Project Manual for:

Empire Apartments
Plumbing Stack Replacement

54 4th Ave. N
St. Cloud, MN 56303



100% CD Bid Set
August 3, 2026

B/A Project No.: 625-47

Blumentals Architecture

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DOCUMENT 000107 **- SEALS PAGE**

PART 1 - GENERAL

1.1 DESIGN PROFESSIONALS OF RECORD

A. Architect:

1. James Moy
2. License number: 27036
3. Responsible for Divisions 01-49 Sections except where indicated as prepared by other design professionals of record.

B. Architect Firm:

1. Blumentals/ Architecture Inc.
2. Responsible for Divisions 01-49 Sections except where indicated as prepared by other design professionals of record.

C. Mechanical Engineer, Plumbing:

1. Design Tree Engineering.
2. Responsible for Division 22.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF DOCUMENT 000107

DOCUMENT 000115 **- LIST OF DRAWING SHEETS**

PART 1 - GENERAL

1.1 LIST OF DRAWINGS

A. Drawings: Drawings that will be enumerated in the Owner/Contractor Agreement as part of the Contract Documents are listed on the Table of Contents page of the separately bound drawing set titled 100% CD Bid Set>, dated 08/03/2026 as modified by subsequent Addenda and Modifications.

1. The words "Resource Drawing" or "For information" after the titles of drawings indicate that those drawings are not intended to be incorporated in the Contract Documents.

B. List of Drawings: Drawings that will be enumerated in the Owner/Contractor Agreement as part of the Contract Documents are the following Drawings and other drawings of type indicated, as modified by subsequent Addenda and Modifications:

1. Insert, in separate subparagraphs, drawing numbers and titles. Include the words "Resource Drawing" or "For information" after the titles of drawings that are not intended to be incorporated in the Contract Documents.

		ISSUE DATE
TITLE SHEET		
T	TITLE	08/03/2026
CIVIL		
ARCHITECTURAL		
A100	PHASING PLANS - OVERALL	08/03/2026
A101	PHASING PLANS - PHASE 1	08/03/2026
A102	PHASING PLANS - PHASE 2	08/03/2026
A103	PHASING PLANS - PHASE 3	08/03/2026
A104	PHASING PLANS - PHASE 4	08/03/2026
A105	PHASING PLANS - PHASE 5	08/03/2026
A106	PHASING PLANS - PHASE 6	08/03/2026
A107	FIRST FLOOR PLANS	08/03/2026
A200	ELEVATIONS AND WALL TYPES	08/03/2026
PLUMBING		
P001	PLUMBING SYMBOLS AND LEGEND	08/03/2026
P100	PLUMBING DEMOLITION PLAN - UNDERGROUND	08/03/2026
P101	PLUMBING DEMOLITION PLANS	08/03/2026
P102	PLUMBING DEMOLITION PLANS	08/03/2026
P103	PLUMBING DEMOLITION PLANS - ROOF & PENTHOUSE	08/03/2026
P300	PLUMBING PLAN - UNDERGROUND	08/03/2026
P301	PLUMBING PLANS	08/03/2026
P302	PLUMBING PLANS	08/03/2026
P401	PLUMBING ISOMETRICS	08/03/2026
P402	PLUMBING ISOMETRICS	08/03/2026
P501	PLUMBING PLANS - ROOF & PENTHOUSE	08/03/2026
P601	PLUMBING ENLARGED PLANS	08/03/2026
P602	PLUMBING ENLARGED PLANS	08/03/2026
P701	PLUMBING DETAILS	08/03/2026
P702	PLUMBING DETAILS	08/03/2026
P801	PLUMBING SCHEDULES	08/03/2026

1.2

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF DOCUMENT 000115

DOCUMENT 001113 - ADVERTISEMENT FOR BIDS

PART 1 - GENERAL

1.1 PROJECT INFORMATION

A. Notice to Bidders: Qualified Bidders to submit bids for Project as described in this Document and in accordance with the Instructions to Bidders.

1. Regulatory Requirements: is to govern submittal, opening, and award of bids.

B. Project Identification: Empire Apartments Plumbing Stack Replacement.

1. Project Location: 54 4th Ave N., St. Cloud, MN 56303.

C. Owner: St Cloud HRA

1. Owner's RepresentativePaul Soenneker, Project Manager. psoenneker@stcloudhra.com 320-202-3147

D. Architect: Blumentals/Architecture

E. Project Description:

PROJECT CONSISTS OF THE SANITARY AND DOMESTIC PIPE REPLACEMENT WITHIN VERTICAL STACKS AND THE HORIZONTAL CONNECTIONS FROM STACK TO SINKS (SINKS REMAINING BUT FAUCETS NEW), SHOWER (REMAINING) AND TOILET (REPLACE) WITHIN EACH UNIT.

1. Project cost range is anticipated to be under <**Insert amount**>.

F. Construction Contract: Bids will be received for the following Work:

1. General contract (all trades).

Issue Bid: 8/10/26
Walk Through: 8/20/26
Addendum: 8/25/26
Bid Closing: 9/9/26
Bid Award: 9/11/26

1.2 BID SUBMITTAL AND OPENING

1.3 BID SECURITY

A. Submit bid security with each Bid in the stipulated form and in the amount identified in the Instructions to Bidders.

B. No bids may be withdrawn for a period of [**60**] days after opening of bids. Owner reserves the right to reject any and all bids and to waive informalities and irregularities.

1.4 PREBID MEETING

A. Prebid Meeting: See Document 002513 "Prebid Meetings."

B. Prebid Meeting and Site Walkthrough, In Person: A prebid meeting for all Bidders will be held at 54 4th Ave N, St Cloud MN 56303 on 8/20/2026 at [**10:00 a.m.**], local time.

C. Bidders' Questions: Architect will provide responses at prebid conference to Bidders' questions received up to [**two**] business days prior to conference. Submit requests for clarification and interpretation using method indicated in Instructions to Bidders.

1.5 BIDDING DOCUMENTS

A. Bidding Documents, Electronic: Online access will be provided via QuestCDN.com to prime bidders only.

1.6 TIME OF COMPLETION

A. By submitting a Bid, Bidder represents that Bidder will begin the Work on receipt of the Notice to Proceed and will complete the Work within the Contract Time indicated in the Bidding Documents.

1.7 LIQUIDATED DAMAGES

A. Work is subject to liquidated damages.

1.8 BIDDER'S QUALIFICATIONS

A. Qualifications: Owner's Bidder qualifications are available at QuestCDN.com.

B. Licenses: Bidders must be properly licensed under the laws governing their respective trades.

C. Insurance and Bonds: A Performance Bond, separate Labor and Material Payment Bond, and insurance in a form acceptable to Owner will be required of the successful Bidder.

D. Contractor's Qualification Statement: A completed AIA Document A305, "Contractor's Qualification Statement," with all exhibits will be requested from one or more Bidders following receipt of Bids.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF DOCUMENT 001113

DOCUMENT 002113 **- INSTRUCTIONS TO BIDDERS**

PART 1 - GENERAL

1.1 INSTRUCTIONS TO BIDDERS

A. AIA Document A701-2018, "Instructions to Bidders," is hereby incorporated into the Bidding Documents by reference.

1. A copy of AIA Document A701-2018, "Instructions to Bidders," with Project-specific edits is bound in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF DOCUMENT 002113

DOCUMENT 004113 **- BID FORM - STIPULATED SUM (SINGLE-PRIME CONTRACT)**

PART 1 - GENERAL

1.1 BID INFORMATION

A. Bidder: _____.

B. Project Name: Empire Apartments.

C. Project Location: 54 4TH AVENUE NORTH, ST CLOUD, MN 56303

D. Owner: St. Cloud HRA.

E. Architect: Blumentals/Architecture Inc.

F. Architect Project Number: 625-47.

1.2 CERTIFICATIONS AND BASE BID

A. Base Bid, Single-Prime (All Trades) Contract: The undersigned Bidder, having carefully examined the Procurement and Contracting Requirements, Conditions of the Contract, Drawings, Specifications, and all subsequent Addenda, as prepared by Blumentals / Architecture Inc. and Architect's consultants, having visited the site, and being familiar with all conditions and requirements of the Work, hereby agrees to furnish all material, labor, equipment and services necessary to complete the construction of the above-named Project, in accordance with the requirements of the Procurement and Contracting Documents, for the stipulated sum of:

1. _____ Dollars ($_____).

1.3 BID SECURITY

A. The undersigned Bidder agrees to execute a contract for this Work in the above amount and to furnish surety as specified within 10 days after a written Notice of Award, if offered within 60 days after receipt of bids, and on failure to do so agrees to forfeit to Owner the attached Bid Security, as liquidated damages for such failure as follows:

1. In the following amount, as stipulated in Document 002113 "Instructions to Bidders":

a. _____ Dollars ($_____).

B. Form of Bid Security: Bidder has attached the following:

1. ▢ AIA Document A310-2010, "Bid Bond."
2. ▢ Cashier's check.
3. ▢ Certified check.

C. In the event Owner does not offer Notice of Award within the time limits stated above, Owner will return to the undersigned the cashier's check, certified check, or bid bond.

1.4 SUBCONTRACTORS AND SUPPLIERS

A. The following companies to execute subcontracts for the portions of the Work indicated:

1. Concrete Work: _____.
2. Masonry Work: _____.
3. Roofing Work: _____.
4. Plumbing Work: _____.
5. HVAC Work: _____.
6. Electrical Work: _____.

1.5 TIME OF COMPLETION

A. Time of Completion:

1. The undersigned Bidder proposes and agrees hereby to commence the Work of the Contract Documents on a date specified in a written Notice to Proceed to be issued by Architect, and to substantially complete the Work within **<Insert number>** calendar days.
2. The undersigned Bidder proposes and agrees hereby to commence the Work of the Contract Documents on a date specified in a written Notice to Proceed to be issued by Architect, and to substantially complete the Work within _____ calendar days.

1.6 ACKNOWLEDGMENT OF ADDENDA

A. The undersigned Bidder acknowledges receipt of and use of the following Addenda in the preparation of this Bid:

1. Addendum No. 1, dated _____.
2. Addendum No. 2, dated _____.
3. Addendum No. 3, dated _____.
4. Addendum No. 4, dated _____.

1.7 CONTRACTOR'S LICENSE

A. The undersigned further states that it is a duly licensed contractor, for the type of work proposed, in **<Insert Project jurisdiction>**, and that all fees, permits, etc., pursuant to submitting this proposal have been paid in full.

1.8 SUBMISSION OF BID

A. Respectfully submitted this ____ day of _____ **<Insert month and year>**.

B. Submitted by: _____ (Name of bidding firm or corporation).

C. Authorized Signature: _____ (Handwritten signature).

D. Signed by: _____ (Type or print name).

E. Title: _____ (Owner/Partner/President/Vice President).

F. Witnessed by: _____ (Handwritten signature).

G. Attest: _____ (Handwritten signature).

H. By: _____ (Type or print name).

I. Attester Title: _____ (Corporate Secretary or Assistant Secretary).

J. Street Address: _____.

K. City, State, Zip: _____.

L. Phone: _____.

M. License No.: _____.

N. Federal ID No.: _____.

O. (Affix Corporate Seal Here)

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF DOCUMENT 004113

SECTION 004330 - MATERIAL PROCUREMENT REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. This project is subject to the Build America, Buy America Act (BABAA) requirements under Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

1. Absent an approved waiver, all iron, steel, manufactured products, and construction materials used in this project must be produced in the United States, as further outlined by the Office of Management and Budget's Memorandum M-22-11, Initial Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure, April 18, 2022.

1.2 DEFINITIONS

A. Build America, Buy America Act (BABAA or BABA):

1. Requirements instituted by the Bipartisan Infrastructure Law of 2021 mandating domestic preference that all iron and steel, manufactured products, and construction materials used in the construction of infrastructure projects within the United States, are produced in the United States.

B. Infrastructure:

1. As defined in BABAA, includes at minimum the structures, facilities, and equipment for projects including roads, highways, bridges, public transportation, water systems, electrical transmission facilities, utilities, buildings and real property (other than those consisting solely of a private home for personal use).

C. Iron or Steel Products:

1. Articles, materials, or supplies that consist wholly or predominantly of iron, steel, or a combination of both. An article, material, or supply is predominantly of iron or steel or a combination of both when the cost of the iron and steel content exceeds 50 percent of the total cost of all its components. The cost of iron and steel is the cost of iron or steel mill products (such as bar, billet, slab, wire, plate, or sheet), castings, or forgings utilized in the manufacture of the product and a good faith estimate of the cost of these components. If such article, material, or supply does not meet the criteria for an iron or steel product or both, it would typically be categorized as a manufactured product.
2. Refer to 2 CFR Part 184 and to Section 70916(6)(A) of BABAA for additional information.

D. Manufactured Product:

1. Items assembled out of components, or otherwise made or processed from raw materials into finished products. Manufactured products must be manufactured (assembled) in the United States, and the cost of components that were mined, produced, or manufactured in the United States must be greater than 55 percent of the total cost of all components of the project.

2. Refer to 2 CFR 184.5 for additional guidance on determining the cost of components for manufactured products. Note that the cost of manufacturing the final manufactured product is not included in the cost of components.

E. Construction Materials:

1. Those articles, materials, or supplies – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives – that are or consist primarily of: non-ferrous metals, plastic and polymer-based products, glass, lumber, or drywall.
2. Refer to 2 CFR 184.6 for additional information on standards for production of each class of material to be considered as “manufactured in the United States.”

F. Manufacturer’s Certification:

1. Documentation provided by a Manufacturer who was responsible for all steps of the manufacturing process, certifying that the items provided by the Manufacturer meet the domestic preference requirements of BABAA.

G. Step Certification:

1. Documentation provided by an entity (including a supplier, fabricator, manufacturer, or processor) that contributes to the manufacturing process, certifying that their “step” in the process meets the requirements of BABAA. Each entity provides their certification and other certifications developed prior to their step to the next entity in product development.
2. The final manufacturer can provide copies of step certifications documenting all prior entities’ compliance, or they can provide a singular certification if they are willing to certify compliance with BABAA at all stages of manufacturing. In this case the manufacturer shall include the names of all manufacturers and locations (including city and state where each step was completed) with a short description of the step performed by each entity.

H. Supplier Certification:

1. A supplier may provide certification if they have knowledge about the product origin and that all processes were completed in the United States. Such certification shall be signed by an authorized representative of the supplier.

1.3 CONTRACTOR’S RESPONSIBILITIES

A. Contractor shall include Manufacturer’s Certification, Step Certification(s), and/or Supplier Certification for BABAA requirements with all applicable submittals. If a specific manufacturer is used in the bidding, a statement that Manufacturer will comply with BABAA must be included with the bid submission. Contractor shall comply with BABAA requirements, including coordination with manufacturers, distributors, and suppliers to correct deficiencies in any BABAA documentation.

B. Contractor shall identify whether any iron and steel products, manufactured products, or construction materials cannot be domestically sourced in a reasonable time frame to complete the project or that would increase the overall project cost by more than 25% when compared to overall project costs using non-BABAA compliant iron and steel, manufactured products, and construction materials.

1. Where a material or product cannot be acquired within the project timeframe or when it would increase the overall project budget by more than 25% above the non-BABAA-

compliant comparison, Contractor shall assist the Owner in completing waiver request(s) for submittal to appropriate Funding Authority.

C. Contractor shall certify upon completion that all work and materials have complied with BABAA requirements.

D. For any change orders, Contractor shall provide BABAA documentation for any new products or materials required by the change.

E. Installation of materials or products that are not compliant with BABAA requirements shall be considered defective work.

F. By submitting an application for payment, based in whole or in part on furnishing equipment or materials, Contractor certifies that such equipment and materials, to contractor's knowledge, are compliant with BABAA requirements.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 004330

SECTION 004330 – MATERIAL PROCUREMENT REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. This project is subject to the Build America, Buy America Act (BABAA) requirements under Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

1. Absent an approved waiver, all iron, steel, manufactured products, and construction materials used in this project must be produced in the United States, as further outlined by the Office of Management and Budget's Memorandum M-22-11, Initial Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure, April 18, 2022.

1.2 DEFINITIONS

A. Build America, Buy America Act (BABAA or BABA):

1. Requirements instituted by the Bipartisan Infrastructure Law of 2021 mandating domestic preference that all iron and steel, manufactured products, and construction materials used in the construction of infrastructure projects within the United States, are produced in the United States.

B. Infrastructure:

1. As defined in BABAA, includes at minimum the structures, facilities, and equipment for projects including roads, highways, bridges, public transportation, water systems, electrical transmission facilities, utilities, buildings and real property (other than those consisting solely of a private home for personal use).

C. Iron or Steel Products:

1. Articles, materials, or supplies that consist wholly or predominantly of iron, steel, or a combination of both. An article, material, or supply is predominantly of iron or steel or a combination of both when the cost of the iron and steel content exceeds 50 percent of the total cost of all its components. The cost of iron and steel is the cost of iron or steel mill products (such as bar, billet, slab, wire, plate, or sheet), castings, or forgings utilized in the manufacture of the product and a good faith estimate of the cost of these components. If such article, material, or supply does not meet the criteria for an iron or steel product or both, it would typically be categorized as a manufactured product.
2. Refer to 2 CFR Part 184 and to Section 70916(6)(A) of BABAA for additional information.

D. Manufactured Product:

1. Items assembled out of components, or otherwise made or processed from raw materials into finished products. Manufactured products must be manufactured (assembled) in the United States, and the cost of components that were mined, produced, or manufactured in the United States must be greater than 55 percent of the total cost of all components of the project.

2. Refer to 2 CFR 184.5 for additional guidance on determining the cost of components for manufactured products. Note that the cost of manufacturing the final manufactured product is not included in the cost of components.

E. Construction Materials:

1. Those articles, materials, or supplies – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives – that are or consist primarily of: non-ferrous metals, plastic and polymer-based products, glass, lumber, or drywall.
2. Refer to 2 CFR 184.6 for additional information on standards for production of each class of material to be considered as “manufactured in the United States.”

F. Manufacturer’s Certification:

1. Documentation provided by a Manufacturer who was responsible for all steps of the manufacturing process, certifying that the items provided by the Manufacturer meet the domestic preference requirements of BABAA.

G. Step Certification:

1. Documentation provided by an entity (including a supplier, fabricator, manufacturer, or processor) that contributes to the manufacturing process, certifying that their “step” in the process meets the requirements of BABAA. Each entity provides their certification and other certifications developed prior to their step to the next entity in product development.
2. The final manufacturer can provide copies of step certifications documenting all prior entities’ compliance, or they can provide a singular certification if they are willing to certify compliance with BABAA at all stages of manufacturing. In this case the manufacturer shall include the names of all manufacturers and locations (including city and state where each step was completed) with a short description of the step performed by each entity.

H. Supplier Certification:

1. A supplier may provide certification if they have knowledge about the product origin and that all processes were completed in the United States. Such certification shall be signed by an authorized representative of the supplier.

1.3 CONTRACTOR’S RESPONSIBILITIES

A. Contractor shall include Manufacturer’s Certification, Step Certification(s), and/or Supplier Certification for BABAA requirements with all applicable submittals. If a specific manufacturer is used in the bidding, a statement that Manufacturer will comply with BABAA must be included with the bid submission. Contractor shall comply with BABAA requirements, including coordination with manufacturers, distributors, and suppliers to correct deficiencies in any BABAA documentation.

B. Contractor shall identify whether any iron and steel products, manufactured products, or construction materials cannot be domestically sourced in a reasonable time frame to complete the project or that would increase the overall project cost by more than 25% when compared to overall project costs using non-BABAA compliant iron and steel, manufactured products, and construction materials.

1. Where a material or product cannot be acquired within the project timeframe or when it would increase the overall project budget by more than 25% above the non-BABAA-

compliant comparison, Contractor shall assist the Owner in completing waiver request(s) for submittal to appropriate Funding Authority.

C. Contractor shall certify upon completion that all work and materials have complied with BABAA requirements.

D. For any change orders, Contractor shall provide BABAA documentation for any new products or materials required by the change.

E. Installation of materials or products that are not compliant with BABAA requirements shall be considered defective work.

F. By submitting an application for payment, based in whole or in part on furnishing equipment or materials, Contractor certifies that such equipment and materials, to contractor's knowledge, are compliant with BABAA requirements.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 004330

SECTION 004330 – MATERIAL PROCUREMENT REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. This project is subject to the Build America, Buy America Act (BABAA) requirements under Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

1. Absent an approved waiver, all iron, steel, manufactured products, and construction materials used in this project must be produced in the United States, as further outlined by the Office of Management and Budget's Memorandum M-22-11, Initial Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure, April 18, 2022.

1.2 DEFINITIONS

A. Build America, Buy America Act (BABAA or BABA):

1. Requirements instituted by the Bipartisan Infrastructure Law of 2021 mandating domestic preference that all iron and steel, manufactured products, and construction materials used in the construction of infrastructure projects within the United States, are produced in the United States.

B. Infrastructure:

1. As defined in BABAA, includes at minimum the structures, facilities, and equipment for projects including roads, highways, bridges, public transportation, water systems, electrical transmission facilities, utilities, buildings and real property (other than those consisting solely of a private home for personal use).

C. Iron or Steel Products:

1. Articles, materials, or supplies that consist wholly or predominantly of iron, steel, or a combination of both. An article, material, or supply is predominantly of iron or steel or a combination of both when the cost of the iron and steel content exceeds 50 percent of the total cost of all its components. The cost of iron and steel is the cost of iron or steel mill products (such as bar, billet, slab, wire, plate, or sheet), castings, or forgings utilized in the manufacture of the product and a good faith estimate of the cost of these components. If such article, material, or supply does not meet the criteria for an iron or steel product or both, it would typically be categorized as a manufactured product.
2. Refer to 2 CFR Part 184 and to Section 70916(6)(A) of BABAA for additional information.

D. Manufactured Product:

1. Items assembled out of components, or otherwise made or processed from raw materials into finished products. Manufactured products must be manufactured (assembled) in the United States, and the cost of components that were mined, produced, or manufactured in the United States must be greater than 55 percent of the total cost of all components of the project.

2. Refer to 2 CFR 184.5 for additional guidance on determining the cost of components for manufactured products. Note that the cost of manufacturing the final manufactured product is not included in the cost of components.

E. Construction Materials:

1. Those articles, materials, or supplies – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives – that are or consist primarily of: non-ferrous metals, plastic and polymer-based products, glass, lumber, or drywall.
2. Refer to 2 CFR 184.6 for additional information on standards for production of each class of material to be considered as “manufactured in the United States.”

F. Manufacturer’s Certification:

1. Documentation provided by a Manufacturer who was responsible for all steps of the manufacturing process, certifying that the items provided by the Manufacturer meet the domestic preference requirements of BABAA.

G. Step Certification:

1. Documentation provided by an entity (including a supplier, fabricator, manufacturer, or processor) that contributes to the manufacturing process, certifying that their “step” in the process meets the requirements of BABAA. Each entity provides their certification and other certifications developed prior to their step to the next entity in product development.
2. The final manufacturer can provide copies of step certifications documenting all prior entities’ compliance, or they can provide a singular certification if they are willing to certify compliance with BABAA at all stages of manufacturing. In this case the manufacturer shall include the names of all manufacturers and locations (including city and state where each step was completed) with a short description of the step performed by each entity.

H. Supplier Certification:

1. A supplier may provide certification if they have knowledge about the product origin and that all processes were completed in the United States. Such certification shall be signed by an authorized representative of the supplier.

1.3 CONTRACTOR’S RESPONSIBILITIES

A. Contractor shall include Manufacturer’s Certification, Step Certification(s), and/or Supplier Certification for BABAA requirements with all applicable submittals. If a specific manufacturer is used in the bidding, a statement that Manufacturer will comply with BABAA must be included with the bid submission. Contractor shall comply with BABAA requirements, including coordination with manufacturers, distributors, and suppliers to correct deficiencies in any BABAA documentation.

B. Contractor shall identify whether any iron and steel products, manufactured products, or construction materials cannot be domestically sourced in a reasonable time frame to complete the project or that would increase the overall project cost by more than 25% when compared to overall project costs using non-BABAA compliant iron and steel, manufactured products, and construction materials.

1. Where a material or product cannot be acquired within the project timeframe or when it would increase the overall project budget by more than 25% above the non-BABAA-

compliant comparison, Contractor shall assist the Owner in completing waiver request(s) for submittal to appropriate Funding Authority.

C. Contractor shall certify upon completion that all work and materials have complied with BABAA requirements.

D. For any change orders, Contractor shall provide BABAA documentation for any new products or materials required by the change.

E. Installation of materials or products that are not compliant with BABAA requirements shall be considered defective work.

F. By submitting an application for payment, based in whole or in part on furnishing equipment or materials, Contractor certifies that such equipment and materials, to contractor's knowledge, are compliant with BABAA requirements.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 004330

DOCUMENT 006000 **- PROJECT FORMS**

PART 1 - GENERAL

1.1 FORM OF AGREEMENT AND GENERAL CONDITIONS

A. The following form of Owner/Contractor Agreement and form of the General Conditions to be used for Project:

1. Owner's document(s) bound following this Document.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF DOCUMENT 006000

General Conditions for Construction Contracts - Public Housing Programs

U.S. Department of Housing and Urban Development
Office of Public and Indian Housing
OMB Approval No. 2577-0157 (exp. 1/31/2027)

Applicability. This form is applicable to any construction/development contract greater than $250,000.

Public reporting burden for this collection of information is estimated to average 1.0 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Comments regarding the accuracy of this burden estimate and any suggestions for reducing this burden can be sent to the Reports Management Officer, Office of Policy Development and Research, REE, Department of Housing and Urban Development, 451 7th St SW, Room 4176, Washington, DC 20410-5000. When providing comments, please refer to OMB Approval No. 2577-0157. This form includes those clauses required by OMB's common rule on grantee procurement, implemented at HUD in 2 CFR 200, and those requirements set forth in Section 3 of the Housing and Urban Development Act of 1968 and its amendment by the Housing and Community Development Act of 1992, implemented by HUD at 24 CFR Part 75. The form is required for construction contracts awarded by Public Housing Agencies (PHAs). The form is used by Housing Authorities in solicitations to provide necessary contract clauses. If the form were not used, PHAs would be unable to enforce their contracts. Responses to the collection of information are required to obtain a benefit or to retain a benefit. The information requested does not lend itself to confidentiality. HUD may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB number.

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1. Definitions

(a) "Architect" means the person or other entity engaged by the PHA to perform architectural, engineering, design, and other services related to the work as provided for in the contract. When a PHA uses an engineer to act in this capacity, the terms "architect" and "engineer" shall be synonymous. The Architect shall serve as a technical representative of the Contracting Officer. The Architect's authority is as set forth elsewhere in this contract.

(b) "Contract" means the contract entered into between the PHA and the Contractor. It includes the forms of Bid, the Bid Bond, the Performance and Payment Bond or Bonds or other assurance of completion, the Certifications, Representations, and Other Statements of Bidders (form HUD-5370), these General Conditions of the Contract for Construction (form HUD-5370), the applicable wage rate determinations from the U.S. Department of Labor, any special conditions included elsewhere in the contract, the specifications, and drawings. It includes all formal changes to any of those documents by addendum, change order, or other modification.

(c) "Contracting Officer" means the person delegated the authority by the PHA to enter into, administer, and/or terminate this contract and designated as such in writing to the Contractor. The term includes any successor Contracting Officer and any duly authorized representative of the Contracting Officer also designated in writing. The Contracting Officer shall be deemed the authorized agent of the PHA in all dealings with the Contractor.

(d) "Contractor" means the person or other entity entering into the contract with the PHA to perform all of the work required under the contract.

(e) "Drawings" means the drawings enumerated in the schedule of drawings contained in the Specifications and as described in the contract clause entitled Specifications and Drawings for Construction herein.

