall be installed to a uniform minimum grade of ¼" per foot unless otherwise noted. Vent piping shall be graded so that all condensation shall flow directly to a soil or waste line.
2. Exterior soil and waste lines shall be installed to inverts or grades indicated on the drawings.
3. Changes in direction of drainage piping shall be accomplished by the use of appropriate drainage and sanitary fittings.
4. Drilling and tapping of drains, soil, waste, or vent pipes and the use of saddle hubs and bands are prohibited.
5. Protection against breakage of piping passing under or through walls shall be provided using specified sleeves and caulking.
6. Adapters shall be installed between threaded iron and soil pipe.
7. Test tees shall be installed at the foot of all soil, waste, and storm water stacks.
8. Cleanouts shall be located where indicated on the Drawings; at all horizontal offsets; at ends of waste or sewer branches more than 5' in length; at intervals of 100' in straight runs of piping, or at closer intervals if directed or required by local code. Location of cleanouts in finished spaces shall be approved by the Architect prior to installation.

C. Hot, Cold Water Systems:
1. Di-electric unions shall be installed where copper pipe is connected to galvanized steel piping or stub outs.
2. Connections from copper pipe to fixture supply fittings shall be made with copper or brass nipples.
3. Provide 18" high vertical air chambers, of size equal to "local connection schedule" size, at all domestic water connections to fixtures and/or equipment that are not specified to have shock absorbers.
4. All domestic water piping shall be kept clear of the building structure. Where it is within 1" of the building structure it shall be wrapped with felt (3/16" minimum thickness).
5. To the greatest extent possible, domestic cold water piping shall be kept separated from hot piping and where there is a choice shall be run in the coolest portion of the available space.

D. Indirect Waste Piping:
1. Indirect waste piping shall be installed to a uniform minimum grade of ¼" per foot unless otherwise noted.
2. Changes in direction of indirect waste piping shall be accomplished by the use of appropriate drainage fittings.
3. Drilling and tapping of indirect waste pipes and the use of saddle hubs and bands are prohibited.
4. Protection against breakage of piping passing under or through walls shall be provided using specified sleeves and caulking.

E. Natural Gas Piping Systems:
1. Natural gas piping shall slope back to meter where possible; bottom of vertical natural gas lines shall be fitted with 6" long capped drip legs.
2. In addition to main shut-off valve, a natural gas stopcock shall be installed at each natural gas fired piece of equipment.

F. Plumbing Fixtures:
   1. Space between wall mounted fixtures and wall surface shall be neatly pointed up with G.E. silicone rubber compound of color matching fixture.
   2. All exposed bolt heads and nuts used to secure fixtures shall be concealed with vitreous china caps.

G. Roof and Wall Penetrations
   1. Flashing:
      a. All roof and wall penetrations shall be flashed and counterflashed water tight with 26 gauge sheet metal, except as noted.

H. Excavation, Backfill:
   1. Provide all excavation, trenching, and backfill in connection with the work of this Section.
   2. Excavation shall be carried to 4" below the bottom of pipes. Provide a sand bedding for all sloped drainage piping, and provide smooth uniformly graded bedding of firm but yielding material for all other piping, catch basins, and similar structures.
   3. Backfill material shall be non-corrosive and free from all foreign material that could damage pipes. Backfill shall be placed in 6" layers, each layer tamped, and compacted to 95% of maximum dry density (ASTM D-1557-64T (c) compaction test procedure).

3.13 CONNECTION, OWNER FURNISHED EQUIPMENT

A. All electrical wiring and connections for equipment furnished under this Section shall be furnished and installed under the Electrical Sections.

3.14 TESTING, INSPECTIONS

A. General:
   1. This Contractor shall not allow or cause any work of this Section to be covered or enclosed until it has been inspected, tested, and approved by the Architect and the authorities having jurisdiction over the Work. Should any of this work be enclosed or covered up before such inspection, testing, and approval, this Contractor shall uncover the work, have the necessary inspections, tests, and approvals made and, at no expense to the Owner, make all repairs necessary to restore both his work and that of other contractors that may have been damaged, to be in conformity with the Contract Documents.
   2. Contractor shall make all tests required by all local, state, and federal laws, codes, ordinances, and regulations having jurisdiction over this work. Furnish all necessary labor, materials, and equipment for conducting tests, and pay all expenses in connection therewith. Should leaks develop while testing, repairs shall be made, and tests shall be repeated until a satisfactory test result is obtained.
   3. In any test, proper safety procedures and equipment should be used, including personal protective equipment such as protective eyewear and clothing. Installers should always consider local conditions, codes and regulations, manufacturer's installation instructions, and Architects'/Engineers' specifications in any installation.

B. Tests:
   1. Hot and Cold Water Piping: Shall be hydrostatically tested for 6 hours at 150 psi. All equipment shall be tested water tight at utility pressure.
   2. Drainage and Vent Piping: Shall be tested for 1 hour by plugging all outlets and filling the pipes with water to the top of vertical sections of pipes. No loss of water shall be permitted.
   3. Condenser Water Piping: Shall be hydrostatically tested at 125-psi pressure and proved tight before covering. Tests may be made in sections provided connection to service

previously tested is included in each succeeding test. Systems shall be tight for eight hours.

4. Natural Gas Piping: Shall be tested for 24 hours at a pressure of 50 psig with nitrogen or compressed air. No pressure drop shall be allowed during the last 4 hours of the test. Tests joints of natural gas piping with Leak-Tec or Nupro-Snoop solution while maintaining 10 psig minimum internal pressure.