(f) "HUD" means the United States of America acting through the Department of Housing and Urban Development including the Secretary, or any other person designated to act on its behalf. HUD has agreed, subject to the provisions of an Annual Contributions Terms and Conditions (ACC), to provide financial assistance to the PHA, which includes assistance in financing the work to be performed under this contract. As defined elsewhere in these General Conditions or the contract documents, the determination of HUD may be required to authorize changes in the work or for release of funds to the PHA for payment to the Contractor. Notwithstanding HUD's role, nothing in this contract shall be construed to create any contractual relationship between the Contractor and HUD.

(g) "Project" means the entire project, whether construction or rehabilitation, the work for which is provided for in whole or in part under this contract.

(h) "PHA" means the Public Housing Agency organized under applicable state laws which is a party to this contract.

(j) "Specifications" means the written description of the technical requirements for construction and includes the criteria and tests for determining whether the requirements are met.

(l) "Work" means materials, workmanship, and manufacture and fabrication of components.

2. Contractor's Responsibility for Work

(a) The Contractor shall furnish all necessary labor, materials, tools, equipment, and transportation necessary for performance of the work. The Contractor shall also furnish all necessary water, heat, light, and power not made available to the Contractor by the PHA pursuant to the clause entitled Availability and Use of Utility Services herein.

(b) The Contractor shall perform on the site, and with its own organization, work equivalent to at least [ ] (12 percent unless otherwise indicated) of the total amount of work to be performed under the order. This percentage may be reduced by a supplemental agreement to this order if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the PHA.

(c) At all times during performance of this contract and until the work is completed and accepted, the Contractor shall directly superintend the work or assign and have on the work site a competent superintendent who is satisfactory to the Contracting Officer and has authority to act for the Contractor.

(d) The Contractor shall be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence, and shall take proper safety and health precautions to protect the work, the workers, the public, and the property of others. The Contractor shall hold and save the PHA, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire work, except for any completed unit of work which may have been accepted under the contract.

(e) The Contractor shall lay out the work from base lines and bench marks indicated on the drawings and be responsible for all lines, levels, and measurements of all work executed under the contract. The Contractor shall verify the figures before laying out the work and will be held responsible for any error resulting from its failure to do so.

(f) The Contractor shall confine all operations (including storage of materials) on PHA premises to areas authorized or approved by the Contracting Officer.

(g) The Contractor shall at all times keep the work area, including storage areas, free from accumulations of waste materials. After completing the work and before final inspection, the Contractor shall (1) remove from the premises all scaffolding, equipment, tools, and materials (including rejected materials) that are not the property of the PHA and all rubbish caused by its work; (2) leave the work area in a clean, neat, and orderly condition satisfactory to the Contracting Officer; (3) perform all specified tests; and, (4) deliver the installation in complete and operating condition.

(h) The Contractor's responsibility will terminate when all work has been completed, the final inspection made, and the work accepted by the Contracting Officer. The Contractor will then be released from further obligation except as required by the warranties specified elsewhere in the contract.

3. Architect's Duties, Responsibilities, and Authority

(a) The Architect for this contract, and any successor, shall be designated in writing by the Contracting Officer.

(b) The Architect shall serve as the Contracting Officer's technical representative with respect to architectural, **Schedule** engineering, and design matters related to the work performed under the contract. The Architect may provide direction on contract performance. Such direction shall be within the scope of the contract and may not be of a nature which: (1) institutes additional work outside the scope of the contract; (2) constitutes a change as defined in the Changes clause herein; (3) causes an increase or decrease in the cost of the contract; (4) alters the Construction Progress Schedule; or (5) changes any of the other express terms or conditions of the contract.

(c) The Architect's duties and responsibilities may include but shall not be limited to:

(1) Making periodic visits to the work site, and on the basis of his/her on-site inspections, issuing written reports to the PHA which shall include all observed deficiencies. The Architect shall file a copy of the report with the Contractor's designated representative at the site;

(2) Making modifications in drawings and technical specifications and assisting the Contracting Officer in the preparation of change orders and other contract modifications for issuance by the Contracting Officer;

(3) Reviewing and making recommendations with respect to - (i) the Contractor's construction progress schedules; (ii) the Contractor's shop and detailed drawings; (iii) the machinery, mechanical and other equipment and materials or other articles proposed for use by the Contractor; and, (iv) the Contractor's price breakdown and progress payment estimates; and,

(4) Assisting in inspections, signing Certificates of Completion, and making recommendations with respect to acceptance of work completed under the contract.

4. Other Contracts

The PHA may undertake or award other contracts for additional work at or near the site of the work under this contract. The Contractor shall fully cooperate with the other contractors and with PHA employees and shall carefully adapt scheduling and performing the work under this contract to accommodate the additional work, heeding any direction that may be provided by the Contracting Officer. The Contractor shall not commit or permit any act that will interfere with the performance of work by any other contractor or by PHA employees

Construction Requirements

5. Pre-construction Conference and Notice to Proceed

(a) Within ten calendar days of contract execution, and prior to the commencement of work, the Contractor shall attend a preconstruction conference with representatives of the PHA, its Architect, and other interested parties convened by the PHA. The conference will serve to acquaint the participants with the general plan of the construction operation and all other requirements of the contract. The PHA will provide the Contractor with the date, time, and place of the conference.

(b) The contractor shall begin work upon receipt of a written Notice to Proceed from the Contracting Officer or designee. The Contractor shall not begin work prior to receiving such notice.

6. Construction Progress

(a) The Contractor shall, within five days after the work commences on the contract or another period of time determined by the Contracting Officer, prepare and submit to the Contracting Officer for approval three copies of a practicable schedule showing the order in which the Contractor proposes to perform the work, and the dates on which the Contractor contemplates starting and completing the several salient features of the work (including acquiring labor, materials, and equipment). The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period. If the Contractor fails to submit a schedule within the time prescribed, the Contracting Officer may withhold approval of progress payments or take other remedies under the contract until the Contractor submits the required schedule.

(b) The Contractor shall enter the actual progress on the chart as required by the Contracting Officer, and immediately deliver three copies of the annotated schedule to the Contracting Officer. If the Contracting Officer determines, upon the basis of inspection conducted pursuant to the clause entitled Inspection and Acceptance of Construction, herein that the Contractor is not meeting the approved schedule, the Contractor shall take steps necessary to improve its progress, including those that may be required by the Contracting Officer, without additional cost to the PHA. In this circumstance, the Contracting Officer may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of construction plant, and to submit for approval any supplementary schedule or schedules in chart form as the Contracting Officer deems necessary to demonstrate how the approved rate of progress will be regained.

(c) Failure of the Contractor to comply with the requirements of the Contracting Officer under this clause shall be grounds for a determination by the Contracting Officer that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the Contract. Upon making this determination, the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the Default clause of this contract.

7. Site Investigation and Conditions Affecting the Work

(a) The Contractor acknowledges that it has taken steps reasonably necessary to ascertain the nature and location of the work, and that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost, including but not limited to, (1) conditions bearing upon transportation, disposal, handling, and storage of materials; (2) the availability of labor, water, electric power, and roads;(3) uncertainties of weather, river stages, tides, or similar physical conditions at the site; (4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during work performance. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is

reasonably ascertainable from an inspection of the site, including all exploratory work done by the PHA, as well as from the drawings and specifications made a part of this contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the PHA.

(b) The PHA assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available by the PHA. Nor does the PHA assume responsibility for any understanding reached or representation made concerning conditions which can affect the work by any of its officers or agents before the execution of this contract, unless that understanding or representation is expressly stated in this contract.

8. Differing Site Conditions

(a) The Contractor shall promptly, and before the conditions are disturbed, give a written notice to the Contracting Officer of (1) subsurface or latent physical conditions at the site which differ materially from those indicated in this contract, or (2) unknown physical conditions at the site(s), of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in the contract.

(b) The Contracting Officer shall investigate the site conditions promptly after receiving the notice. Work shall not proceed at the affected site, except at the Contractor's risk, until the Contracting Officer has provided written instructions to the Contractor. If the conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performing any part of the work under this contract, whether or not changed as a result of the conditions, the Contractor shall file a claim in writing to the PHA within ten days after receipt of such instructions and, in any event, before proceeding with the work. An equitable adjustment in the contract price, the delivery schedule, or both shall be made under this clause and the contract modified in writing accordingly.

(c) No request by the Contractor for an equitable adjustment to the contract under this clause shall be allowed, unless the Contractor has given the written notice required; provided, that the time prescribed in (a) above for giving written notice may be extended by the Contracting Officer.

(d) No request by the Contractor for an equitable adjustment to the contract for differing site conditions shall be allowed if made after final payment under this contract.

9. Specifications and Drawings for Construction

(a) The Contractor shall keep on the work site a copy of the drawings and specifications and shall at all times give the Contracting Officer access thereto. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, the specifications shall govern. In case of discrepancy in the figures, in the drawings, or in the specifications, the matter shall be promptly submitted to the Contracting Officer, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at its own risk and expense. The Contracting Officer shall furnish from time to time such detailed drawings and other information as considered necessary, unless otherwise provided.

(b) Wherever in the specifications or upon the drawings the words "directed", "required", "ordered", "designated", "prescribed", or words of like import are used, it shall be understood that the "direction", "requirement", "order", "designation", or "prescription", of the Contracting Officer is intended and similarly the words "approved", "acceptable", "satisfactory", or words of like import shall mean "approved by", or "acceptable to", or "satisfactory to" the Contracting Officer, unless otherwise expressly stated.

(c) Where "as shown" "as indicated", "as detailed", or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise. The word "provided" as used herein shall be understood to mean "provide complete in place" that is "furnished and installed".

(d) "Shop drawings" means drawings, submitted to the PHA by the Contractor, subcontractor, or any lower tier subcontractor, showing in detail (1) the proposed fabrication and assembly of structural elements and (2) the installation (i.e., form, fit, and attachment details) of materials of equipment. It includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the Contractor to explain in detail specific portions of the work required by the contract. The PHA may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.

(e) If this contract requires shop drawings, the Contractor shall coordinate all such drawings, and review them for accuracy, completeness, and compliance with other contract requirements and shall indicate its approval thereon as evidence of such coordination and review. Shop drawings submitted to the Contracting Officer without evidence of the Contractor's approval may be returned for resubmission. The Contracting Officer will indicate an approval or disapproval of the shop drawings and if not approved as submitted shall indicate the PHA's reasons therefore. Any work done before such approval shall be at the Contractor's risk. Approval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract, except with respect to variations described and approved in accordance with (f) below.

(f) If shop drawings show variations from the contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at the time of submission. If the Architect approves any such variation and the Contracting Officer concurs, the Contracting Officer shall issue an appropriate modification to the contract, except that, if the variation is minor or does not involve a change in price or in time of performance, a modification need not be issued.

(g) It shall be the responsibility of the Contractor to make timely requests of the PHA for such large scale and full size drawings, color schemes, and other additional information, not already in his possession, which shall be

required in the planning and production of the work. Such requests may be submitted as the need arises, but each such request shall be filed in ample time to permit appropriate action to be taken by all parties involved so as to avoid delay.

(h) The Contractor shall submit to the Contracting Officer for approval four copies (unless otherwise indicated) of all shop drawings as called for under the various headings of these specifications. Three sets (unless otherwise indicated) of all shop drawings, will be retained by the PHA and one set will be returned to the Contractor. As required by the Contracting Officer, the Contractor, upon completing the work under this contract, shall furnish a complete set of all shop drawings as finally approved. These drawings shall show all changes and revisions made up to the time the work is completed and accepted.

(i) This clause shall be included in all subcontracts at any tier. It shall be the responsibility of the Contractor to ensure that all shop drawings prepared by subcontractors are submitted to the Contracting Officer.

10. As-Built Drawings

(a) "As-built drawings," as used in this clause, means drawings submitted by the Contractor or subcontractor at any tier to show the construction of a particular structure or work as actually completed under the contract. "As-built drawings" shall be synonymous with "Record drawings."

(b) As required by the Contracting Officer, the Contractor shall provide the Contracting Officer accurate information to be used in the preparation of permanent as-built drawings. For this purpose, the Contractor shall record on one set of contract drawings all changes from the installations originally indicated, and record final locations of underground lines by depth from finish grade and by accurate horizontal offset distances to permanent surface improvements such as buildings, curbs, or edges of walks.

(c) This clause shall be included in all subcontracts at any tier. It shall be the responsibility of the Contractor to ensure that all as-built drawings prepared by subcontractors are submitted to the Contracting Officer.

11. Material and Workmanship

(a) All equipment, material, and articles furnished under this contract shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in this contract. References in the contract to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. The Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of, and as approved by the Contracting Officer, is equal to that named in the specifications, unless otherwise specifically provided in this contract.

(b) Approval of equipment and materials.

(1) The Contractor shall obtain the Contracting Officer's approval of the machinery and mechanical and other equipment to be incorporated into the work. When requesting approval, the Contractor shall furnish to the Contracting Officer the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the machinery and mechanical and other equipment. When required by this contract or by the Contracting Officer, the Contractor shall also obtain the Contracting Officer's approval of the material or articles which the Contractor contemplates incorporating into the work. When requesting approval, the Contractor shall provide full information concerning the material or articles. Machinery, equipment, material, and articles that do not have the required approval shall be installed or used at the risk of subsequent rejection.

(2) When required by the specifications or the Contracting Officer, the Contractor shall submit appropriately marked samples (and certificates related to them) for approval at the Contractor's expense, with all shipping charges prepaid. The Contractor shall label, or otherwise properly mark on the container, the material or product represented, its place of origin, the name of the producer, the Contractor's name, and the identification of the construction project for which the material or product is intended to be used.

(3) Certificates shall be submitted in triplicate, describing each sample submitted for approval and certifying that the material, equipment or accessory complies with contract requirements. The certificates shall include the name and brand of the product, name of manufacturer, and the location where produced.

(4) Approval of a sample shall not constitute a waiver of the PHA right to demand full compliance with contract requirements. Materials, equipment and accessories may be rejected for cause even though samples have been approved.

(5) Wherever materials are required to comply with recognized standards or specifications, such specifications shall be accepted as establishing the technical qualities and testing methods, but shall not govern the number of tests required to be made nor modify other contract requirements. The Contracting Officer may require laboratory test reports on items submitted for approval or may approve materials on the basis of data submitted in certificates with samples. Check tests will be made on materials delivered for use only as frequently as the Contracting Officer determines necessary to insure compliance of materials with the specifications. The Contractor will assume all costs of retesting materials which fail to meet contract requirements and/or testing materials offered in substitution for those found deficient.

(6) After approval, samples will be kept in the Project office until completion of work. They may be built into the work after a substantial quantity of the materials they represent has been built in and accepted.

(c) Requirements concerning lead-based paint. The Contractor shall comply with the requirements concerning lead-based paint contained in the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. 4821-4846) as implemented by 24 CFR Part 35.

12. Permits and Codes

(a) The Contractor shall give all notices and comply with all applicable laws, ordinances, codes, rules and regulations. Notwithstanding the requirement of the Contractor to comply with the drawings and specifications in the contract, all work installed shall comply with all applicable codes and regulations as amended by any

waivers. Before installing the work, the Contractor shall examine the drawings and the specifications for compliance with applicable codes and regulations bearing on the work and shall immediately report any discrepancy it may discover to the Contracting Officer. Where the requirements of the drawings and specifications fail to comply with the applicable code or regulation, the Contracting Officer shall modify the contract by change order pursuant to the clause entitled Changes herein to conform to the code or regulation.

(b) The Contractor shall secure and pay for all permits, fees, and licenses necessary for the proper execution and completion of the work. Where the PHA can arrange for the issuance of all or part of these permits, fees and licenses, without cost to the Contractor, the contract amount shall be reduced accordingly.

13. Health, Safety, and Accident Prevention

(a) In performing this contract, the Contractor shall:

(1) Ensure that no laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his/her health and/or safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation;

(2) Protect the lives, health, and safety of other persons;

(3) Prevent damage to property, materials, supplies, and equipment; and,

(4) Avoid work interruptions.

(b) For these purposes, the Contractor shall:

(1) Comply with regulations and standards issued by the Secretary of Labor at 29 CFR Part 1926. Failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act (Public Law 91-54, 83 Stat. 96), 40 U.S.C. 3701 et seq.; and

(2) Include the terms of this clause in every subcontract so that such terms will be binding on each subcontractor.

(c) The Contractor shall maintain an accurate record of exposure data on all accidents incident to work performed under this contract resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, or equipment, and shall report this data in the manner prescribed by 29 CFR Part 1904.

(d) The Contracting Officer shall notify the Contractor of any noncompliance with these requirements and of the corrective action required. This notice, when delivered to the Contractor or the Contractor's representative at the site of the work, shall be deemed sufficient notice of the noncompliance and corrective action required. After receiving the notice, the Contractor shall immediately take corrective action. If the Contractor fails or refuses to take corrective action promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall not base any claim or request for equitable adjustment for additional time or money on any stop order issued under these circumstances.

(e) The Contractor shall be responsible for its subcontractors' compliance with the provisions of this clause. The Contractor shall take such action with respect to any subcontract as the PHA, the Secretary of Housing and Urban Development, or the Secretary of Labor shall direct as a means of enforcing such provisions.

14. Temporary Heating

The Contractor shall provide and pay for temporary heating, covering, and enclosures necessary to properly protect all work and materials against damage by dampness and cold, to dry out the work, and to facilitate the completion of the work. Any permanent heating equipment used shall be turned over to the PHA in the condition and at the time required by the specifications.

15. Availability and Use of Utility Services

(a) The PHA shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed shall be charged to or paid for by the Contractor at prevailing rates charged to the PHA or, where the utility is produced by the PHA, at reasonable rates determined by the Contracting Officer. The Contractor shall carefully conserve any utilities furnished without charge.

(b) The Contractor, at its expense and in a manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of each utility used for the purpose of determining charges. Before final acceptance of the work by the PHA, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia.

16. Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements

(a) The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed under this contract, and which do not unreasonably interfere with the work required under this contract.

(b) The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during performance of this contract, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Officer.

(c) The Contractor shall protect from damage all existing improvements and utilities (1) at or near the work site and (2) on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. Prior to disturbing the ground at the construction site, the Contractor shall ensure that all underground utility lines are clearly marked.

(d) The Contractor shall shore up, brace, underpin, secure, and protect as necessary all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the site, which may be affected by the excavations or other operations connected with the construction of the project.

(e) Any equipment temporarily removed as a result of work under this contract shall be protected, cleaned, and replaced in the same condition as at the time of award of this contract.

(f) New work which connects to existing work shall correspond in all respects with that to which it connects and/or be similar to existing work unless otherwise required by the specifications.

(g) No structural members shall be altered or in any way weakened without the written authorization of the Contracting Officer, unless such work is clearly specified in the plans or specifications.

(h) If the removal of the existing work exposes discolored or unfinished surfaces, or work out of alignment, such surfaces shall be refinished, or the material replaced as necessary to make the continuous work uniform and harmonious. This, however, shall not be construed to require the refinishing or reconstruction of dissimilar finishes previously exposed, or finished surfaces in good condition, but in different planes or on different levels **Construction** when brought together by the removal of intervening work, unless such refinishing or reconstruction is specified in the plans or specifications.

(i) The Contractor shall give all required notices to any adjoining or adjacent property owner or other party before the commencement of any work.

(j) The Contractor shall indemnify and save harmless the PHA from any damages on account of settlement or the loss of lateral support of adjoining property, any damages from changes in topography affecting drainage, and from all loss or expense and all damages for which the PHA may become liable in consequence of such injury or damage to adjoining and adjacent structures and their premises.

(k) The Contractor shall repair any damage to vegetation, structures, equipment, utilities, or improvements, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

17. Temporary Buildings and Transportation of Materials

(a) Temporary buildings (e.g., storage sheds, shops, offices, sanitary facilities) and utilities may be erected by the Contractor only with the approval of the Contracting Officer and shall be built with labor and materials furnished by the Contractor without expense to the PHA. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Contracting Officer, the buildings and utilities may be abandoned and need not be removed.

(b) The Contractor shall, as directed by the Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Contracting Officer. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any federal, state, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.

18. Clean Air and Water

The contactor shall comply with the Clean Air Act, as amended, 42 USC 7401 et seq., the Federal Water Pollution Control Water Act, as amended, 33 U.S.C. 1251 et seq., and standards issued pursuant thereto in the facilities in which this contract is to be performed.

19. Energy Efficiency

The Contractor shall comply with mandatory standards and policies relating to energy efficiency which are contained in the energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Pub.L. 94-163) for the State in which the work under the contract is performed.

20. Inspection and Acceptance of

(a) Definitions. As used in this clause -
(1) “Acceptance” means the act of an authorized representative of the PHA by which the PHA approves and assumes ownership of the work performed under this contract. Acceptance may be partial or complete.
(2) “Inspection” means examining and testing the work performed under the contract (including, when appropriate, raw materials, equipment, components, and intermediate assemblies) to determine whether it conforms to contract requirements.
(3) “Testing” means that element of inspection that determines the properties or elements, including functional operation of materials, equipment, or their components, by the application of established scientific principles and procedures.

(b) The Contractor shall maintain an adequate inspection system and perform such inspections as will ensure that the work performed under the contract conforms to contract requirements. All work is subject to PHA inspection and test at all places and at all reasonable times before acceptance to ensure strict compliance with the terms of the contract.

(c) PHA inspections and tests are for the sole benefit of the PHA and do not: (1) relieve the Contractor of responsibility for providing adequate quality control measures; (2) relieve the Contractor of responsibility for loss or damage of the material before acceptance; (3) constitute or imply acceptance; or, (4) affect the continuing rights of the PHA after acceptance of the completed work under paragraph (j) below.

(d) The presence or absence of the PHA inspector does not relieve the Contractor from any contract requirement, nor is the inspector authorized to change any term or condition of the specifications without the Contracting Officer’s written authorization. All instructions and approvals with respect to the work shall be given to the Contractor by the Contracting Officer.

(e) The Contractor shall promptly furnish, without additional charge, all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by the Contracting Officer. The PHA may charge to the Contractor any additional cost of inspection or test when work is not ready at the time specified by the Contractor for inspection or test, or when prior rejection makes reinspection or retest necessary. The PHA shall perform all inspections and tests in a manner that will not unnecessarily delay the work. Special, full size, and performance tests shall be performed as described in the contract.

(f) The PHA may conduct routine inspections of the construction site on a daily basis.

(g) The Contractor shall, without charge, replace or correct work found by the PHA not to conform to contract requirements, unless the PHA decides that it is in its interest to accept the work with an appropriate adjustment in contract price. The Contractor shall promptly segregate and remove rejected material from the premises.

(h) If the Contractor does not promptly replace or correct rejected work, the PHA may (1) by contract or otherwise, replace or correct the work and charge the cost to the Contractor, or (2) terminate for default the Contractor's right to proceed.

(i) If any work requiring inspection is covered up without approval of the PHA, it must, if requested by the Contracting Officer, be uncovered at the expense of the Contractor. If at any time before final acceptance of the entire work, the **Construction** PHA considers it necessary or advisable, to examine work already completed by removing or tearing it out, the Contractor, shall on request, promptly furnish all necessary facilities, labor, and material. If such work is found to be defective or nonconforming in any material respect due to the fault of the Contractor or its subcontractors, the Contractor shall defray all the expenses of the examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the contract, the Contracting Officer shall make an equitable adjustment to cover the cost of the examination and reconstruction, including, if completion of the work was thereby delayed, an extension of time.

(j) The Contractor shall notify the Contracting Officer, in writing, as to the date when in its opinion all or a designated portion of the work will be substantially completed and ready for inspection. If the Architect determines that the state of preparedness is as represented, the PHA will promptly arrange for the inspection. Unless otherwise specified in the contract, the PHA shall accept, as soon as practicable after completion and inspection, all work required by the contract or that portion of the work the Contracting Officer determines and designates can be accepted separately. Acceptance shall be final and conclusive except for latent defects, fraud, gross mistakes amounting to fraud, or the PHA's right under any warranty or guarantee.

21. Use and Possession Prior to Completion

(a) The PHA shall have the right to take possession of or use any completed or partially completed part of the work. Before taking possession of or using any work, the Contracting Officer shall furnish the Contractor a list of items of work remaining to be performed or corrected on those portions of the work that the PHA intends to take possession of or use. However, failure of the Contracting Officer to list any item of work shall not relieve the Contractor of responsibility for complying with the terms of the contract. The PHA's possession or use shall not be deemed an acceptance of any work under the contract.

(b) While the PHA has such possession or use, the Contractor shall be relieved of the responsibility for (1) the loss of or damage to the work resulting from the PHA's possession or use, notwithstanding the terms of the clause entitled Permits and Codes herein; (2) all maintenance costs on the areas occupied; and, (3) furnishing heat, light, power, and water used in the areas occupied without proper remuneration therefore. If prior possession or use by the PHA delays the progress of the work or causes additional expense to the Contractor, an equitable adjustment shall be made in the contract price or the time of completion, and the contract shall be modified in writing accordingly.

22. Warranty of Title

The Contractor warrants good title to all materials, supplies, and equipment incorporated in the work and agrees to deliver the premises together with all improvements thereon free from any claims, liens or charges, and agrees further that neither it nor any other person, firm or corporation shall have any right to a lien upon the premises or anything appurtenant thereto.

23. Warranty of

(a) In addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph (j) of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or workmanship performed by the Contractor or any subcontractor or supplier at any tier. This warranty shall continue for a period of _____ (one year unless otherwise indicated) from the date of final acceptance of the work. If the PHA takes possession of any part of the work before final acceptance, this warranty shall continue for a period of (one year unless otherwise indicated) from the date that the PHA takes possession.

(b) The Contractor shall remedy, at the Contractor's expense, any failure to conform, or any defect. In addition, the Contractor shall remedy, at the Contractor's expense, any damage to PHA-owned or controlled real or personal property when the damage is the result of—

(1) The Contractor's failure to conform to contract requirements; or

(2) Any defects of equipment, material, workmanship or design furnished by the Contractor.

(c) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for (one year unless otherwise indicated) from the date of repair or replacement.

(d) The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect or damage.

(e) If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the PHA shall have the right to replace, repair or otherwise remedy the failure, defect, or damage at the Contractor's expense.

(f) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall:

(1) Obtain all warranties that would be given in normal commercial practice;

(2) Require all warranties to be executed in writing, for the benefit of the PHA; and,

(3) Enforce all warranties for the benefit of the PHA.

(g) In the event the Contractor's warranty under paragraph (a) of this clause has expired, the PHA may bring suit at its own expense to enforce a subcontractor's, manufacturer's or supplier's warranty.

(h) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defect of material or design furnished by the PHA nor for the repair of any damage that results from any defect in PHA furnished material or design.

(i) Notwithstanding any provisions herein to the contrary, the establishment of the time periods in paragraphs (a) and (c) above relate only to the specific obligation of the Contractor to correct the work, and have no relationship to the time within which its obligation to comply with the contract may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to its obligation other than specifically to correct the work.

(j) This warranty shall not limit the PHA's rights under the Inspection and Acceptance of Construction clause of this contract with respect to latent defects, gross mistakes or fraud.

24. Prohibition Against Liens

The Contractor is prohibited from placing a lien on the PHA's property. This prohibition shall apply to all subcontractors at any tier and all materials suppliers.

Administrative Requirements

25. Contract Period

this contract within calendar days of the effective date of the contract, or within the time schedule established in the notice to proceed issued by the Contracting Officer.

26. Order of Provisions

accordance with the terms and conditions of the

In the event of a conflict between these General Conditions and the Specifications, the General Conditions shall prevail. In the event of a conflict between the contract and any applicable state or local law or regulation, the state or local law or regulation shall prevail; provided that such state or local law or regulation does not conflict with, or is less restrictive than applicable federal law, regulation, or Executive Order. In the event of such a conflict, applicable federal law, regulation, and Executive Order shall prevail.

27. Payments

retain ten (10) percent of the amount of progress

(a) The PHA shall pay the Contractor the price as provided in this contract.

(b) The PHA shall make progress payments approximately every 30 days as the work proceeds, on estimates of work accomplished which meets the standards of quality established under the contract, as approved by the Contracting Officer. The PHA may, subject to written determination and approval of the Contracting Officer, make more frequent payments to contractors which are qualified small businesses.

(c) Before the first progress payment under this contract, the Contractor shall furnish, in such detail as requested by the Contracting Officer, a breakdown of the total contract price showing the amount included therein for each principal category of the work, which shall substantiate the payment amount requested in order to provide a basis for determining progress payments. The breakdown shall be approved by the Contracting Officer and must be acceptable to HUD. If the contract covers more than one project, the Contractor shall furnish a separate breakdown for each. The values and quantities employed in making up this breakdown are for determining the amount of progress payments and shall not be construed as a basis for additions to or deductions from the contract price. The Contractor shall prorate its overhead and profit over the construction period of the contract.

(d) The Contractor shall submit, on forms provided by the PHA, periodic estimates showing the value of the work performed during each period based upon the approved

submitted not later than _____ days in advance of the date set for payment and are subject to correction and revision as required. The estimates must be approved by the Contracting Officer with the concurrence of the Architect prior to payment. If the contract covers more than one project, the Contractor shall furnish a separate progress payment estimate for each.

(e) Along with each request for progress payments and the required estimates, the Contractor shall furnish the following certification, or payment shall not be made: I hereby certify, to the best of my knowledge and belief, that:

(1) The amounts requested are only for performance in accordance with the specifications, terms, and conditions of the contract;

(2) Payments to subcontractors and suppliers have been made from previous payments received under the contract, and timely payments will be made from the proceeds of the payment covered by this certification, in accordance with subcontract agreements; and,

(3) This request for progress payments does not include any amounts which the prime contractor intends to withhold or retain from a subcontractor or supplier in

subcontract.

Name:

Title:

Date:

(f) Except as otherwise provided in State law, the PHA shall

payments until completion and acceptance of all work under the contract; except, that if upon completion of 50 percent of the work, the Contracting Officer, after consulting with the Architect, determines that the Contractor's performance and progress are satisfactory, the PHA may make the remaining payments in full for the work subsequently completed. If the Contracting Officer subsequently determines that the Contractor's performance and progress are unsatisfactory, the PHA shall reinstate the ten (10) percent (or other percentage as provided in State law) retainage until such time as the Contracting Officer determines that performance and progress are satisfactory.

(g) The Contracting Officer may authorize material delivered on the site and preparatory work done to be taken into consideration when computing progress payments.

Material delivered to the Contractor at locations other than the site may also be taken into consideration if the Contractor furnishes satisfactory evidence that (1) it has acquired title to such material; (2) the material is properly stored in a bonded warehouse, storage yard, or similar suitable place as may be approved by the Contracting Officer; (3) the material is insured to cover its full value; and (4) the material will be used to perform this contract. Before any progress payment which includes delivered material is made, the Contractor shall furnish such documentation as the Contracting Officer may require to assure the protection of the PHA's interest in such materials. The Contractor shall remain responsible for such stored material notwithstanding the transfer of title to the PHA.

(h) All material and work covered by progress payments made shall, at the time of payment become the sole property of the PHA, but this shall not be construed as (1) relieving the Contractor from the sole responsibility for all material and work upon which payments have been made or the restoration of any damaged work; or, (2) waiving the right of the PHA to require the fulfillment of all of the terms of the contract. In the event the work of the Contractor has been damaged by other contractors or persons other than employees of the PHA in the course of their employment, the Contractor shall restore such damaged work without cost to the PHA and to seek redress for its damage only from those who directly caused it.

(i) The PHA shall make the final payment due the Contractor under this contract after (1) completion and final acceptance of all work; and (2) presentation of release of all claims against the PHA arising by virtue of this contract, other than claims, in stated amounts, that the Contractor has specifically excepted from the operation of the release. Each such exception shall embrace no more than one claim, the basis and scope of which shall be clearly defined. The amounts for such excepted claims shall not be included in the request for final payment. A release may also be required of the assignee if the Contractor's claim to amounts payable under this contract has been assigned.

(j) Prior to making any payment, the Contracting Officer may require the Contractor to furnish receipts or other evidence of payment from all persons performing work and supplying material to the Contractor, if the Contracting Officer determines such evidence is necessary to substantiate claimed costs.

(k) The PHA shall not; (1) determine or adjust any claims for payment or disputes arising there under between the Contractor and its subcontractors or material suppliers; or, (2) withhold any moneys for the protection of the subcontractors or material suppliers. The failure or refusal of the PHA to withhold moneys from the Contractor shall in nowise impair the obligations of any surety or sureties under any bonds furnished under this contract.

28. Contract Modifications

(a) Only the Contracting Officer has authority to modify any term or condition of this contract. Any contract modification shall be authorized in writing.

(b) The Contracting Officer may modify the contract unilaterally (1) pursuant to a specific authorization stated in a contract clause (e.g., Changes); or (2) for administrative matters which do not change the rights or responsibilities of the parties (e.g., change in the PHA address). All other contract modifications shall be in the form of supplemental agreements signed by the Contractor and the Contracting Officer.

(c) When a proposed modification requires the approval of HUD prior to its issuance (e.g., a change order that exceeds the PHA's approved threshold), such modification shall not be effective until the required approval is received by the PHA.

29. Changes

(a) The Contracting Officer may, at any time, without notice to the sureties, by written order designated or indicated to be a change order, make changes in the work within the general scope of the contract including changes:
(1) In the specifications (including drawings and designs);
(2) In the method or manner of performance of the work;
(3) PHA-furnished facilities, equipment, materials, services, or site; or,
(4) Directing the acceleration in the performance of the work.

(b) Any other written order or oral order (which, as used in this paragraph (b), includes direction, instruction, interpretation, or determination) from the Contracting Officer that causes a change shall be treated as a change order under this clause; provided, that the Contractor gives the Contracting Officer written notice stating (1) the date, circumstances and source of the order and (2) that the Contractor regards the order as a change order.

(c) Except as provided in this clause, no order, statement or conduct of the Contracting Officer shall be treated as a change under this clause or entitle the Contractor to an equitable adjustment.

(d) If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for the performance of any part of the work under this contract, whether or not changed by any such order, the Contracting Officer shall make an equitable adjustment and modify the contract in writing. However, except for a adjustment based on defective specifications, no proposal for any change under paragraph (b) above shall be allowed for any costs incurred more than 20 days (5 days for oral orders) before the Contractor gives written notice as required. In the case of defective specifications for which the PHA is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with the defective specifications.

(e) The Contractor must assert its right to an adjustment under this clause within 30 days after (1) receipt of a written change order under paragraph (a) of this clause, or (2) the furnishing of a written notice under paragraph (b) of this clause, by submitting a written statement describing the general nature and the amount of the proposal. If the facts justify it, the Contracting Officer may extend the period for submission. The proposal may be included in the notice required under paragraph (b) above. No proposal by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this contract.

(f) The Contractor's written proposal for equitable adjustment shall be submitted in the form of a lump sum proposal supported with an itemized breakdown of all increases and decreases in the contract in at least the following details:

(1) Direct Costs. Materials (list individual items, the quantity and unit cost of each, and the aggregate cost); Transportation and delivery costs associated with materials; Labor breakdowns by hours or unit costs (identified with specific work to be performed); Construction equipment exclusively necessary for the change; Costs of preparation and/ or revision to shop drawings resulting from the change; Worker's Compensation and Public Liability Insurance; Employment taxes under FICA and FUTA; and, Bond Costs when size of change warrants revision.

(2) Indirect Costs. Indirect costs may include overhead, general and administrative expenses, and fringe benefits not normally treated as direct costs.

(3) Profit. The amount of profit shall be negotiated and may vary according to the nature, extent, and complexity of the work required by the change. The allowability of the direct and indirect costs shall be determined in accordance with the Contract Cost Principles and Procedures for Commercial Firms in Part 31 of the Federal Acquisition Regulation (48 CFR 1-31), as implemented by HUD Handbook 2210.18, in effect on the date of this contract. The Contractor shall not be allowed a profit on the profit received by any subcontractor. Equitable adjustments for deleted work shall include a credit for profit and may include a credit for indirect costs. On proposals covering both increases and decreases in the amount of the contract, the application of indirect costs and profit shall be on the net-change in direct costs for the Contractor or subcontractor performing the work.

(g) The Contractor shall include in the proposal its request for time extension (if any), and shall include sufficient information and dates to demonstrate whether and to what extent the change will delay the completion of the contract in its entirety.

(h) The Contracting Officer shall act on proposals within 30 days after their receipt, or notify the Contractor of the date when such action will be taken.

(i) Failure to reach an agreement on any proposal shall be a dispute under the clause entitled Disputes herein. Nothing in this clause, however, shall excuse the Contractor from proceeding with the contract as changed.

(j) Except in an emergency endangering life or property, no change shall be made by the Contractor without a prior order from the Contracting Officer.

30. Suspension of Work

(a) The Contracting Officer may order the Contractor in writing to suspend, delay, or interrupt all or any part of the work of this contract for the period of time that the Contracting Officer determines appropriate for the convenience of the PHA.

(b) If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted (1) by an act of the Contracting Officer in the administration of this contract, or (2) by the Contracting Officer's failure to act within the time specified (or within a reasonable time if not specified) in this contract an adjustment shall be made for any increase in the cost of performance of the contract (excluding profit) necessarily caused by such unreasonable suspension, delay, or interruption and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor or for which any equitable adjustment is provided for or excluded under any other provision of this contract.

(c) A claim under this clause shall not be allowed (1) for any costs incurred more than 20 days before the Contractor shall have notified the Contracting Officer in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order); and, (2) unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of the suspension, delay, or interruption, but not later than the date of final payment under the contract.

31. Disputes

(a) "Claim," as used in this clause, means a written demand or written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of contract terms, or other relief arising under or relating to the contract. A claim arising under the contract, unlike a claim relating to the contract, is a claim that can be resolved under a contract clause that provides for the relief sought by the claimant. A voucher, invoice, or other routine request for payment that is not in dispute when submitted is not a claim. The submission may be converted to a claim by complying with the requirements of this clause, if it is disputed either as to liability or amount or is not acted upon in a reasonable time.

(b) Except for disputes arising under the clauses entitled Labor Standards - Davis Bacon and Related Acts, herein, all disputes arising under or relating to this contract, including any claims for damages for the alleged breach thereof which are not disposed of by agreement, shall be resolved under this clause.

(c) All claims by the Contractor shall be made in writing and submitted to the Contracting Officer for a written decision. A claim by the PHA against the Contractor shall be subject to a written decision by the Contracting Officer.

(d) The Contracting Officer shall, within 60 (unless otherwise indicated) days after receipt of the request, decide the claim or notify the Contractor of the date by which the decision will be made.

(e) The Contracting Officer's decision shall be final unless the Contractor (1) appeals in writing to a higher level in the PHA in accordance with the PHA's policy and procedures, (2) refers the appeal to an independent mediator or arbitrator, or (3) files suit in a court of competent jurisdiction. Such appeal must be made within (30 unless otherwise indicated) days after receipt of the Contracting Officer's decision.

(f) The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim, appeal, or action arising under or relating to the contract, and comply with any decision of the Contracting Officer.

32. Default

(a) If the Contractor refuses or fails to prosecute the work, or any separable part thereof, with the diligence that will insure its completion within the time specified in this contract, or any extension thereof, or fails to complete said work within this time, the Contracting Officer may, by written notice to the Contractor, terminate the right to

proceed with the work (or separable part of the work) that has been delayed. In this event, the PHA may take over the work and complete it, by contract or otherwise, and may take possession of and use any materials, equipment, and plant on the work site necessary for completing the work. The Contractor and its sureties shall be liable for any damage to the PHA resulting from the Contractor's refusal or failure to complete the work within the specified time, whether or not the Contractor's right to proceed with the work is terminated. This liability includes any increased costs incurred by the PHA in completing the work.

(b) The Contractor's right to proceed shall not be terminated or the Contractor charged with damages under this clause if—

(1) The delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include (i) acts of God, or of the public enemy, (ii) acts of the PHA or other governmental entity in either its sovereign or contractual capacity, (iii) acts of another contractor in the performance of a contract with the PHA, (iv) fires, (v) floods, (vi) epidemics, (vii) quarantine restrictions, (viii) strikes, (ix) freight embargoes, (x) unusually severe weather, or (xi) delays of subcontractors or suppliers at any tier arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and the subcontractors or suppliers; and

(2) The Contractor, within days (10 days unless otherwise indicated) from the beginning of such delay (unless extended by the Contracting Officer) notifies the Contracting Officer in writing of the causes of delay. The Contracting Officer shall ascertain the facts and the extent of the delay. If, in the judgment of the Contracting Officer, the findings of fact warrant such action, time for completing the work shall be extended by written modification to the contract. The findings of the Contracting Officer shall be reduced to a written decision which shall be subject to the provisions of the Disputes clause of this contract.

(c) If, after termination of the Contractor's right to proceed, it is determined that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination had been for convenience of the PHA.

33. Liquidated Damages

(a) If the Contractor fails to complete the work within the time specified in the contract, or any extension, as specified in the clause entitled Default of this contract, the Contractor shall pay to the PHA as liquidated damages, the sum of $ _____ Contracting Officer insert amount] for each day of delay. If different completion dates are specified in the contract for separate parts or stages of the work, the amount of liquidated damages shall be assessed on those parts or stages which are delayed. To the extent that the Contractor's delay or nonperformance is excused under another clause in this contract, liquidated damages shall not be due the PHA. The Contractor remains liable for damages caused other than by delay.

(b) If the PHA terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final completion of the work together with any increased costs occasioned the PHA in completing the work.

(c) If the PHA does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the work is completed or accepted.

34. Termination for Convenience

(a) The Contracting Officer may terminate this contract in whole, or in part, whenever the Contracting Officer determines that such termination is in the best interest of the PHA. Any such termination shall be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which the performance of the work under the contract is terminated, and the date upon which such termination becomes effective.

(b) If the performance of the work is terminated, either in whole or in part, the PHA shall be liable to the Contractor for reasonable and proper costs resulting from such termination upon the receipt by the PHA of a properly presented claim setting out in detail: (1) the total cost of the work performed to date of termination less the total amount of contract payments made to the Contractor; (2) the cost (including reasonable profit) of settling and paying claims under subcontracts and material orders for work performed and materials and supplies delivered to the site, payment for which has not been made by the PHA to the Contractor or by the Contractor to the subcontractor or supplier; (3) the cost of preserving and protecting the work already performed until the PHA or assignee takes possession thereof or assumes responsibility therefore; (4) the actual or estimated cost of legal and accounting services reasonably necessary to prepare and present the termination claim to the PHA; and (5) an amount constituting a reasonable profit on the value of the work performed by the Contractor.

(c) The Contracting Officer will act on the Contractor's claim within days (60 days unless otherwise indicated) of receipt of the Contractor's claim.

(d) Any disputes with regard to this clause are expressly made subject to the provisions of the Disputes clause of this contract.

35. Assignment of Contract

The Contractor shall not assign or transfer any interest in this contract; except that claims for monies due or to become due from the PHA under the contract may be assigned to a bank, trust company, or other financial institution. Such assignments of claims shall only be made with the written concurrence of the Contracting Officer. If the Contractor is a partnership, this contract shall inure to the benefit of the surviving or remaining member(s) of such partnership as approved by the Contracting Officer.

36. Insurance

(a) Before commencing work, the Contractor and each subcontractor shall furnish the PHA with certificates of insurance showing the following insurance is in force and will insure all operations under the Contract:

(1) Workers' Compensation, in accordance with state or Territorial Workers' Compensation laws.

(2) Commercial General Liability with a combined single limit for bodily injury and property damage of not less than $ _____ [Contracting Officer insert amount]

per occurrence to protect the Contractor and each subcontractor against claims for bodily injury or death and damage to the property of others. This shall cover the use of all equipment, hoists, and vehicles on the site(s) not covered by Automobile Liability under (3) below. If the Contractor has a "claims made" policy, then the following additional requirements apply: the policy must provide a "retroactive date" which must be on or before the execution date of the Contract; and the extended reporting period may not be less than five years following the completion date of the Contract.

(3) Automobile Liability on owned and non -owned motor vehicles used on the site(s) or in connection therewith for a combined single limit for bodily injury and property damage of not less than $ _____ [Contracting Officer insert amount] per occurrence.

(b) Before commencing work, the Contractor shall furnish the PHA with a certificate of insurance evidencing that Builder's Risk (fire and extended coverage) Insurance on all work in place and/or materials stored at the building site(s), including foundations and building equipment, is in force. The Builder's Risk Insurance shall be for the benefit of the Contractor and the PHA as their interests may appear and each shall be named in the policy or policies as an insured. The Contractor in installing equipment supplied by the PHA shall carry insurance on such equipment from the time the Contractor takes possession thereof until the Contract work is accepted by the PHA. The Builder's Risk Insurance need not be carried on excavations, piers, footings, or foundations until such time as work on the superstructure is started. It need not be carried on landscape work. Policies shall furnish coverage at all times for the full cash value of all completed construction, as well as materials in place and/or stored at the site(s), whether or not partial payment has been made by the PHA. The Contractor may terminate this insurance on buildings as of the date taken over for occupancy by the PHA. The Contractor is not required to carry Builder's Risk Insurance for modernization work which does not involve structural alterations or additions and where the PHA's existing fire and extended coverage policy can be endorsed to include such work.

(c) All insurance shall be carried with companies which are financially responsible and admitted to do business in the State in which the project is located. If any such insurance is due to expire during the construction period, the Contractor (including subcontractors, as applicable) shall not permit the coverage to lapse and shall furnish evidence of coverage to the Contracting Officer. All certificates of insurance, as evidence of coverage, shall provide that no coverage may be canceled or non-renewed by the insurance company until at least 30 days prior written notice has been given to the Contracting Officer.

37. Subcontracts

(a) Definitions. As used in this contract -

(1) "Subcontract" means any contract, purchase order, or other purchase agreement, including modifications and change orders to the foregoing, entered into by a subcontractor to furnish supplies, materials, equipment, and services for the performance of the prime contract or a subcontract.

(2) "Subcontractor" means any supplier, vendor, or firm that furnishes supplies, materials, equipment, or services to or for the Contractor or another subcontractor.

(b) The Contractor shall not enter into any subcontract with any subcontractor who has been temporarily denied participation in a HUD program or who has been suspended or debarred from participating in contracting programs by any agency of the United States Government or of the state in which the work under this contract is to be performed.

(c) The Contractor shall be as fully responsible for the acts or omissions of its subcontractors, and of persons either directly or indirectly employed by them as for the acts or omissions of persons directly employed by the Contractor.

(d) The Contractor shall insert appropriate clauses in all subcontracts to bind subcontractors to the terms and conditions of this contract insofar as they are applicable to the work of subcontractors.

(e) Nothing contained in this contract shall create any contractual relationship between any subcontractor and the PHA or between the subcontractor and HUD.

38. Subcontracting with Small and Minority Firms, Women's Business Enterprise, and Labor Surplus Area Firms

The Contractor shall take the following steps to ensure that, whenever possible, subcontracts are awarded to small business firms, minority firms, women's business enterprises, and labor surplus area firms:

(a) Placing qualified small and minority businesses and women's business enterprises on solicitation lists;

(b) Ensuring that small and minority businesses and women's business enterprises are solicited whenever they are potential sources;

(c) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses and women's business enterprises;

(d) Establishing delivery schedules, where the requirements of the contract permit, which encourage participation by small and minority businesses and women's business enterprises; and

(e) Using the services and assistance of the U.S. Small Business Administration, the Minority Business Development Agency of the U.S. Department of Commerce, and State and local governmental small business agencies.

39. Equal Employment Opportunity

During the performance of this contract, the Contractor/ Seller agrees as follows:

(a) The Contractor/Seller shall not discriminate against any employee or applicant for employment because of of race color, religion, sex, sexual orientation, gender identity, disability, or national origin.

(b) The Contractor/Seller shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, disability, or national origin. Such action shall include, but not be limited to, (1) employment, (2) upgrading demotion, (4) transfer, (5) recruitment or recruitment advertising, (6) layoff or termination, (7) rates of pay or other forms of compensation, and (8) selection for training,including apprenticeship

(c) The Contractor/Seller agrees to post in conspicuous places available to employees and applicants for employment the notices to be provided by the Contracting Officer setting forth the provisions of this nondiscrimination clause.
(d) The Contractor/Seller shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor/Seller, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.
(e) The Contractor/Seller shall send, to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, the notice to be provided by the Contracting Officer advising the labor union or workers' representative of the Contractor's commitments under this clause, and post copies of the notice in conspicuous places available to employees and applicants for employment.
(f) The Contractor/Seller shall comply with Executive Order 11246, as amended, and the rules, regulations, and orders of the Secretary of Labor.
(g) The Contractor/Seller shall furnish all information and reports required by Executive Order 11246, as amended, Section 503 of the Rehabilitation Act of 1973, as amended, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto. The Contractor/Seller shall permit

access to its books, records, and accounts by the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(h) In the event of a that the Contractor/Seller is in noncompliance with the nondiscrimination clauses of this contract or with any of such rules, regulations, or orders, this contract may be canceled, terminated or suspended in whole or in part and the contractor/seller may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(i)The contractor/seller will include the provisions of paragraphs (a) through (h) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each sub[contractor/seller] or vendor. The [contractor/seller] will take such action with respect to any subcontract or purchase order as may be directed by the Secretary of Labor as a means of enforcing such provisions in cluding sanctions for noncompliance: Provided, however, that in the event the [contractor/seller] becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the [contractor/seller] may request the United States to enter into such litigation to protect the interests of the United States.

(j) Compliance with the requirements of this clause shall be to the maximum extent consistent with, but not in derogation of, compliance with section 7(b) of the Indian Self-Determination and Education Assistance Act and the Indian Preference clause of this contract.

40. Employment, Training, and Contracting Opportunities for Low-Income Persons, Section 3 of the Housing and Urban Development Act of 1968.

(a) The work to be performed under this contract is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (section 3). The purpose of section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by Section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.
(b) The parties to this contract agree to comply with HUD's regulations in 24 CFR Part 75, which implement Section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the Part 75 regulations.
(c) The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this section 3 clause and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the Section 3 prioritization requirements and shall state the minimum percentages of labor hour requirements established in the Benchmark Notice (FR-6085-N-04).
(d) The contractor agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 CFR Part 75, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR Part 75. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR Part 75.
(e) Noncompliance with HUD's regulations in 24 CFR Part 75 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.
(f) Contracts, subcontracts, grants, or subgrants subject to Section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 5307(b)) or subject to tribal preference requirements as authorized under 101(k) of the Native American Housing Assistance and Self-Determination Act (25 U.S.C. 4111(k)) must provide preferences in employment, training, and business opportunities to Indians and Indian organizations, and are therefore not subject to the requirements of 24 CFR Part 75.

41. Interest of Members of Congress

No member of or delegate to the Congress of the United States of America shall be admitted to any share or part of this contract or to any benefit that may arise therefrom.

42. Interest of Members, Officers, or Employees and Former Members, Officers, or Employees

No member, officer, or employee of the PHA, no member of the governing body of the locality in which the project is situated, no member of the governing body of the locality in which the PHA was activated, and no other public official of such locality or localities who exercises any functions or responsibilities with respect to the project, shall, during his or her tenure, or for one year thereafter, have any interest, direct or indirect, in this contract or the proceeds thereof.

43. Limitations on Payments made to Influence Certain Federal Financial Transactions

(a) The Contractor agrees to comply with Section 1352 of Title 31, United States Code which prohibits the use of **Acts** Federal appropriated funds to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, and officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract; the making of any Federal grant; the making of any Federal loan; the entering into of any cooperative agreement; or the modification of any Federal contract, grant, loan, or cooperative agreement.

(b) The Contractor further agrees to comply with the requirement of the Act to furnish a disclosure (OMB Standard Form LLL, Disclosure of Lobbying Activities) if any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a Federal contract, grant, loan, or cooperative agreement.

44. Royalties and Patents

The Contractor shall pay all royalties and license fees. It shall defend all suits or claims for infringement of any patent rights and shall save the PHA harmless from loss on account thereof; except that the PHA shall be responsible for all such loss when a particular design, process or the product of a particular manufacturer or manufacturers is specified and the Contractor has no reason to believe that the specified design, process, or product is an infringement. If, however, the Contractor has reason to believe that any design, process or product specified is an infringement of a patent, the Contractor shall promptly notify the Contracting Officer. Failure to give such notice shall make the Contractor responsible for resultant loss.

45. Examination and Retention of Contractor's Records

(a) The PHA, HUD, or Comptroller General of the United States, or any of their duly authorized representatives shall, until 3 years after final payment under this contract, have access to and the right to examine any of the Contractor's directly pertinent books, documents, papers, or other records involving transactions related to this contract for the purpose of making audit, examination, excerpts, and transcriptions.

(b) The Contractor agrees to include in first-tier subcontracts under this contract a clause substantially the same as paragraph (a) above. "Subcontract," as used in this clause, excludes purchase orders not exceeding $10,000.

(c) The periods of access and examination in paragraphs (a) and (b) above for records relating to (1) appeals under the Disputes clause of this contract, (2) litigation or settlement of claims arising from the performance of this contract, or (3) costs and expenses of this contract to which the PHA, HUD, or Comptroller General or any of their duly authorized representatives has taken exception shall continue until disposition of such appeals, litigation, claims, or exceptions.

46. Labor Standards - Davis-Bacon and Related

If the total amount of this contract exceeds $2,000, the Federal labor standards set forth in the clause below shall apply to the development or construction work to be performed under the contract.

(a) Minimum Wages.

(1) All laborers and mechanics employed under this contract in the development or construction of the project(s) involved will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the regular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits in the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein; provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall

be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(2) (i) Any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when all the following criteria have been met: (A) The work to be performed by the classification requested is not performed by a classification in the wage determination; and (B) The classification is utilized in the area by the construction industry; and (C) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(ii) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employee Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary.

(iii) In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator of the Wage and Hour Division for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary.

(iv) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (a)(2)(ii) or (iii) of this clause shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in classification.

(3) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(4) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program; provided, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(b) Withholding of funds. HUD or its designee shall, upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same prime Contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working in the construction or development of the project, all or part of the wages required by the contract, HUD or its designee may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the Contractor, disburse such amounts withheld for and on account of the Contractor or subcontractor to the respective employees to whom they are due.

(c) Payrolls and basic records.

(1) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working in the construction or development of the project. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made, and actual wages paid. Whenever the Secretary of Labor has found, under 29 CFR 5.5(a)(1)(iv), that the wages of any laborer or mechanic include the amount of costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(2) (i) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Contracting Officer for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under subparagraph (c)(1) of this clause. This information may be submitted in any form desired. Optional Form WH-347 (Federal Stock Number 029-005-00014-1) is available for this purpose and may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The Contractor is responsible for the submission of copies of payrolls by all subcontractors. (Approved by the Office of Management and Budget under OMB Control Number 1214-0149.)

(ii) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(A) That the payroll for the payroll period contains the information required to be maintained under paragraph (c) (1) of this clause and that such information is correct and complete;

(B) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3; and

(C) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(iii) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirements for submission of the "Statement of Compliance" required by subparagraph (c)(2)(ii) of this clause.

(iv) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 3729 of Title 31 of the United States Code.