3.15 DOMESTIC WATER SYSTEM STERILIZATION

A. Upon completion of this work, the new domestic water system shall be thoroughly flushed, sterilized and re-flushed. Sterilization and re-flushing shall be performed using the procedure below. All work shall be performed in the presence of the inspector.

B. All domestic water outlets shall have signs posted at their location stating that the water has not been sterilized and shall not be used for human consumption. The signs shall remain until the sterilization process is complete.

C. Procedure
   1. Introduce chlorine or a solution of sodium hypochlorite, filling the lines slowly and supplying the sterilization agent at a rate of 200 parts of chlorine per million. The entire system shall be completely filled with the solution. All valves shall be operated and ends of all branches tested for residual chlorine. Continue to inject the solution until at least 200 ppm of free chlorine is indicated.
   2. After the sterilizing agent has been applied, the system shall be isolated with the solution retained for at least 3 hours. Test for residual chlorine after retention. If less than 200 ppm is indicated, repeat the sterilization procedure.
   3. After satisfactory sterilization, flush the system until all traces of the chemical are removed or until the chlorine content is no greater than that in the existing supply.

D. After a period of 48 hours minimum, bacteriological tests, using samples from at least 3 representative points, shall be made by recognized testing agency, who shall certify to the Architect that the system is bacteriologically safe and at least equal in safety to that of the principal water supply. The laboratory report and certification shall be transmitted to the Architect.

3.16 CLEANING OF PIPING

A. Flush all water piping systems. Remove, clean and replace all strainer baskets prior to final inspection.

3.17 ADJUSTING

A. Properly adjust all stops, and controls, and demonstrate safe and satisfactory operation of all equipment.

3.18 CLEANUP

A. Upon completion of the work of this Section, remove all surplus material, debris, and equipment associated with or used in the performance of this work.

END OF SECTION

SCALE 1" = 10'

SCIENCE

LIBRARY

PERFORMING ARTS CENTER

D BUILDING

C BUILDING

B BUILDING

A WING

STUDENT DROP OFF

STAFF PARKING LOT

REMOVE UPLIFTED FLAGS OF CONCRETE AROUND TREE

REMOVE TREE

REMOVE 172 LF GAS

SAWCUT AT EXISTING SCORELINES (TYP)

PROTECT TREE

PROTECT INLET

REMOVE ELEC VAULT

REMOVE 77 LF ELEC

REMOVE 20 LF W

REMOVE 14 LF SS

REMOVE 193 LF IRR

REMOVE 21 LF SD

REMOVE 166 LF W

ABANDON 130 LF SS REMOVE AS NEEDED

ABANDON 110 LF SS REMOVE AS NEEDED

REMOVE 27 LF SS

REMOVE 21 LF W

REMOVE AWNING

REMOVE AC UNIT

REMOVE 100 LF ELEC

REMOVE BENCH

REMOVE IRRIGATION BOX

REMOVE 40 LF ELEC

REMOVE 85 LF 42" SD

REMOVE 85 LF 12" SD

REMOVE 27 LF 12" SD

REMOVE 87 LF 12" SD

REMOVE OVERHANG

REMOVE 40 LF IRR

REMOVE BOLLARD

REMOVE COLUMN

PROTECT INLET

REMOVE TRUNCATED DOMES WITHIN LIMITS OF REMOVE CONCRETE (TYP)

PROTECT COLUMNS

PROTECT COMM LINES

REMOVE OVERHANG COMMUNICATION LINE TO BE RELOCATED. SEE ELECTRICAL DRAWINGS.

REMOVE WALL

8.1' REMOVE WALL

LEGEND

- REMOVE AC/CONCRETE
- REMOVE BUILDING/OVERHANG
- EXISTING SANITARY SEWER
- EXISTING STORM DRAIN
- EXISTING WATER
- EXISTING IRRIGATION LINE
- EXISTING COMMUNICATION LINE
- EXISTING ELECTRICAL LINE
- EXISTING INLET
- REMOVE UTILITY
- REMOVE TREE

0 10 20 30

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LIBERTY HIGH SCHOOL

NEW CLASSROOM BUILDING

850 2ND STREET
BRENTWOOD, CA
94513

LIBERTY UNION HIGH SCHOOL DISTRICT

REVISIONS

1	8/2022	EXISTING ELEVATIONS
2	8/2022	REMOVE AC

DSA APP NO. 01-119994
ARCH PROJECT NO: 1925.00
DRAWN BY: MJV
DRAWING SCALE: AS SHOWN
PTN: 61721-83 FILE NO: 7-H4
CONSTRUCTION DOCUMENTS
JUNE 24, 2022

SHEET TITLE

EXISTING CONDITIONS/ DEMOLITION

SHEET NUMBER

C-1.0

August 15, 2022

LIBERTY UNION HIGH SCHOOL DISTRICT
REVISED PREQUALIFIED CONTRACTORS
JANUARY 1, 2022 THROUGH DECEMBER 31, 2022

Contractor	Type of License
3D Datacom	C7, C10
ALB, Inc.	A, B
Alten Construction, Inc.	A, B
American Plumbing	B, C4, C36
Arntz Builders	A, B
Avidex Industrial	C7, C10
B&H Electric	C10
Bana Builders	B
Bay Cities Fire Protection	C16
Bay City Mechanical	C4, C20, C36, C43
Beals Martin, Inc.	A, B
Bell Products	A, B, C4, C20, C36, C43
Best Contracting	A, B, C43
BHM Construction	A, B
Bobo Construction	A, B, C20, C36, C43
Bockmon & Woody Electric Co., Inc.	C10
Bowen Engineering & Environmental	A, B, C10
Cal Coast Telecom	C7
Charles Pankow Builders	B
Collins Electrical	A, B, C10
Con J Franke Electric, Inc.	C10
Consolidated Engineering	A
CWS Construction Group	A, B
DDK Mechanical	B, C20, C36, C43
DecoTech Systems	B, C7, C10
Del Monte Electric	C10
Diede Construction, Inc.	A, B
Dinelli Plumbing, Inc.	C36
Diversified Power Corp	C10
DL Falk Construction, Inc.	B
Dowdle & Sons Mechanical	A, B, C4, C20, C36
Du-Mor Fire Systems, Inc.	C16
Edward W. Scott Electric	A, B, C10
EF Brett and Company	A, B
F & H Construction	A, B
Fertado Heating and Air	C20, C43
GCCI, Inc.	B
GP Mechanical	C20
Granite Rock Company	A, B