(3) The Contractor or subcontractor shall make the records required under subparagraph (c)(1) available for inspection, copying, or transcription by authorized representatives of HUD or its designee, the Contracting Officer, or the Department of Labor and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(d) (1) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship and Training, Employer and Labor Services (OATELS), or with a State Apprenticeship Agency recognized by OATELS, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by OATELS or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in this paragraph, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator of the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event OATELS, or a State Apprenticeship Agency recognized by OATELS, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(2) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under

the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed in the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate in the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate in the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate in the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(3) Equal employment opportunity. The utilization of apprentices, trainees, and journeymen under this clause shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

(e) Compliance with Copeland Act requirements. The Contractor shall comply with the requirements of 29 CFR Part 3, which are hereby incorporated by reference in this contract.

(f) Contract termination; debarment. A breach of this contract clause may be grounds for termination of the contract and for debarment as a Contractor and a subcontractor as provided in 29 CFR 5.12.

(g) Compliance with Davis-Bacon and related Act requirements. All rulings and interpretations of the Davis-Bacon and related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.

(h) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this clause shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the PHA, HUD, the U.S. Department of Labor, or the employees or their representatives.

(i) Certification of eligibility.

(1) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded contracts by the United States Government by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(2) No part of this contract shall be subcontracted to any person or firm ineligible for award of a United States Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(3) The penalty for making false statements is prescribed in the U. S. Criminal Code, 18 U.S.C. 1001.

(j) Contract Work Hours and Safety Standards Act. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics, including watchmen and guards, shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the provisions set forth in subparagraph (j)(1) of this clause, the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic (including watchmen and guards) employed in violation of the provisions set forth in subparagraph (j)(1) of this clause, in the sum of $27 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by provisions set forth in subparagraph (j)(1) of this clause. DOL posts current fines at: https://www.dol.gov/whd/govcontracts/cwhssa.htm#cmp

(3) Withholding for unpaid wages and liquidated damages. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or subcontractor under any such contract or any Federal contract with the same prime Contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the provisions set forth in subparagraph (j)(2) of this clause.

(k) Subcontracts. The Contractor or subcontractor shall insert in any subcontracts all the provisions contained in this clause, and such other clauses as HUD or its designee may by appropriate instructions require, and also a clause requiring the subcontractors to include these provisions in any lower tier subcontracts. The prime Contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all these provisions.

47. Non-Federal Prevailing Wage Rates

(a) Any prevailing wage rate (including basic hourly rate and any fringe benefits), determined under State or tribal law to be prevailing, with respect to any employee in any trade or position employed under the contract, is inapplicable to the contract and shall not be enforced against the Contractor or any subcontractor, with respect to employees engaged under the contract whenever such non-Federal prevailing wage rate exceeds:

(1) The applicable wage rate determined by the Secretary of Labor pursuant to the Davis-Bacon Act (40 U.S.C. 3141 et seq.) to be prevailing in the locality with respect to such trade;

(b) An applicable apprentice wage rate based thereon specified in an apprenticeship program registered with the U.S. Department of Labor (DOL) or a DOL-recognized State Apprenticeship Agency; or

(c) An applicable trainee wage rate based thereon specified in a DOL-certified trainee program.

48. Procurement of Recovered Materials.

(a) In accordance with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, the Contractor shall procure items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR Part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition. The Contractor shall procure items designated in the EPA guidelines that contain the highest percentage of recovered materials practicable unless the Contractor determines that such items: (1) are not reasonably available in a reasonable period of time; (2) fail to meet reasonable performance standards, which shall be determined on the basis of the guidelines of the National Institute of Standards and Technology, if applicable to the item; or (3) are only available at an unreasonable price.

( ) Paragraph (a) of this clause shall apply to items purchased under this contract where: (1) the Contractor purchases in excess of $10,000 of the item under this contract; or (2) during the preceding Federal fiscal year, the Contractor: (i) purchased any amount of the items for use under a contract that was funded with Federal appropriations and was with a Federal agency or a State agency or agency of a political subdivision of a State; and (ii) purchased a total of in excess of $10,000 of the item both under and outside that contract.

OMB Approval No. 2577-0157 (Exp. 1/31/2027)

Certification of Payments to Influence Federal Transactions

U.S. Department of Housing and Urban Development
Office of Public and Indian Housing

Public reporting burden for this information collection is estimated to average 30 minutes,including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. The information requested is required to obtain a benefit. This form is used to ensure federal funds are not used to influence members of Congress. There are no assurances of confidentiality. HUD may not conduct or sponsor, and an applicant is not required to respond to a collection of information unless it displays a currently valid OMB control number. Comments regarding the accuracy of this burden estimate and any suggestions for reducing this burden can be sent to the Reports Management Officer, Office of Policy Development and Research, REE, Department of Housing and Urban Development, 451 7th St SW, Room 4176, Washington, DC 20410-5000. When providing comments, please refer to OMB Approval No. 2577-0157.

Applicant Name

Program/Activity Receiving Federal Grant Funding

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, Disclosure Form to Report Lobbying, in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all sub recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

I hereby certify that all the information stated herein, as well as any information provided in the accompaniment herewith, is true and accurate. **Warning:** HUD will prosecute false claims and statements. Conviction may result in criminal and/or civil penalties. (18 U.S.C. 1001, 1010, 1012; 31 U.S.C. 3729, 3802)

Name of Authorized Official	Title

Signature	Date (mm/dd/yyyy)

DISCLOSURE OF LOBBYING ACTIVITIES

Approved by OMB
0348-0046

Complete this form to disclose lobbying activities pursuant to 31 U.S.C. 1352
(See reverse for public burden disclosure.)

1. Type of Federal Action:	2. Status of Federal Action:	3. Report Type:
☐ a. contract b. grant c. cooperative agreement d. loan e. loan guarantee f. loan insurance	☐ a. bid/offer/application b. initial award c. post-award	☐ a. initial filing b. material change **For Material Change Only:** year _____ quarter _____ date of last report _____

4. Name and Address of Reporting Entity:	5. If Reporting Entity in No. 4 is a Subawardee, Enter Name and Address of Prime:
☐ **Prime** ☐ **Subawardee** Tier _____, *if known*: **Congressional District**, *if known*: 4c	 **Congressional District**, *if known*:
6. Federal Department/Agency:	**7. Federal Program Name/Description:** CFDA Number, *if applicable*: _____
8. Federal Action Number, *if known*:	**9. Award Amount,** *if known*: $
10. a. Name and Address of Lobbying Registrant (*if individual, last name, first name, MI*):	**b. Individuals Performing Services** (*including address if different from No. 10a*) (*last name, first name, MI*):
11. Information requested through this form is authorized by title 31 U.S.C. section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when this transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.	Signature: _____ Print Name: _____ Title: _____ Telephone No.: _____ Date: _____
Federal Use Only:	Authorized for Local Reproduction Standard Form LLL (Rev. 7-97)

PRINT

INSTRUCTIONS FOR COMPLETION OF SF-LLL, DISCLOSURE OF LOBBYING ACTIVITIES

This disclosure form shall be completed by the reporting entity, whether subawardee or prime Federal recipient, at the initiation or receipt of a covered Federal action, or a material change to a previous filing, pursuant to title 31 U.S.C. section 1352. The filing of a form is required for each payment or agreement to make payment to any lobbying entity for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employeeof a Member of Congress in connection with a covered Federal action. Complete all items that apply for both the initial filing and material change report. Refer to the implementing guidance published by the Office of Management and Budget for additional information.

1. Identify the type of covered Federal action for which lobbying activity is and/or has been secured to influence the outcome of a covered Federal action.

2. Identify the status of the covered Federal action.

3. Identify the appropriate classification of this report. If this is a followup report caused by a material change to the information previously reported, enter the year and quarter in which the change occurred. Enter the date of the last previously submitted report by this reporting entity for this covered Federal action.

4. Enter the full name, address, city, State and zip code of the reporting entity. Include Congressional District, if known. Check the appropriate classification of the reporting entity that designates if it is, or expects to be, a prime or subaward recipient. Identify the tier of the subawardee, e.g., the first subawardee of the prime is the 1st tier. Subawards include but are not limited to subcontracts, subgrants and contract awards under grants.

5. If the organization filing the report in item 4 checks "Subawardee," then enter the full name, address, city, State and zip code of the prime Federal recipient. Include Congressional District, if known.

6. Enter the name of the Federal agency making the award or loan commitment. Include at least one organizationallevel below agency name, if known. For example, Department of Transportation, United States Coast Guard.

7. Enter the Federal program name or description for the covered Federal action (item 1). If known, enter the full Catalog of Federal Domestic Assistance (CFDA) number for grants, cooperative agreements, loans, and loan commitments.

8. Enter the most appropriate Federal identifying number available for the Federal action identified in item 1 (e.g., Request for Proposal (RFP) number; Invitation for Bid (IFB) number; grant announcement number; the contract, grant, or loan award number; the application/proposal control number assigned by the Federal agency). Include prefixes, e.g., "RFP-DE-90-001."

9. For a covered Federal action where there has been an award or loan commitment by the Federal agency, enter the Federal amount of the award/loan commitment for the prime entity identified in item 4 or 5.

10. (a) Enter the full name, address, city, State and zip code of the lobbying registrant under the Lobbying Disclosure Act of 1995 engaged by the reporting entity identified in item 4 to influence the covered Federal action.

    (b) Enter the full names of the individual(s) performing services, and include full address if different from 10 (a). Enter Last Name, First Name, and Middle Initial (MI).

11. The certifying official shall sign and date the form, print his/her name, title, and telephone number.

According to the Paperwork Reduction Act, as amended, no persons are required to respond to a collection of information unless it displays a valid OMB Control Number. The valid OMB control number for this information collection is OMB No. 0348-0046. Public reporting burden for this collection of information is estimated to average 10 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0046), Washington, DC 20503.

Section 3 Business Self-Certification Form

Business Name: _____

Contact Name: _____ **Title:** _____

Address: _____ **City:** _____ **State:** _____ **Zip:** _____

Phone: _____ **Email:** _____

Does your business qualify as a Section 3 Business based on the definition in 24 CFR Part 75.5?

_____ **YES** _____ **NO**

If **YES**, check the box below under which subcategory you qualify:

A Business Concern meeting at least one of the following criteria, documented within the last six-month period:

1. _____ It is at least 51 percent owned and controlled by low- or very low-income persons (see the annual limit established by HUD)
2. _____ Over 75 percent of the labor hours performed for the business over the prior 3 month period are performed by Section 3 Workers (See 24 CFR Part 75.5 and 75.11 for definition of a Section 3 Worker)
3. _____ It is a business at least 51 percent or more owned and controlled by current public housing residents or residents who currently live in Section 8-assisted housing.

If awarded the contract, the contractor will be responsible for providing documentation of their Section 3 status. Documentation can include, but is not limited to:

1. Proof of business ownership.
2. Three months of payroll review to establish the 75 percent rule.
3. Lease or proof of residency in public housing or Section 8-assisted housing.

By submitting this form, my business certifies that the statements and information contained on this form are true and accurate, and meet the HUD Section 3 business self-certification eligibility requirements in accordance with 24 CFR Part 75. I further understand that a Section 3 business is not entitled to a contract simply by being listed in the Section 3 Business Registry database. Section 3 Business Concerns are not exempt from meeting the specifications of the contract or other Section 3 requirements and obligations. Information that is misrepresented on this form will be grounds for terminating Section 3 certification.

_____ _____

Signature Date

Section 3 Worker:

(1) Any worker who currently fits or when hired within the past five years fit at least one of the following categories, as documented:

(i) The worker's income for the previous or annualized calendar year is below the income limit established by HUD ***(2026 limit $60,000.00)***

(ii) The worker is employed by a Section 3 business concern.

(iii) The worker is a YouthBuild participant.

(2) The status of a Section 3 worker shall not be negatively affected by a prior arrest or conviction.

(3) Nothing in this part shall be construed to require the employment of someone who meets this definition of a Section 3 worker. Section 3 workers are not exempt from meeting the qualifications of the position to be filled.

Targeted Section 3 Worker:

(1) A worker employed by a Section 3 business concern; or

(2) A worker who currently fits or when hired fit at least one of the following categories, as documented within the past five years:

(i) A resident of public housing or Section 8-assisted housing;

(ii) A resident of other public housing projects or Section 8-assisted housing managed by the PHA that is providing the assistance; or

(iii) A YouthBuild participant.

RESPONSIBLE CONTRACTOR VERIFICATION OF COMPLIANCE
St. Cloud Housing and Redevelopment Authority

The purpose of this document is to certify contractor compliance with Minnesota Statutes, Section 16C.285, subdivision 3. Covered contractors must sign the certification below and if subcontractors will be used under the contract, must comply with subdivision 7 requirements as to subcontractors.

Responsible Contractor, Minimum Criteria. "Responsible Contractor" means a contractor that conforms to the responsibility requirements in the solicitation document for its portion of the work on the project and verifies that it meets the minimum criteria set forth below. Each contractor or subcontractor shall obtain from all subcontractors with which it will have a direct contractual relationship a signed statement under oath by an owner or officer verifying that they meet all of the minimum criteria in subdivision 3 prior to execution of a construction contract with each subcontractor.

1. The Contractor:

    i. is in compliance with workers' compensation and unemployment insurance requirements;
    ii. is in compliance with the Department of Revenue and the Department of Employment and Economic Development registration requirements if it has employees;
    iii. has a valid federal tax identification number or a valid Social Security number if an individual; and
    iv. has filed a certificate of authority to transact business in Minnesota with the secretary of state if a foreign corporation or cooperative.

2. The contractor or related entity is in compliance with and, during the three-year period before submitting verification, has not violated section 177.24, 177.25, 177.41 to 177.44, 181.03, 181.101, 181.13, 181.14, or 181.722, and has not violated United States Code, title 29, sections 201 to 219, or United States Code, title 40, section 3141 to 3148. For purposes of this clause, a violation occurs when a contractor or related entity:

    i. repeatedly fails to pay statutorily required wages or penalties on one or more separate projects for a total underpayment of $25,000 or more within the three-year period, provided that a failure to pay is "repeated" only if it involves two or more separate and distinct occurrences of underpayment during the three-year period;
    ii. has been issued an order to comply by the commissioner of labor and industry that has become final;
    iii. has been issued at least two determination letters within the three-year period by the Department of Transportation finding an underpayment by the contractor or related entity to its own employees;
    iv. has been found by the commissioner of labor and industry to have repeatedly or willfully violated any of the sections referenced in this clause pursuant to section 177.27;
    v. has been issued a ruling or findings of underpayment by the administrator of the Wage and Hour Division of the United States Department of Labor that have become final or have been upheld by an administrative law judge or the Administrative Review Board; or
    vi. has been determined to have violated Minn. Stat. §§ 181.03 (prohibited wage practices and retaliation), 181.101 (payment of wages) or 609.52, subd. 2 (19) (criminal wage theft)
    vii. has been found liable for underpayment of wages or penalties or misrepresenting a construction worker as an independent contractor in an action brought in a court having jurisdiction.

    Provided that, if the contractor or related entity contests a determination of underpayment by the Department of Transportation in a contested case proceeding, a violation does not occur until the

contested case proceeding has concluded with a determination that the contractor or related entity underpaid wages or penalties;*

3. The contractor or related entity is in compliance with and, during the three-year period before submitting the verification, has not violated section 181.723 or chapter 326B. For purposes of this clause, a violation occurs when a contractor or related entity has been issued a final administrative or licensing order;*

4. The contractor or related entity has not, more than twice during the three-year period before submitting the verification, had a certificate of compliance under section 363A.36 revoked or suspended based on the provisions of section 363A.36, with the revocation or suspension becoming final because it was upheld by the Office of Administrative Hearings or was not appealed to the office;*

5. The contractor or related entity has not received a final determination assessing a monetary sanction from the Department of Administration or Transportation for failure to meet targeted group business, disadvantaged business enterprise, or veteran-owned business goals, due to a lack of good faith effort, more than once during the three-year period before submitting the verification; and*

6. The contractor or related entity is not currently suspended or debarred by the federal government or the state of Minnesota or any of its departments, commissions, agencies, or political subdivisions that have authority to debar a contractor.

*Any violations, suspensions, revocations, or sanctions, as defined in clauses 2 to 5 occurring prior to July 1, 2014, shall not be considered in determining whether a contractor or related entity meets the minimum criteria.

Certification

By signing this document, I am certifying that I am an owner or officer of the contractor and am verifying under oath that:

1. **Contractor is in compliance with Minnesota Statutes, Section 16C.285,**
2. **That contractor has in place, and will continue maintain, records required to be kept by an employer and those records will either be kept at the place where employees are working or kept in a manner that allows the employer to comply with the commissioner's demand within 72 hours (section 177.30)**
3. **Contractor has carefully reviewed the 2019 revisions to Chapter 181 (employee wage protections) including section 181.101 (wages—how often paid) and section 16C.285 subdivision 3 (responsible contractor), section 177.30 (maintenance of records) and is in full compliance with the amended statutes**
4. **I have included Attachment A-1, and**
5. **if contractor is awarded a contract, I or another owner or officer will also submit a HRA subcontractor compliance form prior to execution of the contract (applicable to prime contractors only). If subcontractors are subsequently added to the project Contractor must file a supplemental subcontractor compliance form.**

Contractor Company Name	Date
Authorized Signature of Owner or Officer	Printed Name

Title

ATTACHMENT A-1:FIRST-TIER SUBCONTRACTOR LIST
(Initial List)

SUBMIT WITH CONTRACTOR SOLICITATION RESPONSE

Minnesota Statutes, Section 16C.285, subdivision 5. A prime contractor or subcontractor shall include in its verification of compliance . . . a list of all of its first-tier subcontractors that it intends to retain for work on the project.

NAMES OF FIRST TIER SUBCONTRACTORS (Legal name of company as registered with the Secretary of State)	Company Address	Work To Be Performed

Extras, Change Orders and Waiver

TO: All Contractors and Suppliers

RE: Extras, Change Orders and Waiver

Any and all additional work which deviates from the original contract price shall be at your own risk unless authorized in writing by the HRA prior to said work occurring.

Any and all changes must be documented by a written change order signed by the HRA/Representative. Other employees of the HRA do not have express, implied or apparent authority to authorize additional work for the HRA. Verbal agreements or orders shall not constitute authorization and any work done pursuant to a verbal agreement or order shall be at your peril. This notice also constitutes your written waiver of any benefits conferred under a claim based on a quasi contract if and when work occurs pursuant to a verbal agreement or order.

Please sign and return this to:

THE ST. CLOUD HOUSING AND REDEVELOPMENT AUTHORITY

By_____
Its: Executive Director
1225 West St. Germain Street
(320) 252-0880
(320) 252-0889 Fax

CONTRACTOR:
_____

By_____
Its: _____
_____
_____
_____

VERIFICATION OF SUB-SUBCONTRACTORS AND SUPPLIERS

Please list all of your subcontractors and/or suppliers you anticipate using for the Project on this form and return to the HRA at least 10 days prior to commencing your work. This form must be returned to us before your first pay request will be processed and it must be updated before all other pay requests are processed.

If you will not be using any subcontractors or suppliers, please state that on this form, sign the bottom and return it to the HRA.

I, the undersigned, hereby certify and swear that the following list of subcontractors and or suppliers is complete, including any and all suppliers of labor and material to and for the Project.

Firm	Amount	Contact Person/Phone
Firm	Amount	Contact Person/Phone
Firm	Amount	Contact Person/Phone
Firm	Amount	Contact Person/Phone

Firm

By_____
(Print Name)

Its_____
(Print Title)

Contractor's Certification

Concerning Labor Standards and Prevailing Wage Requirements

This is to certify that: _____

_____
(Contractor's Company Name & Address)

has executed a contract with St. Cloud HRA _____
(Grantee)

for the construction of _____
(Project)

identified as Project Number _____ and acknowledges that:
(Grant #)

1. The Labor Standards Provisions are included in the aforesaid contract.
2. Correction of any of the aforesaid conditions, including infractions by any of his/her subcontractors and any lower tier subcontractors is this contractor's responsibility;
3. Neither he/she nor any firm, partnership or association in which he/she has a substantial interest is designated as an ineligible contractor by the Comptroller General of the United States pursuant to section 5.6(b) of the regulations of the Secretary of Labor, part 5 (29 CFR, part 5) or pursuant to section 3(a) of the Davis Bacon Act. As amended (40 U.S.C. 276a-2(a)).
4. No part of the aforementioned contract has been or will be subcontracted to any subcontractor if such subcontractor or any firm, corporation, partnership or association in which such subcontractor has a substantial interest is designated as an ineligible contractor pursuant to any of the aforementioned regulatory or statutory provisions.
5. Contractor agrees to obtain and forward to the Grantee or Grantee's Representative within ten (10) days after the execution of any subcontract, a Subcontractor's Certification concerning Federal Labor Standards Provisions and Prevailing Wage requirements.

Contractor's Federal ID# (or SSN) _____

Type of Entity (Check One) ____ Single Proprietorship ____ Partnership
____ Corporation ____ Other Organization

List below the name, title and address of the owner, partner, or officers of the entity:

Name	Title	Address
_____	_____	_____
		_____
_____	_____	_____
		_____
_____	_____	_____
		_____
_____	_____	_____
		_____

Signature of Owner or Officer:_____

Date Signed:_____

Telephone Number:_____

Sub-Contractor's Certification

Concerning Labor Standards and Prevailing Wage Requirements

This is to certify that:_____

_____
(Contractor's Company Name & Address)

has executed a contract with _____
(Contractor or Subcontractor)

for _____in the amount of
$_____
(Project)

in the construction of the above identified project, certifies that:

1. The Labor Standards Provisions are included in the aforesaid contract.
2. Neither he/she nor any firm, partnership or association in which he/she has a substantial interest is designated as an ineligible contractor by the Comptroller General of the United States pursuant to section 5.6(b) of the regulations of the Secretary of Labor, part 5 (29 CFR, part 5) or pursuant to section 3(a) of the Davis Bacon Act. As amended (40 U.S.C. 276a-2(a)), or by the Department of Housing & Urban Development.
3. No part of the aforementioned contract has been or will be subcontracted to any subcontractor if such subcontractor or any firm, corporation, partnership or association in which such subcontractor has a substantial interest is designated as an ineligible contractor pursuant to any of the aforementioned regulatory or statutory provisions.
4. Subcontractor agrees to obtain and forward to the contractor for transmittal to the Department of housing and Urban Development, within 10 days after the execution of any lower tier subcontract, a subcontractor's Certification Concerning Labor Standards and Prevailing Wage Requirements. HUD form No.___, executed by the lower tier subcontractor in duplicate.

Contractor's Federal ID# (or SSN) _____

Type of Entity (Check One) ____ Single Proprietorship ____ Partnership
____ Corporation ____ Other Organization

List below the name, title and address of the owner, partner, or officers of the entity:

Name	Title	Address
_____	_____	_____
		_____
_____	_____	_____
		_____
_____	_____	_____
		_____
_____	_____	_____
		_____

Signature of Owner or Officer:_____

Date Signed:_____

Telephone Number:_____

Build America, Buy America Requirements. Contractor acknowledges that the Project being completed as part of the award from this solicitation is subject to the Build America, Buy America Act ("BABA"), enacted as part of the Infrastructure Investment and Jobs Act (IIJA), Pub. L 117-58, 41 U.S.C 8301 and Contractor agrees to comply with BABA. Pursuant to BABA, Contractor required to apply a domestic content procurement preference (the "Buy America preference" or "BAP") for all iron, steel, manufactured products, and construction materials incorporated into the Project. All iron, steel, manufactured products and construction materials incorporated into the Project must be produced in the United States, including such materials installed by any subcontractors or suppliers. Definitions of iron, steel, manufactured products, and construction materials can be found in 2 C.F.R. Part 184 and are incorporated herein by this reference. Additional information regarding BABA requirements and compliance may be found at:
https://www.hud.gov/program_offices/general_counsel/build_america_buy_america
and is incorporated herein by this reference. Contractor shall certify that they have and will continue to comply with the BABA requirements for this project.

Opinions, Estimates, and Prices. All opinions, estimates, or prices submitted by Contractor relating to this Project shall incorporate, be consistent with, and reflect compliance with BABA requirements.

Confirmation of Compliance. From the date of this Contract until three (3) years after the Project is completed, Contractor must obtain and maintain records sufficient to:

- Track all product purchases relating to the Project in sufficient detail to identify the source of the funding for the purchase; and
- Demonstrate compliance with BABA as follows:
    - For products purchased in compliance with the BAP, obtaining and maintaining documentation that the product complied with BAP requirements; and
    - For products purchased pursuant to a waiver or other exemption from the BAP, obtaining and maintaining adequate information to validate that the purchase was covered by a waiver or other exemption.

      For all iron, steel, manufactured products, and construction materials incorporated into the Project, Contractor shall, upon receipt of the same, obtain confirmation that the product or material was purchased in compliance with the BAP. Such confirmation must take one or more of the following forms:
        - A certificate from the manufacturer or reseller stating that the product complies with BABA;
        - For products that cost less than $100 per product, a copy of a label that indicates the product was made in the United States; or
        - For small purchases of product that are less than the Simplified Acquisition Threshold of $250,000 (see 2 CFR 200.320(a)(2), as may be adjusted from time to time, either a copy of a product specification that provides sufficient detail to conclude that the product complies with the BAP or a certification from a manufacturer or reseller of a product that confirms that the product is BABA compliant.

Termination for Failure to Comply. If at any time Contractor is unable to or fails to comply with the BAP, BABA, Contractor shall notify PHA immediately. Any such failure shall constitute a material breach of this Contract and shall constitute good cause or PHA to terminate this Contract.

Survival. The terms of this section shall survive the expiration or termination of this Agreement

Housing and Redevelopment Authority of St. Cloud, MN (HRA) Project_____
Build America, Buy America Compliance Form

Certification of Product(s) Compliance with the Build America, Buy America Act

The undersigned Contractor performing work for this project are hereby made aware that the associated work within this Contract are subject to the Build America, Buy America Act (BABA). The Contractor shall ensure any materials used within this project shall comply with the BABA requirements, which are outlined below and more specifically within 2 CFR 184. Should the Contractor be unable to obtain suitable projects to comply with the BABA requirements, the Contractor shall immediately notify HRA and provide adequate and suitable due diligence which demonstrates product availability that complies with BABA does not exist. Adequate and suitable shall take the definition of Section I in Public and Indian Housing Notice (PIH) Notice 2024-01. HRA will not approve any change orders associated with an increase in cost for failure to adequately source and comply with the BABA requirements.

Description of Requirements for BABA Compliance:

Products subject to the BABA fall into one of the following categories: 1) iron or steel products; 2) manufactured products; or 3) construction materials. The domestic content requirements for each of these products is as follows:

1) Iron or steel products is defined in 2 CFR 184.3 and means articles, materials, or supplies that consist wholly or predominantly of iron or steel or a combination of both.
   a) Predominantly of iron or steel or a combination of both is defined in 2 CFR 184.3 and means that the cost of the iron and steel content exceeds 50 percent of the total cost of all its components. The cost of iron and steel is the cost of the iron or steel mill products (such as bar, billet, slab, wire, plate, or sheet), castings, or forgings utilized in the manufacture of the product and a good faith estimate of the cost of iron or steel components.
   b) Iron or Steel products must be Produced in the United States. Produced in the United States is defined in 2 CFR 184.3 and means in the case of iron or steel products, all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States.

2) Manufactured Products is defined in 2 CFR 184.3 and means:
   a) Articles, materials, or supplies that have been:
      i) Processed into a specific form and shape; or
      ii) Combined with other articles, materials, or supplies to create a product with different properties than the individual articles, materials, or supplies.
   b) If an item is classified as an iron or steel product, a construction material, or a section 70917(c) material under 2 CFR 184.4(e) and the definitions set forth in this section, then it is not a manufactured product. However, an article, material, or supply classified as a manufactured product under 2 CFR 184.4(e) and paragraph a) of this definition may include components that are construction materials, iron or steel products, or section 70917(c) materials.
   c) Manufactured Products must be Produced in the United States. Produced in the United States is defined in 2 CFR 184.3 and means in the case of manufactured products:
      i) The product was manufactured in the United States; and
      ii) The cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard that meets or exceeds this standard has been established under applicable law or regulation for determining

the minimum amount of domestic content of the manufactured product. See 2 CFR 184.2(a). The costs of components of a manufactured product are determined according to 2 CFR 184.5.