KS Plumbing	C36
Marquee Fire Protection	C16
Martinez Sheet Metal	B, C4, C20, C36, C38, C43
Matrix HG, Inc.	B, C4, C10, C20, C36, C38, C43
McGuire & Hester	A, B
Meehlies Modular Buildings, Inc.	B
Midstate Construction	B
Pacific Coast General Engineering	A
Paschke Electric	C10
PCD	C7, C10
Point One Electrical Systems	B, C7, C10
Presidential Fire Protection	C16
Quality Sound	C7, C10
RCM Fire Protection	B, C16
Robert A. Bothman, Inc.	A, B
Rodan Construction	A, B
Roebbelen Construction	A, B
Saboo, Inc.	A, B, C10, C20
Sausal Corporation	B
Sebastian Corporation	A, B, C7, C10
Smith and Sons Electric	C10
Southern Bleacher Company	A
Sturdiesteel Company	A
SW Allen Construction, Inc.	A, B
Trahan Mechanical	C20, C43
Vanden Bos Electric	B, C7, C10
Wilkinson Electric	C10
Zapein Electric	C10, C38
Zovich & Sons, Inc.	A, B

ASBESTOS SURVEY REPORT

850 2ND STREET (B Building)
Brentwood CA 94513

Received on August 11, 2022

Report by:

Curtis Roberts Inspections
3601 West Haack Court
Elk Grove CA 95758
Curtis Roberts SST 12-4974

Table of Contents

1. **Executive Summary**

Curtis Roberts Inspection

Site Surveillance Technician #12-4974

Curtis Roberts Inspection was retained by ***Liberty High School.*** to perform an Asbestos Hazard Emergency Response Act (AHERA) style asbestos survey of the planned renovation of a classroom (B) to determine the locations of accessible and to the extent feasible, inaccessible friable and non-friable asbestos containing building materials (ACBM). Friable materials are materials that can be reduced to powder with hand pressure such as fireproofing, sprayed-on acoustic ceilings, ceiling tile, pipe insulation, and other thermal systems insulation. All other materials such as floor tile, adhesives, plaster, stucco, and sheet rock mudding compounds are considered non-friable materials.

Because friable materials are more likely to release asbestos fibers into the air when disturbed than non-friable materials, friable materials are considered a greater health concern. Curtis Roberts Inspection performed an Asbestos Hazard Emergency Response Act (AHERA) style asbestos survey of the classroom (B) to identify ACBM. This report identifies the locations and asbestos content of friable and non-friable ACBM, provides assessment of the friable ACBM in relation to the material's hazard potential to building occupants and provides removal cost estimates.

Any identified suspect asbestos-containing materials will be summarized in Section 3.
Materials testing positive for asbestos including material assessments, recommended response actions, and quantities are described in Section 4.

DISCLAIMER
The information in this report or portions thereof may be required to be included in notifications to employees, contractors or other visitors to the building(s). This report is not intended to be used as a sole specification or work plan for any of the work suggested or recommended in this report.

This report is based upon conditions and practices observed at the property and Information made available to the surveyor. This report does not intend to identify all hazards or unsafe practices, nor to indicate that other hazards or unsafe practices do not exist at the premises.

Section 2

Description of slated renovation areas

Number of Floors: 1
Square Footage: +/- 3,500 sq. ft.+/- per unit

Wood Frame
Exterior Stucco
Raised floor

Exterior Roof construction components consist of:
Tar

Section 3 Summary of Findings for ACM -ASBESTOS INSPECTION-

I , **Curtis Roberts SST #12-4974** certify that the construction located at

Curtis Roberts Inspection

Site Surveillance Technician #12-4974

850 – 2ND STREET (B), Brentwood CA 94513

(Building Address, Including Floor and Suite Number)

has been inspected for asbestos containing material and complies with Title 8 Code of California Regulations, "Asbestos Survey Standards for Buildings to be Renovated or Demolished", as promulgated by California Department of Safety and Health (DOSH) and "Clean Air Act" (NESHAP) and OSHA, "Standards for Construction Workers" and found that;

For General Construction:

____ 1. The building or area being renovated has been tested by a licensed Site Surveillance Technician/Certified Asbestos Consultant and no asbestos containing materials regulated by the California State codes or standards were found.

__X__ 2. The building or area being renovated has been tested by a Site Surveillance Technician and is found to have asbestos containing more than 1% (flooring mastic). The asbestos containing material will be removed or encapsulated as required by the above codes and standards, and final clearance levels indicated compliance will be obtained before the area is reoccupied.

____ 3. The combined amount of regulated asbestos containing material is less than the 260 linear feet on pipes, 160 square feet on other facility components, or less than 35 cubic yards when removed from the facility components.

____ 4. The area being renovated or demolished is a single-family dwelling or a residential housing unit with four or less units. These units will not be used for commercial or public use.

Structure information: (check all that apply)
A __The building is a single-family dwelling.
B __The building is residential housing consisting of 4 or fewer dwelling units.
C__ The building is a commercial facility
D_x_ The building is a K-12 school or Federal facility.

Summary-

On 12/20/2019, 7/17/2021, 6/24/2022, 8/10/2022 I, (Curtis Roberts, SST 12-4974) conducted the inspection and bulk sampling at the above listed address.

Respectfully

Curtis Roberts SST

Respectfully,

Dominick Sager
Senior Consultant
CAC #13-5082
CDPH #24356
NV #IM1131
Mycometer
MMA-0226-US | MMS-1258-US | BQS-0118-US
3601 West Haack Court Elk Grove CA 95758 916-690-4884

B Building

Inside B Classroom

Roof
Ceiling Tiles

5. Regulatory Requirements

Curtis Roberts Inspection

Site Surveillance Technician #12-4974

The following is a summary of the major asbestos notification and information requirements in 8 CCR 1529, 5203, 341.6-341.14 and the California Health & Safety Code. See the codes for the complete requirements. Note: Employers also have additional informational duties towards their employees under 8 CCR 1529, 1509 or 3203 (the Injury and Illness Prevention Program requirements for construction and general industry), 3204 (Access to Employee Exposure and Medical Records), as well as other Title 8 regulations.

Employers performing work subject to 8 CCR 1529:

- If less than 100 sq.ft. of asbestos-containing construction materials and therefore not subject to the asbestos registration rules, file a Report of Use with the Chief of DOSH (Cal/OSHA)
- Determine the location and quantity of asbestos-containing material (ACM) and/or presumed ACM (PACM) based on the criteria in 1529(k)(1); {ref. 1529(k)(3)(A)}
- If at a temporary worksite, notify the nearest Cal/OSHA District Enforcement Office 24 hours prior to work (ref. 1529(r) & 5203)
- Any incident resulting an employee exposure in excess of the PEL and/or excursion limit by reporting in writing to the Chief of DOSH within 15 days. (ref. 1529(r) & 5203)
- Through meetings or other methods, inform employees, building owner and other employers on site, prior to work, about the location and quantity of ACM and/or PACM, the nature of their work, requirements pertaining to regulated areas, as well as the means to prevent asbestos air contamination; and {ref. 1529(d)(1) & (k)(3)
- Post a warning sign outside the regulated area that is understandable to employees working in and contiguous to the area {ref. 1529(e)(2) and (k)(7)}
- As soon as possible, notify affected employees regarding the results of personal air monitoring {ref. 1529(f)(5)}
- Within 10 days of completing the work, regarding the location and quantity of remaining asbestos, as well as any final monitoring results {ref. 1529(k)(3)(C)}

See 8 CCR 1529 for the exact requirements. There are additional notification duties to the local air quality district or the U.S.EPA.

Employers performing work subject to 8 CCR Article 2.5 Registration- Asbestos-Related Work:

- Send notices of temporary worksites to the nearest Cal/OSHA District Office 24 hours prior to the start of each job {ref. 341.9}
- Hold a pre-job safety meeting to discuss safety program and safe work practices with employees, their representatives, and the building owner or their representative (for work covered by asbestos registration) {ref. 341.11}
- Post a warning sign readable at 20 feet {ref. 341.10(a); see also 1529(e)(2) and (k)(7) for similar and additional requirements)}
- Before the commencement of the work, provide a copy of the registration to the prime contractor and other employers at the site. Also, post a copy beside the Cal/OSHA poster. {ref. 341.10(b)}
- See 8 CCR, Article 2.5, for the exact requirements.

Building Owners:

- Prior to beginning work, determine the location and quantity of ACM and/or PACM based on the criteria in 1529(k)(1); {ref. 1529(k)(2)(A)}
- Notify in writing or by personal communication the following or their authorized representatives: {ref. 1529(k)(2)(B)

  - Prospective employers applying or bidding for work and all other employers with employees who will work in or adjacent to areas with such material
  - The building owner's employees working in or adjacent to these areas; and
  - Tenants who will occupy areas containing such material
  - If they are owners of public and commercial buildings constructed prior to 1979 and know that the building contains asbestos-containing construction materials, provide information to all occupants. For more details view the regulations of the Health & Safety Code, Division 20, Chapter 10.4 Asbestos Notification, 25915-25919.7 at www.leginfo.ca.gov/calaw.html This code is enforced by city or county jurisdictions, not Cal/OSHA.
  - If a school district, are required by the U.S. EPA to have a management plan and surveys of where asbestos is known or presumed to be present. Contact the U.S. EPA Region 9 Asbestos Regional Coordinator for information.

All Employers:

- Ascertain on a daily basis, the integrity of enclosures and or the effectiveness of other control methods used in regulated areas their employees are working adjacent to. {ref. 1529(d)(4)}
- If they discover their employees are exposed to asbestos they must protect them by, for example, removal from the area or performing an initial exposure assessment. ref. 1529(k)(4)}
- If they discover ACM or PACM they must inform the building owner and other employers of employees working at the work site within 24 hours {ref. 1529(k)(4)}
- In cases when material they reasonably believe to be asbestos has not been rendered harmless, to stop work in affected areas. See section 25914.2(c) of the California Health and Safety Code for the exact requirements.

General Contractors:

- Ascertain whether the asbestos contractor is in compliance with 8 CCR section 1529(d)(5)} and require them to come into compliance when necessary

Appendix **A**
Definitions of Terms and Assessment Criteria

This survey report organizes information on each suspect ACBM identified in tables located in Section 4. This section defines the terms used to describe materials listed in Section 4.