3) Construction Materials is defined in 2 CFR 184.3 and means articles, materials, or supplies that consist of only one of the items listed in paragraph a) of this definition, except as provided in paragraph b) of this definition. To the extent one of the items listed in paragraph a) contains as inputs other items listed in paragraph a), it is nonetheless a construction material.
   a) The listed items are:
      i) Non-ferrous metals;
      ii) Plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables);
      iii) Glass (including optic glass);
      iv) Fiber optic cable (including drop cable);
      v) Optical fiber;
      vi) Lumber;
      vii) Engineered wood; and
      viii) Drywall.
   b) Minor additions of articles, materials, supplies, or binding agents to a construction material do not change the categorization of the construction material.
   c) Construction Materials must be Produced in the United States. Produced in the United States is defined in 2 CFR 184.3 and means: In the case of construction materials, all manufacturing processes for the construction material occurred in the United States. See 2 CFR 184.6 for more information on the meaning of "all manufacturing processes" for specific construction materials.

Note that Section 70917(c) materials is defined in 2 CFR 184.3 and means cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives. See BABA, Section 70917(c). Section 70917(c) materials are not subject to BABA and therefore no certification form is required for them.

I hereby certify that I have reasonably researched whether the above referenced product complies with BABA and have a sound basis for concluding that the above referenced product is compliant with BABA. I also certify that to the best of my knowledge and belief all the information stated herein, as well as any information provided in the accompaniment herewith, is true and accurate.

Name of the person certifying: _____

Title of person certifying: _____

Company/Entity the person certifying represents: _____

Phone number of the person certifying: _____

Email address of the person certifying: _____

St. Cloud HRA Project_____
BABA Product Compliance Form

Certification of Product Compliance with the Build America, Buy America Act

The product described below complies with the requirements of the Build America, Buy America Act (BABA) which was enacted on November 15, 2021, as part of the Infrastructure and Investment in Jobs Act (Public Law 117-58):

Description of product:

_____

_____

Product manufactured by (provide the name and address of the manufacturer in the fill in the blank below):

_____

_____

Description of Requirements for BABA Compliance:

Products subject to the BABA fall into one of the following categories: 1) iron or steel products; 2) manufactured products; or 3) construction materials. The domestic content requirements for each of these products is as follows:

1) Iron or steel products is defined in 2 CFR 184.3 and means articles, materials, or supplies that consist wholly or predominantly of iron or steel or a combination of both.
   a) Predominantly of iron or steel or a combination of both is defined in 2 CFR 184.3 and means that the cost of the iron and steel content exceeds 50 percent of the total cost of all its components. The cost of iron and steel is the cost of the iron or steel mill products (such as bar, billet, slab, wire, plate, or sheet), castings, or forgings utilized in the manufacture of the product and a good faith estimate of the cost of iron or steel components.
   b) Iron or Steel products must be Produced in the United States. Produced in the United States is defined in 2 CFR 184.3 and means in the case of iron or steel products, all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States.

2) Manufactured Products is defined in 2 CFR 184.3 and means:
   a) Articles, materials, or supplies that have been:
      i) Processed into a specific form and shape; or
      ii) Combined with other articles, materials, or supplies to create a product with different properties than the individual articles, materials, or supplies.
   b) If an item is classified as an iron or steel product, a construction material, or a section 70917(c) material under 2 CFR 184.4(e) and the definitions set forth in this section, then it is not a manufactured product. However, an article, material, or supply classified as a manufactured product under 2 CFR 184.4(e) and paragraph a) of this definition may include components that are construction materials, iron or steel products, or section 70917(c) materials.

c) Manufactured Products must be Produced in the United States. Produced in the United States is defined in 2 CFR 184.3 and means in the case of manufactured products:
   i) The product was manufactured in the United States; and
   ii) The cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard that meets or exceeds this standard has been established under applicable law or regulation for determining the minimum amount of domestic content of the manufactured product. See 2 CFR 184.2(a). The costs of components of a manufactured product are determined according to 2 CFR 184.5.

3) Construction Materials is defined in 2 CFR 184.3 and means articles, materials, or supplies that consist of only one of the items listed in paragraph a) of this definition, except as provided in paragraph b) of this definition. To the extent one of the items listed in paragraph a) contains as inputs other items listed in paragraph a), it is nonetheless a construction material.
   a) The listed items are:
      i) Non-ferrous metals;
      ii) Plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables);
      iii) Glass (including optic glass);
      iv) Fiber optic cable (including drop cable);
      v) Optical fiber;
      vi) Lumber;
      vii) Engineered wood; and
      viii) Drywall.
   b) Minor additions of articles, materials, supplies, or binding agents to a construction material do not change the categorization of the construction material.
   c) Construction Materials must be Produced in the United States. Produced in the United States is defined in 2 CFR 184.3 and means: In the case of construction materials, all manufacturing processes for the construction material occurred in the United States. See 2 CFR 184.6 for more information on the meaning of "all manufacturing processes" for specific construction materials.

Note that Section 70917(c) materials is defined in 2 CFR 184.3 and means cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives. See BABA, Section 70917(c). Section 70917(c) materials are not subject to BABA and therefore no certification form is required for them.

I hereby certify that I have reasonably researched whether the above referenced product complies with BABA and have a sound basis for concluding that the above referenced product is compliant with BABA. I also certify that to the best of my knowledge and belief all the information stated herein, as well as any information provided in the accompaniment herewith, is true and accurate.

Name of the person certifying: _____

Title of person certifying: _____

Company/Entity the person certifying represents: _____

Phone number of the person certifying: _____

Email address of the person certifying: _____

"General Decision Number: MN20260099 05/18/2026

State: Minnesota

Construction Types: Building

Counties: Minnesota Counties of
Stearns

Modification Number	Publication Date
0	01/02/2026
1	05/18/2026

SAMN2024-083 12/23/2024

	Rates	Fringes
WIRING SYSTEMS INSTALLER	$ 33.44	17.82
WIRING SYSTEM TECHNICIAN	$ 47.73	22.24
UNDERGROUND AND OPEN DITCH LABORER (EIGHT FEET BELOW STARTING GRADE LEVEL)	$ 40.51	26.01
TRUCK DRIVER: GROUP 4: BITUMINOUS DISTRIBUTOR SPRAY OPERATOR (REAR AND OILER); DUMP PERSON; GREASER; PILOT CAR DRIVER; RUBBER-TIRED, SELF-PROPELLED PACKER UNDER 8 TONS; TWO AXLE UNIT; SLURRY OPERATOR; TANK TRUCK HELPER (GAS, OIL, ROAD OIL, AND WATER); TRACTOR OPERATOR, UNDER 50 H.P.	$ 23.00	6.76
TRUCK DRIVER: GROUP 3: BITUMINOUS DISTRIBUTOR DRIVER; BITUMINOUS DISTRIBUTOR (ONE PERSON OPERATION); THREE AXLE UNITS	$ 35.60	24.55
TRUCK DRIVER: GROUP 2: FOUR OR MORE AXLE UNIT, STRAIGHT BODY TRUCK	$ 23.10	6.91
TRUCK DRIVER: GROUP 1: MECHANIC; TRACTOR TRAILER DRIVER; TRUCK DRIVER (HAULING MACHINERY INCLUDING OPERATION OF HAND AND POWER OPERATED WINCHES)	$ 28.00	0.84
TILE SETTER	$ 40.64	12.47
TILE FINISHER	$ 27.70	6.53
TERRAZZO WORKER	$ 46.27	26.64
SURVEY FIELD TECHNICIAN (OPERATE TOTAL STATION, GPS RECEIVER, LEVEL, ROD OR RANGE POLES, STEEL TAPE MEASUREMENT; MARK AND DRIVE STAKES; HAND OR POWER DIGGING FOR AND IDENTIFICATION OF MARKERS OR MONUMENTS; PERFORM AND CHECK CALCULATIONS; REVIEW AND UNDERSTAND CONSTRUCTION PLANS AND LAND SURVEY MATERIALS)	$ 35.98	23.42
SPRINKLER FITTER	$ 43.53	26.67
SIGN ERECTOR	$ 37.19	19.88
SHEET METAL WORKER	$ 48.15	29.12
ROOFER	$ 41.06	22.68
POWER EQUIPMENT OPERATOR: HIGHWAY/HEAVY GROUP 6: CAT, CHALLENGER, OR SIMILAR TYPE OF TRACTORS, WHEN PULLING DISK OR ROLLER; DREDGE DECK HAND; GRAVEL SCREENING PLANT (PORTABLE NOT CRUSHING OR WASHING); LEVER PERSON; POWER SWEEPER; SHEEP FOOT ROLLER AND ROLLERS ON GRAVEL COMPACTION, INCLUDING VIBRATING ROLLERS; TRACTOR, WHEEL TYPE, OVER 50 H.P.,		

UNRELATED TO LANDSCAPING.....$ 31.06 26.40
POWER EQUIPMENT OPERATOR: HIGHWAY/HEAVY GROUP 5:
BITUMINOUS ROLLER (UNDER EIGHT TONS); CONCRETE SAW
(MULTIPLE BLADE) (POWER OPERATED); FORM TRENCH
DIGGER (POWER); HYDRAULIC LOG SPLITTER; LOADER
(BARBER GREENE OR SIMILAR TYPE); POST HOLE DRIVING
MACHINE/POST HOLE AUGER; POWER ACTUATED JACK;
SELF-PROPELLED CHIP SPREADER (FLAHERTY OR SIMILAR);
SHEEP FOOT COMPACTOR WITH BLADE . 200 H.P. AND
OVER; SHOULDERING MACHINE (POWER) APSCO OR SIMILAR
TYPE INCLUDING SELF-PROPELLED SAND AND CHIP
SPREADER; STUMP CHIPPER AND TREE CHIPPER; TREE
FARMER (MACHINE).....$ 31.71 26.79
POWER EQUIPMENT OPERATOR: HIGHWAY/HEAVY GROUP 4:
AIR TRACK ROCK DRILL; AUTOMATIC ROAD MACHINE (CMI
OR SIMILAR) (HIGHWAY AND HEAVY ONLY); BACKFILLER
OPERATOR; BITUMINOUS ROLLERS, RUBBER TIRED OR STEEL
DRUMMED (EIGHT TONS AND OVER); BITUMINOUS SPREADER
AND FINISHING MACHINES (POWER), INCLUDING PAVERS,
MACRO SURFACING AND MICRO SURFACING, OR SIMILAR
TYPES (OPERATOR AND SCREED PERSON); BROKK OR R.T.C.
REMOTE CONTROL OR SIMILAR TYPE WITH ALL
ATTACHMENTS; CAT CHALLENGER TRACTORS OR SIMILAR
TYPES PULLING ROCK WAGONS, BULLDOZERS AND SCRAPERS;
CHIP HARVESTER AND TREE CUTTER; CONCRETE
DISTRIBUTOR AND SPREADER FINISHING MACHINE,
LONGITUDINAL FLOAT, JOINT MACHINE, AND SPRAY
MACHINE; CONCRETE MOBIL (HIGHWAY AND HEAVY ONLY);
CRUSHING PLANT (GRAVEL AND STONE) OR GRAVEL
WASHING, CRUSHING AND SCREENING PLANT; CURB
MACHINE; DIRECTIONAL BORING MACHINE; DOPE MACHINE
(PIPELINE); DUAL TRACTOR; ELEVATING GRADER; GPS
REMOTE OPERATING OF EQUIPMENT; HYDRAULIC TREE
PLANTER; LAUNCHER PERSON (TANKER PERSON OR PILOT
LICENSE); LOCOMOTIVE (HIGHWAY AND HEAVY ONLY);
MILLING, GRINDING, PLANNING, FINE GRADE, OR TRIMMER
MACHINE; PAVEMENT BREAKER OR TAMPING MACHINE (POWER
DRIVEN) MIGHTY MITE OR SIMILAR TYPE; PIPELINE
WRAPPING, CLEANING OR BENDING MACHINE; POWER
ACTUATED HORIZONTAL BORING MACHINE, OVER SIX
INCHES; PUGMILL; RUBBER-TIRED FARM TRACTOR WITH
BACKHOE INCLUDING ATTACHMENTS (HIGHWAY AND HEAVY
ONLY); SCRAPER; SELF-PROPELLED SOIL STABILIZER;
SLIP FORM (POWER DRIVEN) (PAVING); TIE TAMPER AND
BALLAST MACHINE; TRACTOR, WHEEL TYPE, OVER 50 H.P.
WITH PTO UNRELATED TO LANDSCAPING (HIGHWAY AND
HEAVY ONLY); TUB GRINDER, MORBARK, OR SIMILAR TYPE..$ 33.58 26.79
POWER EQUIPMENT OPERATOR: HIGHWAY/HEAVY GROUP 3:
ASPHALT BITUMINOUS STABILIZER PLANT; CABLEWAY;
DERRICK (GUY OR STIFFLEG)(POWER)(SKIDS OR
STATIONARY) (HIGHWAY AND HEAVY ONLY); DREDGE OR
ENGINEERS, DREDGE (POWER) AND ENGINEER; LOCOMOTIVE
CRANE OPERATOR; TANDEM SCRAPER; TUGBOAT 100 H.P AND
OVER (HIGHWAY AND HEAVY ONLY).....$ 25.00 1.98
POWER EQUIPMENT OPERATOR: HIGHWAY/HEAVY GROUP 2:
GRADER OR MOTOR PATROL; TUGBOAT 100 H.P. AND OVER
WHEN LICENSE REQUIRED.....$ 34.94 26.79
POWER EQUIPMENT OPERATOR: COMMERCIAL GROUP 8:.....$ 16.10 6.00
POWER EQUIPMENT OPERATOR: COMMERCIAL GROUP 7: AIR
COMPRESSOR 600 CFM OR OVER; BRAKEPERSON; CONCRETE
PUMP/PUMPCRETE OR COMPLACO TYPE; FIREPERSON,
TEMPORARY HEAT SECOND CLASS BOILER LICENSE; OILER
(POWER SHOVEL, CRANE, TRUCK CRANE, DRAGLINE,
CRUSHERS AND MILLING MACHINES, OR OTHER SIMILAR
POWER EQUIPMENT); PICK UP SWEEPER (ONE CUBIC YARD

HOPPER CAPACITY); PUMP AND/OR CONVEYOR	$ 43.55	26.90
POWER EQUIPMENT OPERATOR: COMMERCIAL GROUP 6: CONCRETE BATCH PLANT; FIREPERSON, FIRST CLASS BOILER LICENSE; FRONT END, SKID STEER UP TO 1 C YD; GUNITE MACHINE; TRACTOR OPERATOR D2 OR SIMILAR SIZE; TRENCHING MACHINE (SEWER, WATER, GAS) EXCLUDES WALK BEHIND TRENCHER	$ 44.82	26.90
POWER EQUIPMENT OPERATOR: COMMERCIAL GROUP 5: AIR COMPRESSOR 450 CFM OR OVER (TWO OR MORE MACHINES); CONCRETE MIXER; CONCRETE PUMP UP TO 31 METERS/101 FEET OF BOOM; DRILL RIGS, HEAVY ROTARY OR CHURN OR CABLE DRILL WHEN USED FOR CAISSON FOR ELEVATOR OR BUILDING CONSTRUCTION; FORKLIFT; FRONT END, SKID STEER 1 C YD AND OVER; HOIST ENGINEER (ONE OR TWO DRUMS); MECHANIC (ON POWER EQUIPMENT); POWER PLANT (100 KW AND OVER OR MULTIPLES EQUAL TO 100KW AND OVER); PUMP OPERATOR AND/OR CONVEYOR (TWO OR MORE MACHINES); SELF-ERECTING TOWER CRANE UNDER 100 FEET MEASURED FROM BOOM FOOT PIN; STRADDLE CARRIER; TRACTOR OVER D2; WELL POINT PUMP	$ 46.51	26.90
POWER EQUIPMENT OPERATOR: COMMERCIAL GROUP 4: CRAWLER BACKHOE INCLUDING ATTACHMENTS; FIREPERSON, CHIEF BOILER LICENSE; HOIST ENGINEER (THREE DRUMS OR MORE); LOCOMOTIVE; OVERHEAD CRANE (INSIDE BUILDING PERIMETER); TRACTOR . BOOM TYPE	$ 46.99	25.20
POWER EQUIPMENT OPERATOR: COMMERCIAL GROUP 3: ALL-TERRAIN VEHICLE CRANES; CONCRETE PUMP 32-49 METERS/102-164 FEET; DERRICK (GUY & STIFFLEG); SELF-ERECTING TOWER CRANE 100 FEET AND OVER MEASURED FROM BOOM FOOT PIN; STATIONARY TOWER CRANE UP TO 200 FEET; TRAVELING TOWER CRANE; TRUCK OR CRAWLER CRANE UP TO AND NOT INCLUDING 150 FEET OF BOOM, INCLUDING JIB	$ 49.05	26.90
POWER EQUIPMENT OPERATOR: COMMERCIAL GROUP 2: TOWER CRANE 200 FEET AND OVER; CONCRETE PUMP WITH 50 METERS/164 FEET OF BOOM AND OVER; PILE DRIVING WHEN THREE DRUMS IN USE; TRUCK OR CRAWLER CRANE WITH 150 FEET OF BOOM UP TO AND NOT INCLUDING 200 FEET, INCLUDING JIB	$ 50.64	26.90
POWER EQUIPMENT OPERATOR: COMMERCIAL GROUP 1: HELICOPTER PILOT; TOWER CRANE 250 FEET AND OVER; TRUCK CRAWLER CRANE WITH 200 FEET OF BOOM AND OVER, INCLUDING JIB	$ 51.03	26.90
PLUMBER	$ 54.79	30.58
PLASTERER	$ 45.98	24.45
PIPELAYER (WATER, SEWER AND GAS)	$ 42.51	26.01
PIPEFITTER/STEAMFITTER	$ 48.24	34.70
PILEDRIVER (INCLUDING VIBRATORY DRIVER OR EXTRACTOR FOR PILING AND SHEETING OPERATIONS)	$ 41.14	27.05
PAVEMENT MARKING OR MARKING REMOVAL EQUIPMENT ((ONE OR TWO PERSON OPERATORS); SELF-PROPELLED TRUCK OR TRAILER MOUNTED UNITS.)	$ 22.50	0.00
PAINTER (INCLUDING HAND BRUSHED, HAND SPRAYED, AND THE TAPING OF PAVEMENT MARKINGS)	$ 34.23	25.28
MILLWRIGHT	$ 41.66	35.40
LATHER	$ 36.55	26.85
LANDSCAPING EQUIPMENT (INCLUDES HYDRO SEEDER OR MULCHER, SOD ROLLER, FARM TRACTOR WITH ATTACHMENT SPECIFICALLY SEEDING, SODDING, OR PLANT, AND TWO-FRAMED FORKLIFT (EXCLUDING FRONT, POSIT-TRACK, AND SKID STEER LOADERS), NO EARTHWORK OR GRADING FOR ELEVATIONS)	$ 30.04	21.16
LABORER: SKILLED (ASSISTING SKILLED CRAFT JOURNEYMAN)	$ 37.66	24.41
LABORER: LANDSCAPE (GARDENER, SOD LAYER AND		

NURSERY OPERATOR)	$ 31.66	22.78
LABORER: COMMON OR GENERAL (GENERAL LABOR WORK)	$ 37.66	24.41
IRONWORKER	$ 44.85	35.72
HEATING AND FROST INSULATORS	$ 57.24	31.95
GLAZIER	$ 36.49	21.85
FLAG PERSON	$ 37.66	23.97
ELEVATOR CONSTRUCTORS	$ 62.52	45.36
ELECTRICIAN	$ 46.00	30.00
DRYWALL TAPER	$ 35.31	24.43
CEMENT MASON	$ 50.06	25.45
CARPET LAYER (LINOLEUM)	$ 39.03	25.43
CARPENTER	$ 36.55	29.03
BRICKLAYER	$ 43.41	28.50
BOOM TRUCK	$ 46.51	26.90
BOILERMAKER	$ 48.35	31.93
BLASTER (-$950,000)	$ 27.36	17.69
BLASTER (+$950,000)	$ 29.11	17.69
ASBESTOS ABATEMENT WORKER	$ 41.23	25.99
ARTICULATED HAULER	$ 46.51	26.90

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Note: Executive Order 13658 generally applies to contracts subject to the Davis-Bacon Act that were awarded on or between January 1, 2015 and January 29, 2022, and that have not been renewed or extended on or after January 30, 2022. Executive Order 13658 does not apply to contracts subject only to the Davis-Bacon Related Acts regardless of when they were awarded. If a contract is subject to Executive Order 13658, the contractor must pay all covered workers at least $13.65 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract from May 11, 2026, through December 31, 2026. The applicable Executive Order minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under Executive Order 13658 is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the

type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than ◆SU◆, ◆UAVG◆, ◆SA◆, or ◆SC◆ denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The ◆SU◆ identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

◆SU◆ wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The ◆SA◆ identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ◆SA◆ identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

a) a survey underlying a wage determination
b) an existing published wage determination
c) an initial WHD letter setting forth a position on a wage determination matter
d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

Branch of Wage Surveys
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210.

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END OF GENERAL DECISION

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MINNESOTA DEPARTMENT OF LABOR AND INDUSTRY PREVAILING WAGES FOR STATE FUNDED CONSTRUCTION PROJECTS

THIS NOTICE MUST BE POSTED ON THE JOBSITE IN A CONSPICUOUS PLACE

Construction Type: Commercial

County Number: 73

County Name: STEARNS

Effective: 2025-12-22

This project is covered by Minnesota prevailing wage statutes. Wage rates listed below are the minimum hourly rates to be paid on this project.

All hours worked in excess of eight (8) hours per day or forty (40) hours per week shall be paid at a rate of one and one half (1 1/2) times the basic hourly rate. *Note: Overtime pay after eight (8) hours on the project must be paid even if the worker does not exceed forty (40) hours in the work week.*

Violations should be reported to:

Department of Labor and Industry
Prevailing Wage Section
443 Lafayette Road N
St Paul, MN 55155
(651) 284-5091
DLI.PrevWage@state.mn.us

* Indicates that adjacent county rates were used for the labor class listed.

County: STEARNS (73)

LABOR CODE AND CLASS		EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
LABORERS (101 - 112) (SPECIAL CRAFTS 701 - 730)					
101	LABORER, COMMON (GENERAL LABOR WORK)	2025-12-22	39.27	25.73	65.00
		2026-05-01	40.52	27.48	68.00
102	LABORER, SKILLED (ASSISTING SKILLED CRAFT JOURNEYMAN)	2025-12-22	39.27	25.73	65.00
		2026-05-01	40.52	27.48	68.00
103	LABORER, LANDSCAPING (GARDENER, SOD LAYER AND NURSERY OPERATOR)	2025-12-22	31.66	22.78	54.44
104	FLAG PERSON	2025-12-22	39.27	25.73	65.00
		2026-05-01	40.52	27.48	68.00
105*	WATCH PERSON	2025-12-22	34.00	23.42	57.42

LABOR CODE AND CLASS			EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
106*	BLASTER	+$950,000	2025-12-22	29.11	17.69	46.80
		-$950,000	2025-12-22	27.36	17.69	45.05
107	PIPELAYER (WATER, SEWER AND GAS)		2025-12-22	42.51	26.01	68.52
108	TUNNEL MINER		FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
109	UNDERGROUND AND OPEN DITCH LABORER (EIGHT FEET BELOW STARTING GRADE LEVEL)		2025-12-22	40.51	26.01	66.52
110*	SURVEY FIELD TECHNICIAN (OPERATE TOTAL STATION, GPS RECEIVER, LEVEL, ROD OR RANGE POLES, STEEL TAPE MEASUREMENT; MARK AND DRIVE STAKES; HAND OR POWER DIGGING FOR AND IDENTIFICATION OF MARKERS OR MONUMENTS; PERFORM AND CHECK CALCULATIONS; REVIEW AND UNDERSTAND CONSTRUCTION PLANS AND LAND SURVEY MATERIALS). THIS CLASSIFICATION DOES NOT APPLY TO THE WORK PERFORMED ON A PREVAILING WAGE PROJECT BY A LAND SURVEYOR WHO IS LICENSED PURSUANT TO MINNESOTA STATUTES, SECTIONS 326.02 TO 326.15.		2025-12-22	39.27	25.73	65.00
			2026-05-01	40.52	27.48	68.00
111	TRAFFIC CONTROL PERSON (TEMPORARY SIGNAGE)		FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			

SPECIAL EQUIPMENT (201 - 204)

201	ARTICULATED HAULER		2025-12-22	46.51	29.40	75.91
202	BOOM TRUCK		2025-12-22	46.51	29.40	75.91
203	LANDSCAPING EQUIPMENT, INCLUDES HYDRO SEEDER OR MULCHER, SOD ROLLER, FARM TRACTOR WITH ATTACHMENT SPECIFICALLY SEEDING, SODDING, OR PLANT, AND		2025-12-22	31.66	22.78	54.44

LABOR CODE AND CLASS		EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
	TWO-FRAMED FORKLIFT (EXCLUDING FRONT, POSIT-TRACK, AND SKID STEER LOADERS), NO EARTHWORK OR GRADING FOR ELEVATIONS				
204*	OFF-ROAD TRUCK	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
205	PAVEMENT MARKING OR MARKING REMOVAL EQUIPMENT (ONE OR TWO PERSON OPERATORS); SELF-PROPELLED TRUCK OR TRAILER MOUNTED UNITS.	2025-12-22	22.50	0.00	22.50
HIGHWAY/HEAVY POWER EQUIPMENT OPERATOR					
GROUP 2		2025-12-22	36.03	29.17	65.20
306	GRADER OR MOTOR PATROL				
308	TUGBOAT 100 H.P. AND OVER WHEN LICENSE REQUIRED (HIGHWAY AND HEAVY ONLY)				
GROUP 3		2025-12-22	34.96	29.17	64.13
		2026-05-04	35.93	30.77	66.70
309	ASPHALT BITUMINOUS STABILIZER PLANT				
310	CABLEWAY				
312	DERRICK (GUY OR STIFFLEG)(POWER)(SKIDS OR STATIONARY) (HIGHWAY AND HEAVY ONLY)				
314	DREDGE OR ENGINEERS, DREDGE (POWER) AND ENGINEER				
316	LOCOMOTIVE CRANE OPERATOR				
320	TANDEM SCRAPER				
322	TUGBOAT 100 H.P AND OVER (HIGHWAY AND HEAVY ONLY)				
GROUP 4		2025-12-22	36.90	2.52	39.42
323	AIR TRACK ROCK DRILL				
324	AUTOMATIC ROAD MACHINE (CMI OR SIMILAR) (HIGHWAY AND HEAVY ONLY)				
325	BACKFILLER OPERATOR				
327	BITUMINOUS ROLLERS, RUBBER TIRED OR STEEL DRUMMED (EIGHT TONS AND OVER)				
328	BITUMINOUS SPREADER AND FINISHING MACHINES (POWER), INCLUDING PAVERS, MACRO SURFACING AND MICRO SURFACING, OR SIMILAR TYPES (OPERATOR AND SCREED PERSON)				
329	BROKK OR R.T.C. REMOTE CONTROL OR SIMILAR TYPE WITH ALL ATTACHMENTS				
330	CAT CHALLENGER TRACTORS OR SIMILAR TYPES PULLING ROCK WAGONS, BULLDOZERS AND SCRAPERS				
331	CHIP HARVESTER AND TREE CUTTER				

LABOR CODE AND CLASS		EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
332	CONCRETE DISTRIBUTOR AND SPREADER FINISHING MACHINE, LONGITUDINAL FLOAT, JOINT MACHINE, AND SPRAY MACHINE				
334	CONCRETE MOBIL (HIGHWAY AND HEAVY ONLY)				
335	CRUSHING PLANT (GRAVEL AND STONE) OR GRAVEL WASHING, CRUSHING AND SCREENING PLANT				
336	CURB MACHINE				
337	DIRECTIONAL BORING MACHINE				
338	DOPE MACHINE (PIPELINE)				
340	DUAL TRACTOR				
341	ELEVATING GRADER				
345	GPS REMOTE OPERATING OF EQUIPMENT				
347	HYDRAULIC TREE PLANTER				
348	LAUNCHER PERSON (TANKER PERSON OR PILOT LICENSE)				
349	LOCOMOTIVE (HIGHWAY AND HEAVY ONLY)				
350	MILLING, GRINDING, PLANNING, FINE GRADE, OR TRIMMER MACHINE				
352	PAVEMENT BREAKER OR TAMPING MACHINE (POWER DRIVEN) MIGHTY MITE OR SIMILAR TYPE				
354	PIPELINE WRAPPING, CLEANING OR BENDING MACHINE				
356	POWER ACTUATED HORIZONTAL BORING MACHINE, OVER SIX INCHES				
357	PUGMILL				
359	RUBBER-TIRED FARM TRACTOR WITH BACKHOE INCLUDING ATTACHMENTS (HIGHWAY AND HEAVY ONLY)				
360	SCRAPER				
361	SELF-PROPELLED SOIL STABILIZER				
362	SLIP FORM (POWER DRIVEN) (PAVING)				
363	TIE TAMPER AND BALLAST MACHINE				
365	TRACTOR, WHEEL TYPE, OVER 50 H.P. WITH PTO UNRELATED TO LANDSCAPING (HIGHWAY AND HEAVY ONLY)				
367	TUB GRINDER, MORBARK, OR SIMILAR TYPE				
GROUP 5		2025-12-22	32.64	29.17	61.81
370	BITUMINOUS ROLLER (UNDER EIGHT TONS)				
371	CONCRETE SAW (MULTIPLE BLADE) (POWER OPERATED)				
372	FORM TRENCH DIGGER (POWER)				
375	HYDRAULIC LOG SPLITTER				
376	LOADER (BARBER GREENE OR SIMILAR TYPE)				
377	POST HOLE DRIVING MACHINE/POST HOLE AUGER				
379	POWER ACTUATED JACK				
381	SELF-PROPELLED CHIP SPREADER (FLAHERTY OR SIMILAR)				
382	SHEEP FOOT COMPACTOR WITH BLADE . 200 H.P. AND OVER				
383	SHOULDERING MACHINE (POWER) APSCO OR SIMILAR TYPE INCLUDING SELF-PROPELLED SAND AND CHIP SPREADER				
384	STUMP CHIPPER AND TREE CHIPPER				

LABOR CODE AND CLASS		EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
385	TREE FARMER (MACHINE)				
GROUP 6		2025-12-22	31.06	26.40	57.46
387	CAT, CHALLENGER, OR SIMILAR TYPE OF TRACTORS, WHEN PULLING DISK OR ROLLER				
389	DREDGE DECK HAND				
391	GRAVEL SCREENING PLANT (PORTABLE NOT CRUSHING OR WASHING)				
393	LEVER PERSON				
395	POWER SWEEPER				
396	SHEEP FOOT ROLLER AND ROLLERS ON GRAVEL COMPACTION, INCLUDING VIBRATING ROLLERS				
397	TRACTOR, WHEEL TYPE, OVER 50 H.P., UNRELATED TO LANDSCAPING				
COMMERCIAL POWER EQUIPMENT OPERATOR					
GROUP 1 *		2025-12-22	51.03	29.40	80.43
501	HELICOPTER PILOT (COMMERCIAL CONSTRUCTION ONLY)				
502	TOWER CRANE 250 FEET AND OVER (COMMERCIAL CONSTRUCTION ONLY)				
503	TRUCK CRAWLER CRANE WITH 200 FEET OF BOOM AND OVER, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 2		2025-12-22	51.99	29.40	81.39
		2026-05-04	53.79	31.00	84.79
504	CONCRETE PUMP WITH 50 METERS/164 FEET OF BOOM AND OVER (COMMERCIAL CONSTRUCTION ONLY)				
505	PILE DRIVING WHEN THREE DRUMS IN USE (COMMERCIAL CONSTRUCTION ONLY)				
506	TOWER CRANE 200 FEET AND OVER (COMMERCIAL CONSTRUCTION ONLY)				
507	TRUCK OR CRAWLER CRANE WITH 150 FEET OF BOOM UP TO AND NOT INCLUDING 200 FEET, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 3		2025-12-22	50.34	29.40	79.74
		2026-05-04	52.08	31.00	83.08
508	ALL-TERRAIN VEHICLE CRANES (COMMERCIAL CONSTRUCTION ONLY)				
509	CONCRETE PUMP 32-49 METERS/102-164 FEET (COMMERCIAL CONSTRUCTION ONLY)				
510	DERRICK (GUY & STIFFLEG) (COMMERCIAL CONSTRUCTION ONLY)				
511	STATIONARY TOWER CRANE UP TO 200 FEET				
512	SELF-ERECTING TOWER CRANE 100 FEET AND OVER MEASURED FROM BOOM FOOT PIN (COMMERCIAL CONSTRUCTION ONLY)				
513	TRAVELING TOWER CRANE (COMMERCIAL CONSTRUCTION ONLY)				
514	TRUCK OR CRAWLER CRANE UP TO AND NOT INCLUDING 150 FEET OF BOOM, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 4 *		2025-12-22	49.95	29.40	79.35

LABOR CODE AND CLASS		EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
		2026-05-04	51.68	31.00	82.68
515	CRAWLER BACKHOE INCLUDING ATTACHMENTS (COMMERCIAL CONSTRUCTION ONLY)				
516	FIREPERSON, CHIEF BOILER LICENSE (COMMERCIAL CONSTRUCTION ONLY)				
517	HOIST ENGINEER (THREE DRUMS OR MORE) (COMMERCIAL CONSTRUCTION ONLY)				
518	LOCOMOTIVE (COMMERCIAL CONSTRUCTION ONLY)				
519	OVERHEAD CRANE (INSIDE BUILDING PERIMETER) (COMMERCIAL CONSTRUCTION ONLY)				
520	TRACTOR . BOOM TYPE (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 5		2025-12-22	47.25	29.40	76.65
		2026-05-04	48.52	31.00	79.52
521	AIR COMPRESSOR 450 CFM OR OVER (TWO OR MORE MACHINES) (COMMERCIAL CONSTRUCTION ONLY)				
522	CONCRETE MIXER (COMMERCIAL CONSTRUCTION ONLY)				
523	CONCRETE PUMP UP TO 31 METERS/101 FEET OF BOOM				
524	DRILL RIGS, HEAVY ROTARY OR CHURN OR CABLE DRILL WHEN USED FOR CAISSON FOR ELEVATOR OR BUILDING CONSTRUCTION (COMMERCIAL CONSTRUCTION ONLY)				
525	FORKLIFT (COMMERCIAL CONSTRUCTION ONLY)				
526	FRONT END, SKID STEER 1 C YD AND OVER				
527	HOIST ENGINEER (ONE OR TWO DRUMS) (COMMERCIAL CONSTRUCTION ONLY)				
528	MECHANIC-WELDER (ON POWER EQUIPMENT) (COMMERCIAL CONSTRUCTION ONLY)				
529	POWER PLANT (100 KW AND OVER OR MULTIPLES EQUAL TO 100KW AND OVER) (COMMERCIAL CONSTRUCTION ONLY)				
530	PUMP OPERATOR AND/OR CONVEYOR (TWO OR MORE MACHINES) (COMMERCIAL CONSTRUCTION ONLY)				
531	SELF-ERECTING TOWER CRANE UNDER 100 FEET MEASURED FROM BOOM FOOT PIN (COMMERCIAL CONSTRUCTION ONLY)				
532	STRADDLE CARRIER (COMMERCIAL CONSTRUCTION ONLY)				
533	TRACTOR OVER D2 (COMMERCIAL CONSTRUCTION ONLY)				
534	WELL POINT PUMP (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 6		2025-12-22	44.82	29.40	74.22
535	CONCRETE BATCH PLANT (COMMERCIAL CONSTRUCTION ONLY)				
536	FIREPERSON, FIRST CLASS BOILER LICENSE (COMMERCIAL CONSTRUCTION ONLY)				
537	FRONT END, SKID STEER UP TO 1 C YD				
538	GUNITE MACHINE (COMMERCIAL CONSTRUCTION ONLY)				
539	TRACTOR OPERATOR D2 OR SIMILAR SIZE (COMMERCIAL CONSTRUCTION ONLY)				
540	TRENCHING MACHINE (SEWER, WATER, GAS) EXCLUDES WALK BEHIND TRENCHER				
GROUP 7		2025-12-22	44.18	29.40	73.58
		2026-05-04	45.34	31.00	76.34
541	AIR COMPRESSOR 600 CFM OR OVER (COMMERCIAL CONSTRUCTION ONLY)				
542	BRAKEPERSON (COMMERCIAL CONSTRUCTION ONLY)				

LABOR CODE AND CLASS		EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
543	CONCRETE PUMP/PUMPCRETE OR COMPLACO TYPE (COMMERCIAL CONSTRUCTION ONLY)				
544	FIREPERSON, TEMPORARY HEAT SECOND CLASS BOILER LICENSE (COMMERCIAL CONSTRUCTION ONLY)				
545	OILER (POWER SHOVEL, CRANE, TRUCK CRANE, DRAGLINE, CRUSHERS AND MILLING MACHINES, OR OTHER SIMILAR POWER EQUIPMENT) (COMMERCIAL CONSTRUCTION ONLY)				
546	PICK UP SWEEPER (ONE CUBIC YARD HOPPER CAPACITY) (COMMERCIAL CONSTRUCTION ONLY)				
547	PUMP AND/OR CONVEYOR (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 8		2025-12-22	16.10	6.00	22.10
548	ELEVATOR OPERATOR (COMMERCIAL CONSTRUCTION ONLY)				
549	GREASER (COMMERCIAL CONSTRUCTION ONLY)				
550	MECHANICAL SPACE HEATER (TEMPORARY HEAT NO BOILER LICENSE REQUIRED) (COMMERCIAL CONSTRUCTION ONLY)				
TRUCK DRIVERS					
GROUP 1 *		2025-12-22	28.00	0.84	28.84
601	MECHANIC . WELDER				
602	TRACTOR TRAILER DRIVER				
603	TRUCK DRIVER (HAULING MACHINERY INCLUDING OPERATION OF HAND AND POWER OPERATED WINCHES)				
GROUP 2		2025-12-22	23.10	6.91	30.01
604	FOUR OR MORE AXLE UNIT, STRAIGHT BODY TRUCK				
GROUP 3 *		2025-12-22	35.60	24.55	60.15
605	BITUMINOUS DISTRIBUTOR DRIVER				
606	BITUMINOUS DISTRIBUTOR (ONE PERSON OPERATION)				
607	THREE AXLE UNITS				
GROUP 4		2025-12-22	23.00	6.76	29.76
608	BITUMINOUS DISTRIBUTOR SPRAY OPERATOR (REAR AND OILER)				
609	DUMP PERSON				
610	GREASER				
611	PILOT CAR DRIVER				
612	RUBBER-TIRED, SELF-PROPELLED PACKER UNDER 8 TONS				
613	TWO AXLE UNIT				
614	SLURRY OPERATOR				
615	TANK TRUCK HELPER (GAS, OIL, ROAD OIL, AND WATER)				
616	TRACTOR OPERATOR, UNDER 50 H.P.				

LABOR CODE AND CLASS		EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
SPECIAL CRAFTS					
701	HEATING AND FROST INSULATORS	2025-12-22	55.34	33.85	89.19
		2026-06-08	59.39	33.85	93.24
702	BOILERMAKERS	2025-12-22	48.35	31.93	80.28
703	BRICKLAYERS	2025-12-22	45.48	29.98	75.46
		2026-05-04	48.48	29.98	78.46
704	CARPENTERS	2025-12-22	39.55	29.44	68.99
		2026-05-04	42.55	29.44	71.99
705*	CARPET LAYERS (LINOLEUM)	2025-12-22	43.00	24.79	67.79
		2026-06-01	45.80	24.79	70.59
706	CEMENT MASONS	2025-12-22	49.31	27.22	76.53
		2026-05-01	52.20	27.22	79.42
707	ELECTRICIANS	2025-12-22	50.00	30.86	80.86
		2026-07-01	54.86	30.86	85.72
708	ELEVATOR CONSTRUCTORS	2025-12-22	62.52	45.36	107.88
		2026-01-01	65.21	46.21	111.42
709	GLAZIERS	2025-12-22	38.65	22.89	61.54
710*	LATHERS	2025-12-22	39.55	27.35	66.90
		2026-05-04	42.55	27.35	69.90
712	IRONWORKERS	2025-12-22	46.35	37.86	84.21
		2026-05-03	49.50	37.86	87.36
714	MILLWRIGHT	2025-12-22	42.95	37.81	80.76
		2026-05-01	46.15	37.81	83.96
715	PAINTERS (INCLUDING HAND BRUSHED, HAND SPRAYED, AND THE TAPING OF PAVEMENT MARKINGS)	2025-12-22	33.13	26.14	59.27

LABOR CODE AND CLASS		EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
		2026-05-01	35.73	26.14	61.87
716	PILEDRIVER (INCLUDING VIBRATORY DRIVER OR EXTRACTOR FOR PILING AND SHEETING OPERATIONS)	2025-12-22	41.14	27.05	68.19
717	PIPEFITTERS . STEAMFITTERS	2025-12-22	51.00	37.00	88.00
		2026-06-01	55.93	37.00	92.93
718	PLASTERERS	2025-12-22	45.98	24.45	70.43
719	PLUMBERS	2025-12-22	56.91	32.21	89.12
720	ROOFER	2025-12-22	44.93	24.21	69.14
		2026-04-06	46.93	24.21	71.14
		2026-10-05	48.68	24.21	72.89
721	SHEET METAL WORKERS	2025-12-22	50.86	30.51	81.37
		2026-05-01	54.96	30.51	85.47
722	SPRINKLER FITTERS	2025-12-22	45.93	27.26	73.19
		2026-04-01	48.71	28.56	77.27
723*	TERRAZZO WORKERS	2025-12-22	46.27	26.64	72.91
724*	TILE SETTERS	2025-12-22	40.64	12.47	53.11
725*	TILE FINISHERS	2025-12-22	27.70	6.53	34.23
726	DRYWALL TAPER	2025-12-22	34.42	25.62	60.04
		2026-06-01	37.47	25.62	63.09
727	WIRING SYSTEM TECHNICIAN	2025-12-22	51.07	24.02	75.09
		2026-07-02	54.44	24.02	78.46
728	WIRING SYSTEMS INSTALLER	2025-12-22	35.78	19.15	54.93
		2026-07-02	38.15	19.15	57.30
729	ASBESTOS ABATEMENT WORKER	2025-12-22	41.23	25.99	67.22

LABOR CODE AND CLASS		EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
730	SIGN ERECTOR	2025-12-22	34.91	20.31	55.22

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Contractor's use of site and premises.
4. Coordination with occupants.
5. Specification and Drawing conventions.
6. Miscellaneous provisions.

1.2 DEFINITIONS

A. Work Package: A group of specifications, drawings, and schedules prepared by the design team to describe a portion of the Project Work for pricing, permitting, and construction.

1.3 PROJECT INFORMATION

A. Project Identification: Empire Apartments

1. Project Location: 54 4th Ave N, Saint Cloud MN 56303

B. Owner: St. Cloud HRA

1. Owner's Representative: Paul Soenneker, Project Manager; psoenneker@stcloudhra.com; (320) 202-3147

C. Architect: Blumentals/Architecture Inc..

1. Architect's Representative: Dan Noyes; dann@blumentals.com; (612) 331-2222

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:

1. Domestic water and sewer stack replacement at the existing Empire Apartments, a 10-story, 89-unit building. Scope to include replacement of vertical stack components including horizontals to fixtures within units, replacement of all galvanized piping at domestic water supply to water heater/water line hook-up to building, repair to shaft enclosures / gypsum board assemblies, new access panels, new toilets and faucets at units and site restoration.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

C. Existing Conditions

1. Become familiar with existing site conditions. Verify dimensions, existing conditions, and existing electrical, mechanical, plumbing, utility and other site conditions. Notify Architect of discrepancies before proceeding with Work. Discrepancies found must be immediately brought to attention of Architect and Owner in writing.
2. Prior to contracting for or beginning construction of each portion of work carefully verify Contract Documents and supplemental information provided by Owner against existing conditions. Notify Owner and Architect in writing of discrepancies. Perform remediation of said work begun or completed to satisfaction of Owner and Architect at no additional cost to Owner.

1.5 PROJECT PHASING AND SCHEDULE

A. It is anticipated project will proceed in Owner/Contractor agreed phases, with related work based on tenant relocation schedule. Contractor shall coordinate work schedules, shutdowns, etc. with Owner and tenant requirements.

B. Work is anticipated to begin February, 2027.

C. A single Certificate of Substantial Completion will be issued at the end of the project, not later than

1.6 REQUIRED BONDS

A. Performance Bond Requirement:

1. To protect HUD's and Owner's interest, General Contractor must provide a Performance Bond prior to commencement of work. Refer to Owner-provided materials for additional information.

1.7 ENERGY REBATE AND TAX CREDITS

A. Provide assistance, submittals, cut sheets, applicable forms, etc. as required for energy rebates and/or tax credit applications as requested by Owner.

B. Local and State sales taxes are eligible for an exemption. Coordinate documentation requirements with Owner. Failure to coordinate with Owner and comply with requirements of tax exemption will result in Contractor responsibility to pay applicable taxes at their expense.

1.8 HAZARDOUS MATERIALS AND ENVIRONMENTAL SITE ASSESSMENTS

A. The following environmental reports are included as reference appendices to this Project Manual. They were produced by the testing agency for the sole and explicit use by the Owner and may not be used or relied upon by any other group or person.

1. Lead-Based Paint Inspection Report
2. Asbestos Sampling Report, and Asbestos Operations and Maintenance Plan

1.9 MATERIAL PROCUREMENT REQUIREMENTS

A. This project is subject to requirements of the Build America, Buy America Act. Refer to Section 004330.

1.10 FURNITURE

A. Furniture is not in the Contract. Coordinate with the Owner's furniture supplier for related electrical, mechanical, logistical, storage, etc. requirements (if requested by Owner).

1.11 CONTRACTOR'S DUTIES

A. Provide and pay for: labor, materials, and equipment; tools, construction equipment, and machinery; and water, heat, and utilities required for construction.

B. Pay legally required sales, consumers and use taxes.

C. As applicable at the time of receipt of bids, secure and pay for permits, fees, and licenses necessary for execution and completion of the work.

D. Give required notices.

E. Comply with codes, ordinances, rules, regulations, orders and other legal requirements of public authorities, which bear on performance of work.

F. Enforce strict discipline and good order among employees. Do not employ unfit persons or persons not skilled in assigned task.

G. Obtain required government, utility companies and other agency approvals for layout, equipment, etc.

H. Coordination of work with each trade and prompt notification of requirements affecting execution of work.

I. Scheduling, material purchase, installation lead time, Sub-contractor or interdisciplinary coordination, determining working hours, and complete installation of appliance or materials necessary for proper operation of items, including coordinating work with Owner's vendors/Contractors who are under separate Contract.

J. Bring uncoordinated issues to attention of Architect prior to finalizing Contract with Owner.

K. Provide storage containers for construction materials. Ensure materials are stored in a suitable place and in an orderly fashion.

L. Provide construction signage and barricades for work within right-of-way conforming to latest revisions of Manual of Uniform Traffic Control Devices.

M. Provide supervision, tools, material, labor, services, transportation, etc. necessary for completion of work as it is intended, shown and/or described.

N. Do not proceed with work which will alter Contract Sum or Construction Schedule without written consent of Owner and Architect of Change Order price or length of time proposed to

complete such work. Work completed without prior written approval may be required to be remedied or removed at discretion of Owner and Architect without additional cost to Owner.

O. No alcoholic beverages or illegal substances, abusive or profane language, or other disruptive or illegal activities will be tolerated.

P. Prior to ordering and installing equipment verify clearances required for proper, warrantied installation of new equipment is either existing or is included in scope of new work performed. If required dimensional clearances are not met in existing locations or are illustrated in scope of new work inform Architect immediately in writing.

Q. Furnish and install appliances or materials obviously part of, or required by, manufacturer of electrical, mechanical, plumbing, sprinkler and/or alarm work and necessary for its proper operation, even if not specifically mentioned or shown on drawings.

R. Items depicted as new and/or called out with words "new", "provide", "complete", "paint", "finish" and/or "install" denote Contractor is to purchase and fully install/complete specified or said item/work, as well as manufacturer recommended accessories and procedures for proper installation and operation of said item/work for project scope of work. Items shown on plans are new, provided and completely installed unless explicitly stated otherwise.

1.12 OWNER-FURNISHED/CONTRACTOR-INSTALLED (OFCI) PRODUCTS

A. Owner's Responsibilities: Owner will furnish products indicated and perform the following, as applicable:

1. Provide for delivery of Owner-furnished products to Project site.
2. Upon delivery, inspect, with Contractor present, delivered items.
    a. If Owner-furnished products are damaged, defective, or missing, arrange for replacement.
3. Obtain manufacturer's inspections, service, and warranties.
4. Inform Contractor of earliest available delivery date for Owner-furnished products.

B. Contractor's Responsibilities: The Work includes the following, as applicable:

1. Designate delivery dates of Owner-furnished products in Contractor's construction schedule, utilizing Owner-furnished earliest available delivery dates.
2. Receive, unload, handle, store, protect, and install Owner-furnished products.
3. Make building services connections for Owner-furnished products.
4. Protect Owner-furnished products from damage during storage, handling, and installation and prior to Substantial Completion.
5. Repair or replace Owner-furnished products damaged following receipt.

1.13 CONTRACTOR'S USE OF SITE AND PREMISES

A. Restricted Use of Site: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

B. Limits on Use of Site: Limit use of Project site to Work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.

    a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
    b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

D. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.14 COORDINATION WITH OCCUPANTS

A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
2. Notify Owner and Residents not less than 24 hours in advance of activities within dwelling units.

1.15 WORK RESTRICTIONS

A. Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work to between 8:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated. Work hours may be modified to meet Project requirements if approved by Owner and authorities having jurisdiction.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging for temporary utility services according to requirements indicated:

1. Notify Owner not less than two days in advance of proposed utility interruptions.
2. Obtain Owner's written permission before proceeding with utility interruptions.

D. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.

E. Nonsmoking Building: Smoking is not permitted within the building or within **25 feet** of entrances, operable windows, or outdoor-air intakes.

1.16 INSPECTIONS

A. Provide to Architect, in writing, requests for clarification or additional design requirements received from inspecting officials.

1.17 SPECIFICATION AND DRAWING CONVENTIONS

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

B. Examine Design Drawings, Specifications, and other data or instructions pertaining to the Work. No pleas of ignorance of existing conditions, or difficulties of conditions encountered, or other matter concerning work to be performed, will be accepted as an excuse for failure or omission by Contractor to fulfill every detail of requirements of documents governing the Work. Contractor shall not be allowed extra compensation by reason of matters or things concerning which such Bidder might have fully informed himself prior to bidding, including increased costs which may occur during the contract period.

C. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Specification Format: The Specifications are organized into Divisions and Sections using the 2020 CSI/CSC's "Master Format" numbering system.

    a. Section Identification: the Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the Table of Contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.

2. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase. Requirements expressed in imperative mood are to be performed by Contractor. Occasionally, indicative or subjunctive mood may be used in Section text for clarity to describe responsibilities to be fulfilled indirectly by Contractor or by others when so noted.
3. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
4. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.

D. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Interpret words and meanings as appropriate. Words implied, but not stated, shall be inferred, as the sense requires. Interpret single words as plural, and plural words as singular where applicable as the context of the Contract Documents indicates.

E. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.

F. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

G. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.

1.18 EXPLANATIONS AND ADDENDA

A. Doubt as to the true meaning of part of the Design Drawings or Specifications or other proposed contract documents shall be submitted to the Architect in a written request for an interpretation thereof. Interpretations of proposal documents shall be made only by an addendum duly issued. A copy of such addendum shall be delivered to the Contractor.

B. Addendum issued up to and including the bid date shall be included in the bid price and subsequent resulting contract.

C. Verbal information obtained from, or statements made by, Owner's representatives at the time of examination of the documents or site shall not be construed as in any way amending contract documents. Only such corrections or addenda as are issued in writing shall become p art of the contract.

1.19 HIERARCHY OF DOCUMENTS

A. The complete set of documents in this set includes the Project Manual and the Drawing Set along with other miscellaneous documents referenced.

1. The Drawings set the quantities for items.
2. The Specifications set the standard to complete the Work.

B. When these items are in conflict with each other, the document with the more stringent requirement shall supersede the others. Bring discrepancies to the attention of the Architect during the bid phase so clarifications can be made prior to bidding.

C. No modification of the Contract Sum will be made for failure to adequately examine the Contract Documents or the project conditions.

D. Commencement of work by Contractor or Sub-Contractor shall constitute acknowledgement by Contractor that this specification can be satisfactorily executed, under the project conditions and with necessary prerequisites for warranty acceptance by manufacturer(s) as required. No modification of Contract Sum will be made for failure to adequately examine Contract Documents or project conditions.

1.20 INTERPRETATION

A. Blumentals / Architecture is sole interpreter of Contract Documents and performance in disputes between Owner and Contractor as it pertains to Life Safety, Code, or Aesthetic issues.

1.21 COORDINATION WITH MEP

A. General Contractor is required to leave chases and openings in walls, floors, ceilings, roof, partitions, etc., and to provide frames and other additional structural members needed to receive MEP work (except in pre-poured concrete wall and floor panels Mechanical Contractor shall provide openings). Coordinate with MEP Contractors for locations, dimensions, etc., of such chases and openings, including provisions and proper setting of sleeves and other equipment in such time as to cause no delay to the work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

1.2 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required but may offer advantage to Contractor or Owner.

1.3 ACTION SUBMITTALS

A. Substitution Requests: Submit documentation identifying product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use form acceptable to Architect.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.

j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.4 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.5 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.6 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.

e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience:

1. Architect will consider requests for substitution if received within 60 days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.

a. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

1) Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
2) Requested substitution does not require extensive revisions to the Contract Documents.
3) Requested substitution is consistent with the Contract Documents and will produce indicated results.
4) Substitution request is fully documented and properly submitted.
5) Requested substitution will not adversely affect Contractor's construction schedule.
6) Requested substitution has received necessary approvals of authorities having jurisdiction.
7) Requested substitution is compatible with other portions of the Work.
8) Requested substitution has been coordinated with other portions of the Work.
9) Requested substitution provides specified warranty.
10) If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

1.7 ACCEPTANCE

A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

1.8 ATTACHMENTS

A. Copies of the Substitution Request Forms to be used during Bidding/Procurement and during construction are included after this Section.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

B. Related Requirements:

1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.
2. Section 013100 "Project Management and Coordination" for requirements for forms for contract modifications provided as part of web-based Project management software.

1.2 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
2. Within 10 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.
    d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.

5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use form acceptable to Architect.

1.3 ADMINISTRATIVE CHANGE ORDERS

A. Allowance Adjustment: See Section 012100 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.

B. Unit-Price Adjustment: See Section 012200 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.4 CHANGE ORDER PROCEDURES

A. Computation of Change in Contract Amount. As specified in the Agreement and Conditions of the Contract.

1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
3. For pre-determined unit prices and quantities, the amount will based on the fixed unit prices.
4. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.