Material description contains the description of the suspect homogeneous asbestos containing building material.

Material Serial Number is used to reference the material for reinspections, etc..

Asbestos type and content describes the type of asbestos and its percentage in the material.

Asbestos Results for positive materials are shown as a percentage. Samples having less than 1% asbestos are reported as containing “Trace” amounts of asbestos and samples with no detected asbestos are reported as “BLD” or below limit of detection.

Sample number(s) identifies a particular material sample obtained from a specific sample location. Sample numbers are used primarily for laboratory identification.

Sample Location identifies where the samples of this material were obtained.

Material Category categorizes each material as surfacing, TSI or miscellaneous.
Surfacing Materials - Asbestos containing materials that are sprayed-on, trowled-on or otherwise applied to surfaces, such as acoustical plaster on ceilings and fireproofing on structural members, or other materials on surfaces for acoustical, fireproofing, or other purposes.
Thermal Systems Insulation (TSI) - Asbestos containing materials applied to pipes, fittings, boilers, breaching, tanks, ducts or other interior structural components to prevent heat loss or gain or water condensation.
Miscellaneous Materials - Asbestos containing materials applied to or a part of building components that are not classified as surfacing materials or thermal systems insulation.

Quantity & Units reports approximate total quantity per unit of measure for each material.

Building(s) & Floor(s) specifies where a material is located.

Material Location describes where the material is found throughout the building.

Material Condition identifies the material as Friable, Non-friable or Jacketed (for thermal systems insulation only) if asbestos is present.

Friable - An asbestos containing material that can be crumbled, pulverized or reduced to powder, when dry, by hand pressure, such as spray applied fireproofing on structural steel members, spray applied acoustical ceiling materials or damaged thermal systems insulation. Friable materials are of greatest concern due to their potential fiber release.

Non-Friable - An asbestos containing material where the asbestos is bound tightly in a matrix or sealed by a protective layer. Non-friable materials can become friable by being rendered to a crumbled, pulverized or powdered state, when dry, by crushing, sanding, sawing, shot-blasting, severe weathering or by other mechanically induced means. Common examples of non-friable materials are adhesives, floor tiles, transite and roofing materials.

Jacketed - An asbestos containing material applied to thermal systems insulation and “jacketed” with a protective outer layer such as canvas or metal to keep the material in good condition. Undamaged jacketed ACBM is considered non-friable. If the jacketing is damaged, the material is considered friable.

Damage Category describes the type of damage, if any, to the material. The following damage categories are used: None, Physical, Air, and Water.

Material Assessment identifies the condition of the material in relation to physical and water damage, delamination of the material from its substrate, the extent of the damage and the potential for damage from building conditions, such as, accessibility by building occupants, influence of vibration, etc. The six standard assessment categories ranked by hazard

potential, with the first being the lowest hazard are as follows: 1) Potential for Damage, 2) Potential for Significant Damage, 3) Damaged, 4) Damaged with Potential for Damage, 5) Damaged with Potential for Significant Damage, and 6) Significantly Damaged. Only friable materials are assessed under AHERA regulations. Non-friable materials, unless damaged, are not assessed and can be assumed to be in good condition.

Damaged - The damage or deterioration of the material results in inadequate cohesion or adhesion with crumbling, blistering, water stains, marring or otherwise abraded over less than on-tenth (1/10) of the surface if the damage is evenly distributed or one-fourth (1/4) if the damage is localized.
Significant Damage - The damage or deterioration of the material results in inadequate adhesion or cohesion and the damage is extensive and severe with one or more of the following characteristics: 1) Crumbling or blistering over at least one-tenth (1/10) of the surface if evenly distributed, one-fourth (1/4) if the damage is localized; 2) Areas of the material hanging from the surface, delaminated, or showing adhesive failure; 3) Water stains, gouges or marred.

Recommended Response suggests the appropriate options for controlling or maintaining ACBM in a safe manner. There are four options used:

Operations & Maintenance (O&M) - A program designed to “manage” asbestos in-place. As long as asbestos containing materials remain in a building, an O&M program should be instituted to alert maintenance personnel, custodial workers and outside vendors of the existence and location of these materials and to set a policy for the maintenance of these materials. The material is usually only required to be removed if it is significantly damaged, prior to demolition of the building or if it will be disturbed by renovation activities.

Repair - The restoration of damaged or deteriorated asbestos containing building materials to an intact condition. Once the intact condition is established, the material should be included in an O&M program. The material is usually only required to be removed if it is significantly damaged, prior to demolition of the building or if it will be disturbed by renovation activities.

Abate Due to Condition - This material is significantly damaged and is unsafe in its current condition. The access to the area should be restricted to personnel equipped with appropriate personal protection. This material should be properly removed by a licensed contractor using workers trained in the safe removal of asbestos.

Abate Prior to Renovation - This material should be properly removed prior to planned renovation activities by a licensed contractor using workers trained in the safe removal of asbestos. This recommendation is usually made only on survey reports prepared prior to planned renovation activities.

Comments & Damage Description contains any additional information and or specific details of material damage are noted here. **EPA Category** provides the appropriate material category as outlined in the NESHAPS regulation. The four options are friable, Category 1, Category 2, and needs determination.

Friable - Materials containing greater than 1% asbestos are always considered Regulated Asbestos Containing Materials (RACM) that require removal prior to building renovation or demolition activities that impact the material.

Category 1 - Materials that are bituminous non-friable and contain more than 1% asbestos that become RACM and require removal only when will be subject to grinding, cutting, sanding or abrading.

Category 2 - Materials that are non-friable and contain more than 1% asbestos that will have a high probability of being crumbled, pulverized or reduced to a powder by the demolition or renovation activity. These material usually become RACM and will require removal.