B. Substantiation of Costs: Provide full information required for evaluation.

1. Provide the following data. Support each claim for additional costs with additional information.

    a. Quantities of products, labor, and equipment.
    b. Taxes, insurance, and bonds.
    c. Overhead and profit.
    d. Justification for any change in Contract Time.
    e. Credit for deletions from Contract, similarly documented.
    f. Dates and times work was performed, and by whom.
    g. Time records and wage rates paid.
    h. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

2. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.

C. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

D. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

E. Promptly enter changes in Project Record Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 **- PAYMENT PROCEDURES**

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Requirements:

1. Section 012100 "Allowances" for procedural requirements governing the handling and processing of allowances.
2. Section 012200 "Unit Prices" for administrative requirements governing the use of unit prices.
3. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

1.2 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.3 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:

a. Project name and location.
b. Owner's name.
c. Owner's Project number.
d. Name of Architect.
e. Architect's Project number.
f. Contractor's name and address.
g. Date of submittal.

2. Arrange schedule of values consistent with format of AIA Document G703.
3. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

a. Differentiate between items stored on-site and items stored off-site.

4. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
5. Temporary Facilities: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
6. Retainage. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
7. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.4 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments, as certified by Architect and paid for by Owner.

B. Payment Application Times: The date for each progress payment is indicated in the Owner/Contractor Agreement. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

C. Payment Application Times-1: Submit Application for Payment to Architect by the <**Insert day**> of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.

1. Submit draft electronic copy of Application for Payment seven days prior to due date for review by Architect.

D. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.

E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.

F. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.

2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Products list (preliminary if not final).
5. Sustainable design action plans, including preliminary project materials cost data.
6. Schedule of unit prices.
7. Submittal schedule (preliminary if not final).
8. List of Contractor's staff assignments.
9. Report of preconstruction conference.

H. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.

    a. Complete administrative actions, submittals, and Work preceding this application, as described in Section 017700 "Closeout Procedures."

2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Certification of completion of final punch list items.
3. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
4. Updated final statement, accounting for final changes to the Contract Sum.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Startup construction schedule.
2. Contractor's Construction Schedule.
3. Construction schedule updating reports.
4. Daily construction reports.
5. Material location reports.
6. Site condition reports.
7. Unusual event reports.

B. Related Requirements:

1. Section 012900 "Payment Procedures" for schedule of values and requirements for use of cost-loaded schedule for Applications for Payment.
2. Section 014000 "Quality Requirements" for schedule of tests and inspections.

1.2 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the schedule of values for completing an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum.

C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

D. Event: The starting or ending point of an activity.

E. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

F. Resource Loading: The allocation of labor and equipment necessary for completing an activity as scheduled.

1.3 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file.
2. PDF file.

B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.

C. Construction Schedule Updating Reports: Submit with Applications for Payment.

D. Daily Construction Reports: Submit at weekly intervals.

E. Material Location Reports: Submit at monthly intervals.

F. Site Condition Reports: Submit at time of discovery of differing conditions.

G. Unusual Event Reports: Submit at time of unusual event.

1.4 COORDINATION

A. Coordinate Contractor's Construction Schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities, and schedule them in proper sequence.

1.5 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Computer Scheduling Software: Prepare schedules using current version of a program that is capable of managing construction schedules.

B. Time Frame: Extend schedule from date established for commencement of the Work to date of Substantial Completion.

1. Contract completion date to not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.

2. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
3. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
4. Work Restrictions: Show the effect of the following items on the schedule:

    a. Coordination with existing construction.
    b. Limitations of continued occupancies.
    c. Uninterruptible services.
    d. Use-of-premises restrictions.
    e. Seasonal variations.
    f. Environmental control.

5. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

    a. Subcontract awards.
    b. Submittals.
    c. Purchases.
    d. Fabrication.
    e. Installation.
    f. Tests and inspections.
    g. Adjusting.
    h. Curing.
    i. Startup and placement into final use and operation.
    j. Commissioning.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.

E. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.

1. See Section 012900 "Payment Procedures" for cost reporting and payment procedures.

F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and the Contract Time.

G. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.

2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate Final Completion percentage for each activity.

H. Distribution: Distribute copies of approved schedule to Architect Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

1.6 GANTT-CHART SCHEDULE REQUIREMENTS

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for commencement of the Work.

1. Base schedule on the startup construction schedule and additional information received since the start of Project.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

1.7 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Testing and inspection.
8. Accidents.
9. Meetings and significant decisions.
10. Unusual events.
11. Stoppages, delays, shortages, and losses.
12. Meter readings and similar recordings.
13. Emergency procedures.
14. Orders and requests of authorities having jurisdiction.
15. Change Orders received and implemented.
16. Services connected and disconnected.
17. Equipment or system tests and startups.
18. Partial completions and occupancies.

19. Substantial Completions authorized.

B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List to be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:

1. Material stored prior to previous report and remaining in storage.
2. Material stored prior to previous report and since removed from storage and installed.
3. Material stored following previous report and remaining in storage.

C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

D. Unusual Event Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

1. Submit unusual event reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013200

SECTION 013300 **- SUBMITTAL PROCEDURES**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

B. Related Requirements:

1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 013100 "Project Management and Coordination" for requirements for web-based Project software.
3. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
4. Section 014000 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
5. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
6. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.3 SUBMITTAL SCHEDULE

A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Final Submittal Schedule: Submit concurrently with the first complete submittal of Contractor's construction schedule.

a. Submit revised submittal schedule as required to reflect changes in current status and timing for submittals.

3. Format: Arrange the following information in a tabular format:

a. Scheduled date for first submittal.
b. Specification Section number and title.
c. Submittal Category: Action; informational.
d. Name of subcontractor.
e. Description of the Work covered.
f. Scheduled date for Architect's final release or approval.
g. Scheduled dates for installation.
h. Activity or event number.

1.4 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:

1. Project name.
2. Date.
3. Name of Architect.
4. Name of Contractor.
5. Name of firm or entity that prepared submittal.
6. Names of subcontractor, manufacturer, and supplier.
7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier and alphanumeric suffix for resubmittals.
8. Category and type of submittal.
9. Submittal purpose and description.
10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
11. Drawing number and detail references, as appropriate.
12. Indication of full or partial submittal.
13. Location(s) where product is to be installed, as appropriate.
14. Other necessary identification.
15. Remarks.
16. Signature of transmitter.

B. Options: Identify options requiring selection by Architect.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

D. Submittals Utilizing Web-Based Project Software: Prepare submittals as PDF files or other format indicated by Project management software.

1.5 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project management software website. Enter required data in web-based software site to fully identify submittal.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections, so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow ten working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow ten days for review of each resubmittal.
4. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.

D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block, and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.6 SUBMITTAL REQUIREMENTS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams that show factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.
    d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before Shop Drawings, and before or concurrently with Samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

    a. Identification of products.
    b. Schedules.
    c. Compliance with specified standards.
    d. Notation of coordination requirements.
    e. Notation of dimensions established by field measurement.
    f. Relationship and attachment to adjoining construction clearly indicated.
    g. Seal and signature of professional engineer if specified.

C. Samples: Submit Samples for review of type, color, pattern, and texture for a check of these characteristics with other materials.

1. Transmit Samples that contain multiple, related components, such as accessories together in one submittal package.
2. Identification: Permanently attach label on unexposed side of Samples that includes the following:

    a. Project name and submittal number.
    b. Generic description of Sample.
    c. Product name and name of manufacturer.
    d. Sample source.

e. Number and title of applicable Specification Section.
f. Specification paragraph number and generic name of each item.

3. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units, showing the full range of colors, textures, and patterns available.

    a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

    a. Number of Samples: Submit two sets of Samples. Architect will retain one Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.

        1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
        2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.

E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

G. Certificates:

1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
2. Installer Certificates: Submit written statements on manufacturer's letterhead, certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead, certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead, certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead, certifying that product complies with requirements in the Contract Documents.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of AWS B2.1/B2.1M on AWS forms. Include names of firms and personnel certified.

H. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for substrate preparation and primers required.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

    a. Name of evaluation organization.
    b. Date of evaluation.
    c. Time period when report is in effect.
    d. Product and manufacturers' names.
    e. Description of product.
    f. Test procedures and results.
    g. Limitations of use.

1.7 DELEGATED DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.8 CONTRACTOR'S REVIEW

A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Contractor's review shall verify and indicate compliance with BABAA requirements prior to forwarding to Architect. Refer to Section 004330 for additional information.

1.9 ARCHITECT'S REVIEW

A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return.

1. Submittals by Web-Based Project Management Software: Architect will indicate, on Project management software website, the appropriate action.

B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Architect will return without review submittals received from sources other than Contractor.

F. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

SECTION 014000 **- QUALITY REQUIREMENTS**

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

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

1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.2 DEFINITIONS

A. Experienced: When used with an entity or individual, "experienced," unless otherwise further described, means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, subcontractor, or sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.

1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).

D. Mockups: Physical assemblies of portions of the Work constructed to establish the standard by which the Work will be judged. Mockups are not Samples.

1. Mockups are used for one or more of the following:

a. Verify selections made under Sample submittals.
b. Demonstrate aesthetic effects.
c. Demonstrate the qualities of products and workmanship.
d. Demonstrate successful installation of interfaces between components and systems.
e. Perform preconstruction testing to determine system performance.

2. Product Mockups: Mockups that may include multiple products, materials, or systems specified in a single Section.
3. In-Place Mockups: Mockups constructed on-site in their actual final location as part of permanent construction.

E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.

F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) in accordance with 29 CFR 1910.7, by a testing agency accredited in accordance with NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

G. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source (e.g., plant, mill, factory, or shop).

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. The term "testing laboratory" has the same meaning as the term "testing agency."

I. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work, to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work, to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect.

1.3 DELEGATED DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated Design Services Statement: Submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.4 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Architect regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Architect for clarification before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified is the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data: For Contractor's quality-control personnel.

C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
2. Primary wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.

D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

F. Reports: Prepare and submit certified written reports and documents as specified.

G. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.6 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.

3. Name, address, telephone number, and email address of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample-taking and testing and inspection.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement of whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement of whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

1.7 QUALITY ASSURANCE

A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that is similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities be performed by entities who are recognized experts in those operations. Specialists will satisfy qualification requirements indicated and engage in the activities indicated.

1. Requirements of authorities having jurisdiction supersede requirements for specialists.

G. Testing and Inspecting Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented in accordance with ASTM E329, and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect, demonstrate, repair, and perform service on installations of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor's Responsibilities:

a. Provide test specimens representative of proposed products and construction.
b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
d. Build site-assembled test assemblies and mockups, using installers who will perform same tasks for Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from the Contract Documents.

K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups of size indicated.
2. Build mockups in location indicated or, if not indicated, as directed by Architect.
3. Notify Architectseven days in advance of dates and times when mockups will be constructed.
4. Employ supervisory personnel who will oversee mockup construction. Employ workers who will be employed to perform same tasks during the construction at Project.
5. Demonstrate the proposed range of aesthetic effects and workmanship.
6. Obtain Architect's approval of mockups before starting corresponding Work, fabrication, or construction.

    a. Allow seven days for initial review and each re-review of each mockup.

7. Promptly correct unsatisfactory conditions noted by Architect's preliminary review, to the satisfaction of the Architect, before completion of final mockup.
8. Approval of mockups by the Architect does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
9. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
10. Demolish and remove mockups when directed unless otherwise indicated.

L. Tolerances

1. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
2. Comply with manufacturers' tolerances. Should manufacturer's tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
3. Adjust products to appropriate dimensions; position before securing products in place.

1.8 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
2. Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Engage a qualified testing agency to perform quality-control services.

a. Contractor will not employ same entity engaged by Owner, unless agreed to in writing by Owner.

3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform duties of Contractor.

E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

G. Contractor's Associated Requirements and Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.

7. Security and protection for samples and for testing and inspection equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect'sand authorities' having jurisdiction reference during normal working hours.

1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspection, sample-taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 014200 **- REFERENCES**

PART 1 - GENERAL

1.1 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms, including "requested," "authorized," "selected," "required," and "permitted," have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms, including "shown," "noted," "scheduled," and "specified," have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.2 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

1. For standards referenced by applicable building codes, comply with dates of standards as listed in building codes.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.3 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they are to mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

B. Industry Organizations, List: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they are to mean the recognized name of the entities in the following list. Abbreviations and acronyms not included in this list are to mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."The information in this list is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. AABC - Associated Air Balance Council; www.aabc.com.
2. AAMA - American Architectural Manufacturers Association; (see FGIA).
3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
7. ABMA - American Boiler Manufacturers Association; www.abma.com.
8. ACI - American Concrete Institute; www.concrete.org.
9. ACP - American Clean Power; (Formerly: American Wind Energy Association); www.cleanpower.org.
10. ACPA - American Concrete Pipe Association; www.concretepipe.org.
11. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
12. AF&PA - American Forest & Paper Association; www.afandpa.org.
13. AGA - American Gas Association; www.aga.org.
14. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
15. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
16. AI - Asphalt Institute; www.asphaltinstitute.org.
17. AIA - American Institute of Architects (The); www.aia.org.
18. AISC - American Institute of Steel Construction; www.aisc.org.
19. AISI - American Iron and Steel Institute; www.steel.org.
20. AITC - American Institute of Timber Construction; (see PLIB).
21. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
22. AMPP - Association for Materials Protection and Performance; www.ampp.org.
23. ANSI - American National Standards Institute; www.ansi.org.
24. AOSA/SCST - Association of Official Seed Analysts (The)/Society of Commercial Seed Technologists (The); www.analyzeseeds.com.
25. APA - APA - The Engineered Wood Association; www.apawood.org.
26. APA - Architectural Precast Association; www.archprecast.org.
27. API - American Petroleum Institute; www.api.org.
28. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
29. ASA - Acoustical Society of America; www.acousticalsociety.org.
30. ASCE - American Society of Civil Engineers; www.asce.org.
31. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (see ASCE).
32. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.

33. ASME - ASME International; American Society of Mechanical Engineers (The); www.asme.org.
34. ASSE - ASSE International; (American Society of Sanitary Engineering); www.asse-plumbing.org.
35. ASSP - American Society of Safety Professionals; www.assp.org.
36. ASTM - ASTM International; www.astm.org.
37. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
38. AVIXA - Audiovisual and Integrated Experience Association; www.avixa.org.
39. AWI - Architectural Woodwork Institute; www.awinet.org.
40. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
41. AWPA - American Wood Protection Association; www.awpa.com.
42. AWS - American Welding Society; www.aws.org.
43. AWWA - American Water Works Association; www.awwa.org.
44. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
45. BIA - Brick Industry Association (The); www.gobrick.com.
46. BICSI - BICSI, Inc.; www.bicsi.org.
47. BIFMA - Business and Institutional Furniture Manufacturer's Association; www.bifma.org.
48. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
49. BSI - British Standards Institution; www.bsigroup.com.
50. BWF - Badminton World Federation; www.bwfbadminton.com.
51. CARB - California Air Resources Board; www.arb.ca.gov.
52. CDA - Copper Development Association Inc.; www.copper.org.
53. CE - Conformite Europeenne (European Commission); www.ec.europa.eu/growth/single-market/ce-marking.
54. CEA - Canadian Electricity Association; www.electricity.ca.
55. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
56. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
57. CGA - Compressed Gas Association; www.cganet.com.
58. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
59. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
60. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
61. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
62. CMHA - Concrete Masonry & Hardscape Association; (Formerly: National Concrete Masonry Association); www.masonryandhardscapes.org.
63. CPA - Composite Panel Association; www.compositepanel.org.
64. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
65. CRRC - Cool Roof Rating Council; www.coolroofs.org.
66. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
67. CSA - CSA Group; www.csagroup.org.
68. CSI - Cast Stone Institute; www.caststone.org.
69. CSI - Construction Specifications Institute (The); www.csiresources.org.
70. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
71. CTA - Consumer Technology Association; www.cta.tech.
72. CTI - Cooling Technology Institute; www.coolingtechnology.org.
73. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
74. DHA - Decorative Hardwoods Association; www.decorativehardwoods.org.
75. DHI - Door and Hardware Institute; www.dhi.org.
76. ECIA - Electronic Components Industry Association; www.ecianow.org.
77. EIMA - EIFS Industry Members Association; www.eima.com.
78. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
79. EOS/ESD - EOS/ESD Association, Inc.; Electrostatic Discharge Association; www.esda.org.
80. ESTA - Entertainment Services and Technology Association; www.esta.org.
81. EVO - Efficiency Valuation Organization; www.evo-world.org.
82. FCI - Fluid Controls Institute; www.fluidcontrolsinstitute.org.

83. FGIA - Fenestration and Glazing Industry Alliance; https://fgiaonline.org.
84. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
85. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
86. FM Approvals - FM Approvals LLC; www.fmapprovals.com.
87. FM Global - FM Global; www.fmglobal.com.
88. FRSA - Florida Roofing and Sheet Metal Contractors Association, Inc.; www.floridaroof.com.
89. FSA - Fluid Sealing Association; www.fluidsealing.com.
90. FSC - Forest Stewardship Council U.S.; www.fscus.org.
91. GA - Gypsum Association; www.gypsum.org.
92. GS - Green Seal; www.greenseal.org.
93. HI - Hydraulic Institute; www.pumps.org.
94. HMMA - Hollow Metal Manufacturers Association; (see NAAMM).
95. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
96. IAS - International Accreditation Service; www.iasonline.org.
97. ICC - International Code Council; www.iccsafe.org.
98. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
99. ICPA - International Cast Polymer Association (The); www.theicpa.com.
100. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
101. IEC - International Electrotechnical Commission; www.iec.ch.
102. IEEE SA - IEEE Standards Association; https://standards.ieee.org.
103. IES - Illuminating Engineering Society; www.ies.org.
104. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
105. IGMA - Insulating Glass Manufacturers Alliance; (see FGIA).
106. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.org.
107. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
108. Intertek - Intertek Group; www.intertek.com.
109. ISA - International Society of Automation (The); www.isa.org.
110. ISFA - International Surface Fabricators Association; www.isfanow.org.
111. ISO - International Organization for Standardization; www.iso.org.
112. ITU - International Telecommunication Union; www.itu.int.
113. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
114. LPI - Lightning Protection Institute; www.lightning.org.
115. MBMA - Metal Building Manufacturers Association; www.mbma.com.
116. MCA - Metal Construction Association; www.metalconstruction.org.
117. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
118. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
119. MHI - Material Handling Industry; www.mhi.org.
120. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.
121. MPI - Master Painters Institute; www.paintinfo.com.
122. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry, Inc.; www.msshq.org.
123. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
124. NACE - NACE International; (National Association of Corrosion Engineers International); (see AMPP).
125. NADCA - National Air Duct Cleaners Association; www.nadca.com.
126. NAIMA - North American Insulation Manufacturers Association; www.insulationinstitute.org.
127. NALP - National Association of Landscape Professionals; www.landscapeprofessionals.org.
128. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
129. NBI - New Buildings Institute; www.newbuildings.org.
130. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
131. NCMA - National Concrete Masonry Association; (see CMHA).

132. NEBB - National Environmental Balancing Bureau; www.nebb.org.
133. NECA - National Electrical Contractors Association; www.necanet.org.
134. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
135. NEMA - National Electrical Manufacturers Association; www.nema.org.
136. NETA - InterNational Electrical Testing Association; www.netaworld.org.
137. NFHS - National Federation of State High School Associations; www.nfhs.org.
138. NFPA - National Fire Protection Association; www.nfpa.org.
139. NFPA - NFPA International; (see NFPA).
140. NFRC - National Fenestration Rating Council; www.nfrc.org.
141. NGA - National Glass Association; www.glass.org.
142. NHLA - National Hardwood Lumber Association; www.nhla.com.
143. NLGA - National Lumber Grades Authority; www.nlga.org.
144. NOFMA - National Oak Flooring Manufacturers Association; (see NWFA).
145. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
146. NRCA - National Roofing Contractors Association; www.nrca.net.
147. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
148. NSF - NSF International; www.nsf.org.
149. NSI - Natural Stone Institute; www.naturalstoneinstitute.org.
150. NSPE - National Society of Professional Engineers; www.nspe.org.
151. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
152. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
153. NWFA - National Wood Flooring Association; www.nwfa.org.
154. NWRA - National Waste & Recycling Association; www.wasterecycling.org.
155. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
156. PDI - Plumbing & Drainage Institute; www.pdionline.org.
157. PLASA - PLASA; www.plasa.org.
158. PLIB - Pacific Lumber Inspection Bureau; www.plib.org.
159. PVCPA - Uni-Bell PVC Pipe Association; www.uni-bell.org.
160. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
161. RFCI - Resilient Floor Covering Institute; www.rfci.com.
162. RIS - Redwood Inspection Service; (see WWPA).
163. SAE - SAE International; www.sae.org.
164. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
165. SDI - Steel Deck Institute; www.sdi.org.
166. SDI - Steel Door Institute; www.steeldoor.org.
167. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.
168. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (see ASCE).
169. SIA - Security Industry Association; www.securityindustry.org.
170. SJI - Steel Joist Institute; www.steeljoist.org.
171. SMA - Screen Manufacturers Association; www.smainfo.org.
172. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
173. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
174. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
175. SPIB - Southern Pine Inspection Bureau; www.spib.org.
176. SPRI - Single Ply Roofing Industry; www.spri.org.
177. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
178. SSINA - Specialty Steel Industry of North America; www.ssina.com.
179. SSPC - SSPC: The Society for Protective Coatings; (see AMPP).
180. STI/SPFA - Steel Tank Institute/Steel Plate Fabricators Association; www.steeltank.com.
181. SWI - Steel Window Institute; www.steelwindows.com.
182. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
183. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
184. TCNA - Tile Council of North America, Inc.; www.tcnatile.com.
185. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.kbcdco.tema.org.

186. TIA - Telecommunications Industry Association; www.tiaonline.org.
187. TMS - The Masonry Society; www.masonrysociety.org.
188. TPI - Truss Plate Institute; www.tpinst.org.
189. TPI - Turfgrass Producers International; www.turfgrasssod.org.
190. TRI - Tile Roofing Industry Alliance; www.tileroofing.org.
191. ULSE - UL Standards & Engagement Inc.; www.ulse.org.
192. UL - UL Solutions Inc.; www.ul.com.
193. USAV - USA Volleyball; www.usavolleyball.org.
194. USGBC - U.S. Green Building Council; www.usgbc.org.
195. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
196. WA - Wallcoverings Association; www.wallcoverings.org.
197. WCLIB - West Coast Lumber Inspection Bureau; (see PLIB).
198. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
199. WDMA - Window & Door Manufacturers Association; www.wdma.com.
200. WI - Woodwork Institute; www.woodworkinstitute.com.
201. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
202. WWPA - Western Wood Products Association; www.wwpa.org.

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they are to mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. DIN - Deutsches Institut fur Normung e.V.; www.din.de.
2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
3. ICC - International Code Council; www.iccsafe.org.
4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they are to mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.

1. CPSC - U.S. Consumer Product Safety Commission; www.cpsc.gov.
2. DOC - U.S. Department of Commerce; www.commerce.gov.
3. DOD - U.S. Department of Defense; www.defense.gov.
4. DOE - U.S. Department of Energy; www.energy.gov.
5. DOJ - U.S. Department of Justice; www.ojp.usdoj.gov
6. DOS - U.S. Department of State; www.state.gov.
7. EPA - United States Environmental Protection Agency; www.epa.gov.
8. FAA - Federal Aviation Administration; www.faa.gov.
9. GPO - U.S. Government Publishing Office; www.gpo.gov.
10. GSA - U.S. General Services Administration; www.gsa.gov.
11. HUD - U.S. Department of Housing and Urban Development; www.hud.gov.
12. LBNL - Lawrence Berkeley National Laboratory; Energy Technologies Area; www.lbl.gov/.
13. NIST - National Institute of Standards and Technology; www.nist.gov.
14. OSHA - Occupational Safety & Health Administration; www.osha.gov.
15. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
16. USACE - U.S. Army Corps of Engineers; www.usace.army.mil.
17. USDA - U.S. Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
18. USDA - U.S. Department of Agriculture; Rural Utilities Service; www.usda.gov.
19. USP - U.S. Pharmacopeial Convention; www.usp.org.
20. USPS - United States Postal Service; www.usps.com.

E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they are to mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from U.S. Government Publishing Office; www.govinfo.gov.
2. DOD - U.S. Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.dsp.dla.mil/Specs-Standards/.
3. DSCC - Defense Supply Center Columbus; (see FS).
4. FED-STD - Federal Standard; (see FS).
5. FS - Federal Specification; Available from DLA Document Services; www.dsp.dla.mil/Specs-Standards/.
    a. Available from Defense Standardization Program; www.dsp.dla.mil.
    b. Available from U.S. General Services Administration; www.gsa.gov.
    c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org.
6. MILSPEC - Military Specifications and Standards; (see DOD).
7. USAB - United States Access Board; www.access-board.gov.
8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (see USAB).

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.2 USE CHARGES

A. Installation, removal, and use charges for temporary facilities to be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.3 INFORMATIONAL SUBMITTALS

A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

B. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.

C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

D. Moisture- and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold. Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.

1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and requirements for replacing water-damaged Work.
2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
3. Indicate methods to be used to avoid trapping water in finished work.

E. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:

1. Locations of dust-control partitions at each phase of work.
2. HVAC system isolation schematic drawing.
3. Location of proposed air-filtration system discharge.
4. Waste-handling procedures.
5. Other dust-control measures.

F. Noise and Vibration Control Plan: Identify construction activities that may impact the occupancy and use of existing spaces within the building or adjacent existing buildings, whether occupied by others, or occupied by Owner. Include the following:

1. Methods used to meet the goals and requirements of Owner.
2. Concrete cutting method(s) to be used.
3. Location of construction devices on the site.
4. Show compliance with the use and maintenance of quieted construction devices for the duration of the Project.
5. Indicate activities that may disturb building occupants and that are planned to be performed during non-standard working hours as coordinated with Owner.

1.4 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Accessible Temporary Egress: Comply with applicable provisions in ICC A117.1.

1.5 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Chain-Link Fencing: Minimum **2-inch**, **0.148-inch-** thick, galvanized-steel, chain-link fabric fencing; minimum **6 feet** high with galvanized-steel pipe posts; minimum **2-3/8-inch-** OD line posts and **2-7/8-inch-** OD corner and pull posts, with **1-5/8-inch-** OD top rails.

B. Portable Chain-Link Fencing: Minimum **2-inch**, **0.148-inch-** thick, galvanized-steel, chain-link fabric fencing; minimum **6 feet** high with galvanized-steel pipe posts; minimum **2-3/8-inch-** OD line posts and **2-7/8-inch-** OD corner and pull posts, with **1-5/8-inch-** OD top and bottom rails. Provide galvanized-steel bases for supporting posts.

C. Fencing Windscreen Privacy Screen: Polyester fabric scrim with grommets for attachment to chain-link fence, sized to height of fence, in color selected by Architect from manufacturer's standard colors.

D. Wood Enclosure Fence: Plywood, **6 feet** high, framed with four **2-by-4-inch** rails, with preservative-treated wood posts spaced not more than **8 feet** apart.

E. Polyethylene Sheet: Reinforced, fire-resistive sheet, **10-mil** minimum thickness, with flame-spread rating of 15 or less in accordance with ASTM E84 and passing NFPA 701 Test Method 2.

F. Dust-Control Adhesive-Surface Walk-Off Mats: Provide mats, minimum **36 by 60 inches**.

G. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

A. Field Offices:

1. Owner will provide conditioned interior space for field offices for duration of Project.

B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating, Cooling, and Dehumidifying Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.