Needs Determination - Materials that the individual designing the abatement and demolition project needs to inspect and evaluate to determine the potential for the material to become RACM and/or evaluate the asbestos content for the composite and individual layers of the material. For sheet rock with mudding compounds only, the EPA allows using the composite sample result. If the composite result by Point Counting the sample is below 1% asbestos, the material is not RACM.

Appendix B
Bulk Sampling Protocol and Analytical Methods

Bulk samples of suspect asbestos containing building materials were obtained using standard industrial hygiene techniques including wetting friable materials to minimize fiber release. When necessary, our personnel wore half-face air purifying respirators equipped with high efficiency particulate (HEPA) filters while obtaining samples.

Our sampling strategy for suspect friable surfacing materials was based on the guidelines outlined in the EPA publication “Asbestos in Buildings: Simplified Sampling Scheme for Friable Surfacing Materials,” the procedures outlined in 40 CFR 763, Subpart E (AHERA), and the standards of the Texas Department of Health presented in the Texas Asbestos Health Protection Rules. For non-friable suspect materials, AHERA requires the building inspector to determine the appropriate number of samples to obtain and analyze. As required by the Texas Department of Health, a minimum of three samples were collected for each suspect material.

For each homogeneous material identified by visual inspection as suspect material, random samples are obtained. A bulk sample is randomly selected from each homogeneous material for first-round testing. If the sample is positive, the remaining samples are not analyzed; if the sample is negative, the other samples are submitted for study. Every sample must be reported negative if the material is to be considered non-asbestos containing.

The bulk samples were delivered to an independent laboratory that participates in the bulk sample proficiency analysis program conducted by the United States Environmental Protection Agency and is accredited by the National Voluntary Laboratory Program (NVLAP). The samples were analyzed using Polarized Light Microscopy (PLM) with dispersion staining to estimate the percent of asbestos composition by volume. Samples with no observable asbestiform minerals are designated as Non-Detect (ND). Samples in which asbestiform minerals are observed, but exist in concentrations of less than one percent (<1%), are designated as present in Trace (TR) amounts; all other samples are designated as asbestos containing with the appropriate percent of asbestos noted.

ASBESTOS SURVEY REPORT

850 2nd STREET (C Building)
Brentwood CA 94513

Received on August 11, 2022

Report by:

Curtis Roberts Inspections
3601 West Haack Court
Elk Grove CA 95758
Curtis Roberts SST 12-4974

Table of Contents

1. **Executive Summary**

Curtis Roberts Inspection

Site Surveillance Technician #12-4974

Curtis Roberts Inspection was retained by ***Liberty High School.*** to perform an Asbestos Hazard Emergency Response Act (AHERA) style asbestos survey of the planned renovation of a classroom (C) to determine the locations of accessible and to the extent feasible, inaccessible friable and non-friable asbestos containing building materials (ACBM). Friable materials are materials that can be reduced to powder with hand pressure such as fireproofing, sprayed-on acoustic ceilings, ceiling tile, pipe insulation, and other thermal systems insulation. All other materials such as floor tile, adhesives, plaster, stucco, and sheet rock mudding compounds are considered non-friable materials.

Because friable materials are more likely to release asbestos fibers into the air when disturbed than non-friable materials, friable materials are considered a greater health concern. Curtis Roberts Inspection performed an Asbestos Hazard Emergency Response Act (AHERA) style asbestos survey of the classroom (C) to identify ACBM. This report identifies the locations and asbestos content of friable and non-friable ACBM, provides assessment of the friable ACBM in relation to the material's hazard potential to building occupants and provides removal cost estimates.

Any identified suspect asbestos-containing materials will be summarized in Section 3.
Materials testing positive for asbestos including material assessments, recommended response actions, and quantities are described in Section 4.

DISCLAIMER

The information in this report or portions thereof may be required to be included in notifications to employees, contractors or other visitors to the building(s). This report is not intended to be used as a sole specification or work plan for any of the work suggested or recommended in this report.

This report is based upon conditions and practices observed at the property and Information made available to the surveyor. This report does not intend to identify all hazards or unsafe practices, nor to indicate that other hazards or unsafe practices do not exist at the premises.

Section 2

Description of slated renovation areas

Number of Floors: 1
Square Footage: +/- 3,500 sq. ft.+/- per unit

Wood Frame
Exterior Stucco
Raised floor

Exterior Roof construction components consist of:
Tar

Section 3 Summary of Findings for ACM -ASBESTOS INSPECTION-

I , **Curtis Roberts SST #12-4974** certify that the construction located at

Curtis Roberts Inspection

Site Surveillance Technician #12-4974

850 – 2nd Street (C), Brentwood CA 94513

(Building Address, Including Floor and Suite Number)

has been inspected for asbestos containing material and complies with Title 8 Code of California Regulations, "Asbestos Survey Standards for Buildings to be Renovated or Demolished", as promulgated by California Department of Safety and Health (DOSH) and "Clean Air Act" (NESHAP) and OSHA, "Standards for Construction Workers" and found that;

For General Construction:

____ 1. The building or area being renovated has been tested by a licensed Site Surveillance Technician/Certified Asbestos Consultant and no asbestos containing materials regulated by the California State codes or standards were found.

__X__ **2. The building or area being renovated has been tested by a Site Surveillance Technician and is found to have asbestos containing more than 1% (mastic flooring, Window puddy, boiler insulation), less than 1% (joint compound in sheetrock). The asbestos containing material will be removed or encapsulated as required by the above codes and standards, and final clearance levels indicated compliance will be obtained before the area is reoccupied.**

____ 3. The combined amount of regulated asbestos containing material is less than the 260 linear feet on pipes, 160 square feet on other facility components, or less than 35 cubic yards when removed from the facility components.

____ 4. The area being renovated or demolished is a single-family dwelling or a residential housing unit with four or less units. These units will not be used for commercial or public use.

Structure information: (check all that apply)
A __The building is a single-family dwelling.
B __The building is residential housing consisting of 4 or fewer dwelling units.
C__ The building is a commercial facility
D_x_ The building is a K-12 school or Federal facility.

Summary-

On 12/31/2019 6/24/2021, 7/17/2022, 8/10/2022 I, (Curtis Roberts, SST 12-4974) conducted the inspection and bulk sampling at the above listed address.

Respectfully

Curtis Roberts SST

Respectfully,

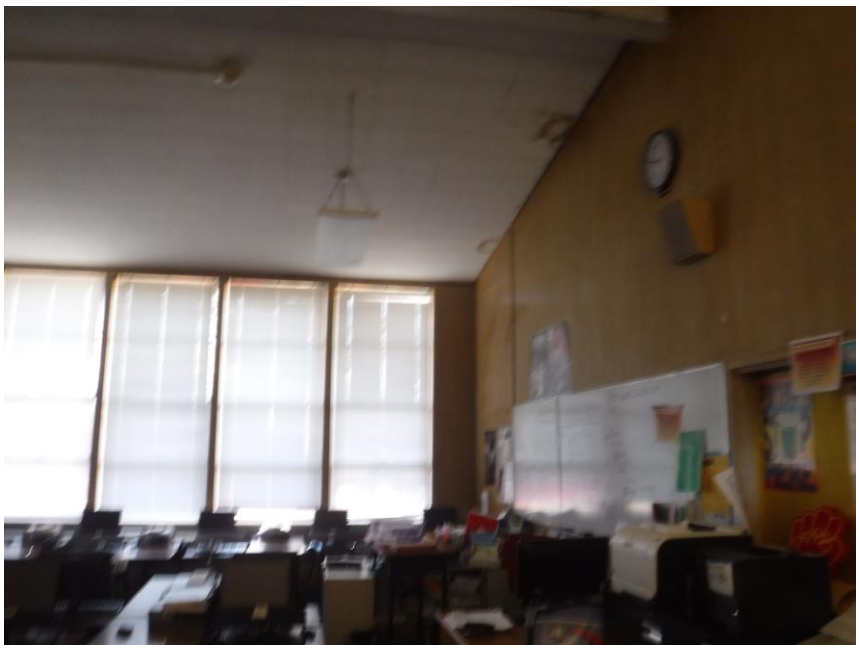
Curtis Roberts Inspection

Site Surveillance Technician #12-4974

Dominick Sager
Senior Consultant
CAC #13-5082
CDPH #24356
NV #IM1131
Mycometer
MMA-0226-US | MMS-1258-US | BQS-0118-US

C Building

Inside C Classroom



Roof
Ceiling Tiles

BLACK MASTIC

5. Regulatory Requirements

The following is a summary of the major asbestos notification and information requirements in 8 CCR 1529, 5203, 341.6-341.14 and the California Health & Safety Code. See the codes for the complete requirements. Note: Employers also have additional informational duties towards their employees under 8 CCR 1529, 1509 or 3203 (the Injury and Illness Prevention Program requirements for construction and general industry), 3204 (Access to Employee Exposure and Medical Records), as well as other Title 8 regulations.

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- Any incident resulting an employee exposure in excess of the PEL and/or excursion limit by reporting in writing to the Chief of DOSH within 15 days. (ref. 1529(r) & 5203)
- Through meetings or other methods, inform employees, building owner and other employers on site, prior to work, about the location and quantity of ACM and/or PACM, the nature of their work, requirements pertaining to regulated areas, as well as the means to prevent asbestos air contamination; and {ref. 1529(d)(1) & (k)(3)
- Post a warning sign outside the regulated area that is understandable to employees working in and contiguous to the area {ref. 1529(e)(2) and (k)(7)}
- As soon as possible, notify affected employees regarding the results of personal air monitoring {ref. 1529(f)(5)}
- Within 10 days of completing the work, regarding the location and quantity of remaining asbestos, as well as any final monitoring results {ref. 1529(k)(3)(C)}

See 8 CCR 1529 for the exact requirements. There are additional notification duties to the local air quality district or the U.S.EPA.

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- The building owner's employees working in or adjacent to these areas; and
- Tenants who will occupy areas containing such material
- If they are owners of public and commercial buildings constructed prior to 1979 and know that the building contains asbestos-containing construction materials, provide

information to all occupants. For more details view the regulations of the Health & Safety Code, Division 20, Chapter 10.4 Asbestos Notification, 25915-25919.7 at www.leginfo.ca.gov/calaw.html This code is enforced by city or county jurisdictions, not Cal/OSHA.

- If a school district, are required by the U.S. EPA to have a management plan and surveys of where asbestos is known or presumed to be present. Contact the U.S. EPA Region 9 Asbestos Regional Coordinator for information.

All Employers:

- Ascertain on a daily basis, the integrity of enclosures and or the effectiveness of other control methods used in regulated areas their employees are working adjacent to. {ref. 1529(d)(4)}
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- If they discover ACM or PACM they must inform the building owner and other employers of employees working at the work site within 24 hours {ref. 1529(k)(4)}
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- Ascertain whether the asbestos contractor is in compliance with 8 CCR section 1529(d)(5)} and require them to come into compliance when necessary

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Asbestos Results for positive materials are shown as a percentage. Samples having less than 1% asbestos are reported as containing “Trace” amounts of asbestos and samples with no detected asbestos are reported as “BLD” or below limit of detection.

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Sample Location identifies where the samples of this material were obtained.

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Surfacing Materials - Asbestos containing materials that are sprayed-on, trowled-on or otherwise applied to surfaces, such as acoustical plaster on ceilings and fireproofing on structural members, or other materials on surfaces for acoustical, fireproofing, or other purposes.
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Miscellaneous Materials - Asbestos containing materials applied to or a part of building components that are not classified as surfacing materials or thermal systems insulation.

Quantity & Units reports approximate total quantity per unit of measure for each material.

Building(s) & Floor(s) specifies where a material is located.

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Jacketed - An asbestos containing material applied to thermal systems insulation and “jacketed” with a protective outer layer such as canvas or metal to keep the material in good condition. Undamaged jacketed ACBM is considered non-friable. If the jacketing is damaged, the material is considered friable.

Damage Category describes the type of damage, if any, to the material. The following damage categories are used: None, Physical, Air, and Water.

Material Assessment identifies the condition of the material in relation to physical and water damage, delamination of the material from its substrate, the extent of the damage and the potential for damage from building conditions, such as, accessibility by building occupants, influence of vibration, etc. The six standard assessment categories ranked by hazard potential, with the first being the lowest hazard are as follows: 1) Potential for Damage, 2) Potential for Significant Damage, 3) Damaged, 4) Damaged with Potential for Damage, 5) Damaged with Potential for Significant Damage, and 6) Significantly Damaged. Only friable materials are assessed under AHERA regulations. Non-friable materials, unless damaged, are not assessed and can be assumed to be in good condition.

Damaged - The damage or deterioration of the material results in inadequate cohesion or adhesion with crumbling, blistering, water stains, marring or otherwise abraded over less than on-tenth (1/10) of the surface if the damage is evenly distributed or one-fourth (1/4) if the damage is localized.
Significant Damage - The damage or deterioration of the material results in inadequate adhesion or cohesion and the damage is extensive and severe with one or more of the following characteristics: 1) Crumbling or blistering over at least one-tenth (1/10) of the surface if evenly distributed, one-fourth (1/4) if the damage is localized; 2) Areas of the material hanging from the surface, delaminated, or showing adhesive failure; 3) Water stains, gouges or marred.

Recommended Response suggests the appropriate options for controlling or maintaining ACBM in a safe manner. There are

four options used:

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Repair - The restoration of damaged or deteriorated asbestos containing building materials to an intact condition. Once the intact condition is established, the material should be included in an O&M program. The material is usually only required to be removed if it is significantly damaged, prior to demolition of the building or if it will be disturbed by renovation activities.

Abate Due to Condition - This material is significantly damaged and is unsafe in its current condition. The access to the area should be restricted to personnel equipped with appropriate personal protection. This material should be properly removed by a licensed contractor using workers trained in the safe removal of asbestos.

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Friable - Materials containing greater than 1% asbestos are always considered Regulated Asbestos Containing Materials (RACM) that require removal prior to building renovation or demolition activities that impact the material.

Category 1 - Materials that are bituminous non-friable and contain more than 1% asbestos that become RACM and require removal only when will be subject to grinding, cutting, sanding or abrading.

Category 2 - Materials that are non-friable and contain more than 1% asbestos that will have a high probability of being crumbled, pulverized or reduced to a powder by the demolition or renovation activity. These material usually become RACM and will require removal.

Needs Determination - Materials that the individual designing the abatement and demolition project needs to inspect and evaluate to determine the potential for the material to become RACM and/or evaluate the asbestos content for the composite and individual layers of the material. For sheet rock with mudding compounds only, the EPA allows using the composite sample result. If the composite result by Point Counting the sample is below 1% asbestos, the material is not RACM.

Appendix B
Bulk Sampling Protocol and Analytical Methods

Bulk samples of suspect asbestos containing building materials were obtained using standard industrial hygiene techniques including wetting friable materials to minimize fiber release. When necessary, our personnel wore half-face air purifying respirators equipped with high efficiency particulate (HEPA) filters while obtaining samples.

Our sampling strategy for suspect friable surfacing materials was based on the guidelines outlined in the EPA publication "Asbestos in Buildings: Simplified Sampling Scheme for Friable Surfacing Materials," the

procedures outlined in 40 CFR 763, Subpart E (AHERA), and the standards of the Texas Department of Health presented in the Texas Asbestos Health Protection Rules. For non-friable suspect materials, AHERA requires the building inspector to determine the appropriate number of samples to obtain and analyze. As required by the Texas Department of Health, a minimum of three samples were collected for each suspect material.

For each homogeneous material identified by visual inspection as suspect material, random samples are obtained. A bulk sample is randomly selected from each homogeneous material for first-round testing. If the sample is positive, the remaining samples are not analyzed; if the sample is negative, the other samples are submitted for study. Every sample must be reported negative if the material is to be considered non-asbestos containing.

The bulk samples were delivered to an independent laboratory that participates in the bulk sample proficiency analysis program conducted by the United States Environmental Protection Agency and is accredited by the National Voluntary Laboratory Program (NVLAP). The samples were analyzed using Polarized Light Microscopy (PLM) with dispersion staining to estimate the percent of asbestos composition by volume. Samples with no observable asbestiform minerals are designated as Non-Detect (ND). Samples in which asbestiform minerals are observed, but exist in concentrations of less than one percent (<1%), are designated as present in Trace (TR) amounts; all other samples are designated as asbestos containing with the appropriate percent of asbestos noted.