C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

C. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

1. Prior to commencing work, isolate the HVAC system in area where work is to be performed.

a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
b. Maintain negative air pressure within work area, using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.

2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

3.3 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service:

1. Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, safety shower and eyewash facilities, and drinking water for use of construction personnel. Comply with requirements of

authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

E. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.

F. Electric Power Service:

1. Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

H. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Provideonetelephone line(s) for each field office.

1. Provide additional telephone lines for the following:
2. At each telephone, post a list of important telephone numbers.

a. Police and fire departments.
b. Ambulance service.
c. Contractor's home office.
d. Contractor's emergency after-hours telephone number.
e. Architect's office.
f. Engineers' offices.
g. Owner's office.
h. Principal subcontractors' field and home offices.

I. Electronic Communication Service: Provide secure WiFi wireless connection to internet with provisions for access by Architect and Owner.

3.4 SUPPORT FACILITIES INSTALLATION

A. Comply with the following:

1. Utilize designated area within existing building for temporary field offices.
2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Use of Planned Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary

roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
2. Prepare subgrade and install subbase and base for temporary roads and paved areas in accordance with Section 312000 "Earth Moving."
3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course in accordance with Section 321216 "Asphalt Paving."

C. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain, including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

D. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

E. Storage and Staging: Use designated areas of Project site for storage and staging needs.

F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs as indicated on Drawings.
2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

    a. Provide temporary, directional signs for construction personnel and visitors.

3. Maintain and touch up signs, so they are legible at all times.

H. Waste Disposal Facilities:

1. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
2. Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

I. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.

1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas, so no evidence remains of correction work.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Section 011000 "Summary."

C. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

D. Tree and Plant Protection:

1. Comply with requirements specified in Section 015639 "Temporary Tree and Plant Protection."

E. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals, so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.

F. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.

G. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

H. Temporary Egress: Provide temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction. Provide signage directing occupants to temporary egress.

I. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

J. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner and tenants from fumes and noise.

1. Construct dustproof partitions with gypsum wallboard, with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.

2. Construct dustproof partitions with two layers of **6-mil** polyethylene sheet on each side. Cover floor with two layers of **6-mil** polyethylene sheet, extending sheets **18 inches** up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.

    a. Construct vestibule and airlock at each entrance through temporary partition with not less than **48 inches** between doors. Maintain water-dampened foot mats in vestibule.

3. Insulate partitions to control noise transmission to occupied areas.
4. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
5. Protect air-handling equipment.
6. Provide walk-off mats at each entrance through temporary partition.

K. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.

1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition in accordance with requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign, stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.6 MOISTURE AND MOLD CONTROL

A. Moisture and Mold Protection: Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.

B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:

1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water-damaged material.
5. Do not install material that is wet.

6. Discard and replace stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.

D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

    a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective and require replacing.
    b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
    c. Remove and replace materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.7 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.

3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SECTION 016000 **- PRODUCT REQUIREMENTS**

PART 1 - GENERAL

1.1 SUMMARY

A. The Work of This Section Includes: Administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:

1. Section 011000 "Summary" for Contractor requirements related to Owner-furnished products.
2. Section 004330 "Material Procurement Requirements" for materials subject to requirements of BABAA.
3. Section 012500 "Substitution Procedures" for requests for substitutions.
4. Section 014200 "References" for applicable industry standards for products specified.
5. Section 017700 "Closeout Procedures" for submitting warranties.

1.2 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products unless otherwise indicated.
3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in "Comparable Products" Article, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.

1. Evaluating Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.

C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.

D. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:

1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
2. Data indicating compliance with the requirements specified in "Comparable Products" Article.

E. Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 013300 "Submittal Procedures."

F. Substitution: Refer to Section 012500 "Substitution Procedures" for definition and limitations on substitutions.

1.3 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1. Resolution of Compatibility Disputes between Multiple Contractors:

a. Contractors are responsible for providing products and construction methods compatible with products and construction methods of other contractors.
b. If a dispute arises between the multiple contractors over concurrently selectable but incompatible products, Architect will determine which products will be used.

B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is inconspicuous.
2. Equipment Nameplates: Provide a permanent nameplate on each item of service- or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:

a. Name of product and manufacturer.
b. Model and serial number.
c. Capacity.
d. Speed.
e. Ratings.

3. See individual identification Sections in Divisions 21, 22, 23, and 26 for additional equipment identification requirements.

1.4 COORDINATION

A. Modify or adjust affected work as necessary to integrate work of approved comparable products and approved substitutions.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products, using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and that products are undamaged and properly protected.

C. Storage:

1. Provide a secure location and enclosure at Project site for storage of materials and equipment.
2. Store products to allow for inspection and measurement of quantity or counting of units.
3. Store materials in a manner that will not endanger Project structure.
4. Store products that are subject to damage by the elements under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation and with adequate protection from wind.
5. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.
8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.6 PRODUCT WARRANTIES

A. Warranties specified in other Sections are to be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written standard warranty form furnished by individual manufacturer for a particular product and issued in the name of Owner or endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner and issued in the name of Owner or endorsed by manufacturer to Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included in the Project Manual, prepare a written document, using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

    a. Submit additional documentation required by Architect in order to establish equivalency of proposed products. Unless otherwise indicated, evaluation of "or equal" product status is by Architect, whose determination is final.

B. Product Selection Procedures:

1. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed or an unnamed product that complies with requirements.

a. Non-limited list of products is indicated by the phrase "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following."
b. Provision of an unnamed product is not considered a substitution, if the product complies with requirements.

2. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed or a product by an unnamed manufacturer that complies with requirements.

a. Non-limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following."
b. Provision of products of an unnamed manufacturer is not considered a substitution, if the product complies with requirements.

C. Visual Matching Specification: Where Specifications require the phrase "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or a similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

E. Sustainable Product Selection: Where Specifications require product to meet sustainable product characteristics, select products complying with indicated requirements. Comply with requirements in Division 01 sustainability requirements Section and individual Specification Sections.

F. Project Source Limitations: This project is required to meet applicable provisions of the Build America, Buy America Act (BABA).

1. All iron, steel, manufactured products, and construction materials shall be produced in the United States in a manner complying with the Build America, Buy America requirements, unless a waiver of the requirements is approved by the appropriate AHJ(s).
2. The Contractor shall provide any information, certification, or assurance as required to verify compliance with BABA requirements, or information requested to support a waiver application, as applicable.
3. Failure of the Contractor to comply with BABA requirements shall permit the Owner or Funding Authority to recover as damages against the Contractor any loss, expense, or cost resulting from such failure.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with the following requirements:

1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those of the named basis-of-design product. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects, with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

B. Architect's Action on Comparable Products Submittal: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for a comparable product. Architect will notify Contractor of approval or rejection of proposed comparable product within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

1. Architect's Approval of Submittal: Indication of approval in web-based Project management software. See Section 013300 "Submittal Procedures."
2. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

C. Submittal Requirements, Two-Step Process: Approval by Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 **- EXECUTION**

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work, including, but not limited to, the following:

1. Installation.
2. Cutting and patching.
3. Progress cleaning.
4. Starting and adjusting.
5. Protection of installed construction.
6. Correction of the Work.

B. Related Requirements:

1. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.
2. Section 024119 "Selective Demolition" for demolition and removal of selected portions of the building.
3. Section 078413 "Penetration Firestopping" for patching penetrations in fire-rated construction.

1.2 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.3 QUALITY ASSURANCE

A. Professional Engineer Qualifications: Refer to Section 014000 "Quality Requirements."

B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, or when encountering the need for cutting and patching of elements whose structural function is not known, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:

a. Primary operational systems and equipment.
b. Fire separation assemblies.
c. Air or smoke barriers.
d. Fire-suppression systems.
e. Plumbing piping systems.
f. Mechanical systems piping and ducts.
g. Control systems.
h. Communication systems.
i. Fire-detection and -alarm systems.
j. Conveying systems.
k. Electrical wiring systems.
l. Operating systems of special construction.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:

a. Water, moisture, or vapor barriers.
b. Membranes and flashings.
c. Equipment supports.
d. Piping, ductwork, vessels, and equipment.
e. Noise- and vibration-control elements and systems.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Comply with requirements specified in other Sections.

1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials. Use materials that are not considered hazardous.

C. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, gas service piping, and water-service piping; underground electrical services; and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect in accordance with requirements in Section 013100 "Project Management and Coordination."

3.3 INSTALLATION

A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb, and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
4. Maintain minimum headroom clearance of 90 inches in occupied spaces and in unoccupied spaces, unless otherwise indicated on Drawings.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure satisfactory results as judged by Architect. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations, so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy of type expected for Project.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on-site and placement in permanent locations.

F. Tools and Equipment: Select tools or equipment that minimize production of excessive noise levels.

G. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions with manufacturer.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed Work are not indicated, arrange joints for the best visual effect, as judged by Architect. Fit exposed connections together to form hairline joints.

3.4 CUTTING AND PATCHING

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of Work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements in Section 011000 "Summary."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as practicable, as judged by Architect. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

    a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch, corner to corner of wall and edge to edge of ceiling. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.5 PROGRESS CLEANING

A. Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above **80 deg F**.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, in accordance with regulations.

    a. Use containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces in accordance with written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.6 STARTING AND ADJUSTING

A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 019113 "General Commissioning Requirements."

B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.7 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

C. Comply with manufacturer's written instructions for temperature and relative humidity.

3.8 CORRECTION OF THE WORK

A. Repair or remove and replace damaged, defective, or nonconforming Work. Restore damaged substrates and finishes.

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.

C. Restore permanent facilities used during construction to their specified condition.

D. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

E. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

F. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 017300

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

A. The Work of this Section includes administrative and procedural requirements for the following:

1. Salvaging nonhazardous demolition waste.
2. Recycling nonhazardous demolition and construction waste.
3. Disposing of nonhazardous demolition and construction waste.

1.2 DEFINITIONS

A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.

C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner's property.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition and construction waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.4 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within 30 days of date established for commencement of the Work. Plan must include the following:

1. Strategies to reduce the generation of waste during Project design and construction.

2. Waste diversion goals for Project, identifying the materials (both structural and nonstructural) targeted for recycling, reuse, or salvage and identifying the target diversion percentage (at least 50 percent).
3. Where materials will be taken, including expected diversion rates for each material.

1.5 INFORMATIONAL SUBMITTALS

A. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.

B. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

C. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.

D. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

E. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

F. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed in accordance with EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.6 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.

1.7 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan in accordance with requirements in this Section. Plan must include provisions for waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of demolition and construction waste generated by the Work. Use Form CWM-1 for construction waste and Form CWM-2 for demolition waste. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Use Form CWM-3 for construction waste Form CWM-4 for demolition waste. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work in compliance with Section 024119 "Selective Demolition."
2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Achieve end-of-Project rates for salvage/recycling of 75 percent by weight of total nonhazardous solid waste generated by the Work. Practice efficient waste management in use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials, including the following:

1. Demolition Waste:

a. Concrete.
b. Concrete reinforcing steel.
c. Brick.
d. CMU.
e. Wood studs.
f. Wood joists.
g. Plywood and oriented strand board.
h. Wood trim.
i. Rough hardware.
j. Roofing.
k. Doors and frames.
l. Door hardware.
m. Windows.
n. Glazing.
o. Metal studs.
p. Gypsum board.
q. Acoustical tile and panels.
r. Carpet and carpet pad.
s. Equipment.
t. Cabinets.
u. Plumbing fixtures.
v. Piping.
w. Supports and hangers.
x. Valves.
y. Mechanical equipment.
z. Refrigerants.
aa. Electrical conduit.

bb. Copper wiring.
cc. Lighting fixtures.
dd. Lamps.
ee. Ballasts.
ff. Electrical devices.
gg. Switchgear and panelboards.

2. Construction Waste:

a. Masonry and CMU.
b. Lumber.
c. Wood sheet materials.
d. Wood trim.
e. Metals.
f. Roofing.
g. Insulation.
h. Carpet and pad.
i. Gypsum board.
j. Piping.
k. Electrical conduit.
l. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:

1) Paper.
2) Cardboard.
3) Boxes.
4) Plastic sheet and film.
5) Polystyrene packaging.
6) Wood crates.
7) Wood pallets.
8) Plastic pails.

m. Construction Office Waste: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following construction office waste materials:

1) Paper.
2) Aluminum cans.
3) Glass containers.

2.2 WASTE MANAGEMENT REQUIREMENTS

A. Owner requires that this project generate the least amount of trash and waste possible.

1. Divert a minimum of 75% (by weight) of demolition and construction waste from landfills.
2. Recycle 100% of cardboard.
3. Recycle 100% of wood.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

D. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:

1. Aluminum and plastic beverage containers.
2. Corrugated cardboard.
3. Wood pallets.
4. Clean dimensional wood.
5. Land clearing debris, including brush, branches, logs, and stumps.
6. Metals: including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
7. Glass.
8. Gypsum drywall and plaster.
9. Plastic buckets.
10. Asphalt roofing shingles.
11. Paint.
12. Plumbing fixtures.
13. Mechanical and electrical equipment.
14. Fluorescent lamps / light bulbs.

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during entire duration of the Contract.

B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.

1. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged and recycled.

3.2 SALVAGING DEMOLITION WASTE

A. Comply with requirements in Section 024119 "Selective Demolition" for salvaging demolition waste.

B. Salvaged Items for Reuse in the Work: Handle as follows:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until installation.

4. Protect items from damage during transport and storage.
5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

C. Salvaged Items for Sale or Donation: Permitted on Project site.

D. Salvaged Items for Owner's Use: Handle as follows:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

E. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.

F. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.

G. Plumbing Fixtures: Separate by type and size.

H. Lighting Fixtures: Separate lamps by type and protect from breakage.

I. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Preparation of Waste: Prepare and maintain recyclable waste materials in accordance with recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to maximum extent practical in accordance with approved construction waste management plan.

1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

    a. Inspect containers and bins for contamination, and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.

5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor as often as required to prevent overfilling bins.

3.4 RECYCLING DEMOLITION WASTE

A. Asphalt Paving Recycling: Break up and transport paving to asphalt-recycling facility.

B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.

C. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.

1. Clean and stack undamaged, whole masonry units on wood pallets.

D. Wood Materials: Sort and stack members per size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.

E. Metals: Separate metals by type.

1. Structural Steel: Stack members per size, type of member, and length.
2. Remove and dispose of bolts, nuts, washers, and other rough hardware.

F. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.

G. Gypsum Board: Stack large clean pieces on wood pallets or in containers and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.

H. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.

I. Metal Suspension System: Separate metal members, including trim and other metals from acoustical panels and tile, and sort with other metals.

J. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.

1. Store clean, dry carpet and pad in a closed container or trailer provided by carpet reclamation agency or carpet recycler.

K. Carpet Tile: Remove debris, trash, and adhesive.

1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by carpet reclamation agency or carpet recycler.

L. Piping: Reduce piping to straight lengths and store by material and size. Separate supports, hangers, valves, sprinklers, and other components by material and size.

M. Conduit: Reduce conduit to straight lengths and store by material and size.

N. Lamps: Separate lamps by type and store in accordance with requirements in 40 CFR 273.

3.5 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cutoffs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

C. Gypsum Board: Stack large clean pieces on wood pallets or in containers and store in a dry location.

D. Paint: Seal containers and store by type.

3.6 DISPOSAL OF WASTE

A. Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Unless otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning:

1. Do not burn waste materials.

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final Completion procedures.
3. List of incomplete items.
4. Submittal of Project warranties.
5. Final cleaning.

B. Related Requirements:

1. Section 012900 "Payment Procedures" for requirements for Applications for Payment for Substantial Completion and Final Completion.
2. Section 017823 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.

1.2 DEFINITIONS

A. List of Incomplete Items: Contractor-prepared list of items to be completed or corrected, prepared for the Architect's use prior to Architect's inspection, to determine if the Work is substantially complete.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of cleaning agent.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest-control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items required by other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.
5. Submit testing, adjusting, and balancing records.
6. Submit sustainable design submittals not previously submitted.
7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
6. Advise Owner of changeover in utility services.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements.
10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

2. Results of completed inspection will form the basis of requirements for Final Completion.

1.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:

1. Submit a final Application for Payment in accordance with Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list will state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit Final Completion photographic documentation.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first, listed by room or space number.
2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Contractor.
    e. Page number.

4. Submit list of incomplete items in the following format:

    a. Web-Based Project Software Upload: Utilize software feature for creating and updating list of incomplete items (punch list).

1.9 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

C. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

1. Submit on digital media acceptable to Architect.

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

g. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Clean flooring, removing debris, dirt, and staining; clean in accordance with manufacturer's instructions.
i. Vacuum and mop concrete.
j. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean in accordance with manufacturer's instructions if visible soil or stains remain.
k. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
l. Remove labels that are not permanent.
m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
p. Clean ducts, blowers, and coils.
q. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
r. Clean strainers.
s. Leave Project clean and ready for occupancy.

C. Construction Waste Disposal: Comply with waste-disposal requirements in Section 017419 "Construction Waste Management and Disposal."

3.2 CORRECTION OF THE WORK

A. Complete repair and restoration operations required by "Correction of the Work" Article in Section 017300 "Execution" before requesting inspection for determination of Substantial Completion.

END OF SECTION 017700

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. The Work of this Section Includes:

1. Demolition and removal of selected portions of exterior or interior of building or structure and site elements.
2. Removal and salvage of existing items for delivery to Owner and removal of existing items for reinstallation.

B. Related Requirements:

1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 017300 "Execution" for cutting and patching procedures.
3. Section 330500 "Common Work Results for Utilities" for removal of site utility systems piping, equipment, and components.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner as indicated.

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage; prepare for reuse; and reinstall where indicated.

D. Existing to Remain: Existing items of construction that are not to be removed.

1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.4 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

1.5 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials:

1. Environmental reports for Lead Paint and ACM are included as reference appendices to this Project Manual. They were produced by the testing agency for the sole and explicit use by the Owner and may not be used or relied upon by any other group or person

E. On-site sale of removed items or materials is not permitted.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

C. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

D. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

E. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video, measured drawings and templates. Comply with Section 013233 "Photographic Documentation."

1. Inventory and record the condition of items to be removed for salvage or reinstallation. Photograph or video conditions that might be misconstrued as damage caused by removal.
2. Photograph or video existing conditions of adjoining construction including finish surfaces, that might be misconstrued as damage caused by selective demolition operations or removal of items for salvage or reinstallation.

3.2 PREPARATION

A. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

B. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."

C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.3 UTILITY SERVICES AND BUILDING SYSTEMS

A. Existing Services/Systems to Remain: Maintain utilities and building systems and equipment to remain and protect against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utilities and building systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated utilities when requested by Contractor.
2. Arrange to shut off utilities with utility companies.

3. If disconnection of utilities and building systems will affect adjacent occupied parts of the building, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to those parts of the building.
4. Demolish and remove existing building systems, equipment, and components indicated on Drawings to be removed.

    a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    b. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
    c. Equipment to Be Removed: Disconnect and cap services and remove equipment and components.

5. Abandon existing building systems, equipment, and components indicated on Drawings to be abandoned in place.

    a. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
    b. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

6. Remove and reinstall/salvage existing building systems, equipment, and components indicated on drawings to be removed and reinstalled or removed and salvaged:

    a. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment and components; when appropriate, reinstall, reconnect, and make equipment operational.
    b. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and components and deliver to Owner.

3.4 SALVAGE/REINSTALL

A. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

B. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

3.5 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain fire watch during and for at least <**Insert number**> hours after flame-cutting operations.
6. Maintain adequate ventilation when using cutting torches.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed trafficways if required by authorities having jurisdiction.
2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete:

1. Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least **3/4 inch** at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
2. Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.

B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.

C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and recycle or dispose of them in accordance with Section 017419 "Construction Waste Management and Disposal."

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

3.8 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 071416 - COLD FLUID-APPLIED WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Polyurethane waterproofing.
2. Accessory waterproofing system materials.
3. Protection course.

B. Related Requirements:

1. Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.
2. Section 221423 "Storm Drainage Piping Specialties" for plaza-deck drains.
3. Section 334600 "Subdrainage" for molded-sheet drainage panels.

1.2 DEFINITIONS

A. Compatible: Material that will not adversely affect adjacent materials, is chemically compatible with adjacent materials, and where required for bond, achieves adhesive compatibility with adjacent materials.

B. Chemical Compatibility: Material that will not break down, deteriorate, degrade, or prematurely fail when in contact with another material. Material that will not cause chemical breakdown, deterioration, degradation, staining, or premature failure of another material.

C. Adhesive Compatibility: Material that will develop bond strength or provide a suitable surface for another material to develop bond strength complying with requirements when in contact with another material.

1.3 COORDINATION

A. Coordinate Work under this Section with adjacent concrete foundation work, including fill[**, other waterproofing systems**][**, under-slab vapor retarders**][**, under-slab insulation**][**and**][**, subdrainage systems**].

B. Coordinate requirements for concrete formwork to provide suitable substrate for waterproofing and to minimize penetrations in waterproofing.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, and tested physical and performance properties of waterproofing.
2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.

B. Shop Drawings:

1. Indicate locations and extent of waterproofing.
2. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, expansion-joint conditions, tie-ins with adjoining waterproofing, and other termination conditions.
3. Include setting drawings indicating layout, sizes, sections, profiles, and joint details of pedestal-supported concrete pavers.

C. Samples: For the following materials:

1. Cured sample of waterproofing membrane on suitable rigid substrate, **8 by 8 inches**.
2. Flashing sheet, **8 by 8 inches**.
3. Membrane-reinforcing fabric, **8 by 8 inches**.
4. Drainage panel, **4 by 4 inches**.
5. Plaza-deck paver, [**4 by 4 inches**][**full sized**].
6. Paver pedestal assembly.

D. Sustainable Design Submittals:

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For [**Installer**][**and**][**testing agency**].

B. Field quality control reports.

C. Sample warranties.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Entity that employs installers and supervisors who are trained and [**certified**][**approved**] by waterproofing manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by waterproofing manufacturer. Protect stored materials in accordance with manufacturer's written instructions.

B. Remove and replace materials that cannot be applied within their stated shelf life.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer.

1. Do not apply waterproofing to frozen, damp, or wet substrates, when relative humidity exceeds 85 percent, or when temperatures are less than **5 deg F** above dew point.
2. Do not apply waterproofing when snow, rain, fog, or mist are present, or when such weather conditions are imminent during application and curing period.

B. Maintain adequate ventilation during application and curing of waterproofing materials.

1.9 WARRANTY

A. Manufacturer's Special Warranty: Manufacturer agrees to repair or remove and replace waterproofing that fails to remain watertight within specified warranty period.

1. Warranty includes leak remediation, including repair, removal, and replacement of [**protection course**][**drainage panels**][**and**][**pedestals and pavers on plaza decks**].
2. Pavers Warranty: Pavers must not dish or warp, nor crack, split, or disintegrate in freeze-thaw conditions.
3. Warranty Period: [**Five**][**10**]<**Insert number**> years from date of Substantial Completion.

B. Installer's Special Warranty: Submit warranty[**, on warranty form at end of this Section,**] signed by Installer, covering the Work of this Section, for warranty period of [**two**]<**Insert number**> years from date of Substantial Completion.

1. Warranty includes leak remediation, including repair, removal, and replacement of [**protection course**][**drainage panels**][**and**][**pedestals and pavers on plaza decks**].

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Waterproofing System: Obtain waterproofing materials [**and**][**protection course**][**molded-sheet drainage panels**][**insulation drainage panels**] from [**same manufacturer as waterproofing membrane**][**or**][**manufacturer approved by waterproofing membrane manufacturer**].

B. Plaza-Deck Paving: Obtain plaza-deck pavers[**and paver pedestal assembly**] from single source from single manufacturer for consistent quality in appearance and physical properties.

2.2 POLYURETHANE WATERPROOFING

A. Two-Component, Polyurethane Waterproofing:[**ASTM C836/C836M.**]

1. Manufacturers: Subject to compliance with requirements, [**provide products by the following**][**provide products by one of the following**][**available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following**]:

a. [**Carlisle Coatings & Waterproofing Inc**]
b. [**Gaco; Holcim Building Envelope**]
c. [**MAPEI Corporation**]
d. [**Urethane Polymers International, Inc. (UPI)**]
e. <**Insert manufacturer's name**>

2.3 RUBBER WATERPROOFING

A. Single-Component, Rubber Waterproofing: ASTM C836/C836M; solvent based; coal-tar free.

1. Hydrostatic-Head Resistance: **69.3 ft.** minimum; [**ASTM C1306/C1306M**][**ASTM E154/E154M**].

2.4 ACCESSORY WATERPROOFING SYSTEM MATERIALS

A. General: Accessory materials as recommended in writing by waterproofing manufacturer for intended use and compatible with one another and with waterproofing.

B. Primer: Liquid [**waterborne**][**solvent-borne**] primer as recommended in writing for substrate by waterproofing manufacturer.

C. Surface Conditioner: Liquid, waterborne surface conditioner as recommended in writing for substrate by waterproofing manufacturer.

D. Sheet Flashing: Manufacturer's standard flashing sheet.

1. Adhesive: Manufacturer's standard contact adhesive.

E. Metal Termination Bars: Manufacturer's standard, predrilled, stainless steel or aluminum termination bars; approximately **1 by 1/8 inch** thick; with stainless steel anchors.

F. Reinforcing Fabric: Manufacturer's standard fiberglass mesh or spun-bonded polyester fabric.

G. Detailing Seam Tape: Manufacturer's standard detailing tape.

H. Joint Sealant: [**Single-component**][**Multicomponent**] polyurethane sealant, compatible with waterproofing; [**ASTM C920, Type M, Class 25 or greater; Grade NS for sloping and vertical applications and Grade P for deck applications; Use NT exposure**][**as specified in Section 079200 "Joint Sealants"**]<**Insert requirement**>; and as recommended in writing by waterproofing manufacturer for substrate and joint conditions.

I. Backer Rod: Closed-cell polyethylene foam.

2.5 PROTECTION COURSE

A. Protection Course, Asphaltic: ASTM D6506/D6506M; semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners:

1. Thickness: Nominal [**1/8 inch**][**1/4 inch**][**1/8 inch for vertical applications; 1/4 inch elsewhere**].

B. Protection Course, Extruded-Polystyrene Board Insulation, Faced: Fan folded, faced on [**one side**][**or**][**both sides**] with plastic film, nominal thickness **1/4 inch**, with compressive strength of not less than **8 psi** when tested in accordance with ASTM D1621/D1621M, and maximum water absorption by volume of 0.6 percent when tested in accordance with ASTM C272/C272M.

C. Protection Course, Extruded-Polystyrene Board Insulation, Unfaced: ASTM C578, Type X, **1/2 inch** thick.

D. Protection Course, Molded-Polystyrene Board Insulation: ASTM C578, Type I, **0.90 lb/cu. ft.** minimum density, **1-inch** minimum thickness.

2.6 ELECTRONIC LEAK-DETECTION (ELD) MATERIALS

A. Conductive Medium: Electrically conductive material specifically designed to enable ELD testing procedures as approved in writing by waterproofing membrane manufacturer.

1. Conductive medium to be located directly under waterproofing membrane in accordance with ASTM D7877 and ASTM D8231.

B. Moisture-Monitoring System: Permanently embedded, continuously monitored moisture-detection system.

1. Sensors measuring moisture content to be placed within waterproofing system and connected to a monitoring program, with a notification indicating location of breach.

2.7 PLAZA-DECK PAVERS

A. Plaza-Deck Pavers: [**Brick**][**Concrete**][**Asphalt-block**]<**Insert type**> pavers specified in Section 321400 "Unit Paving."

B. Stone Plaza-Deck Pavers: [**Granite**][**Limestone**][**Marble**][**Quartz-based stone**][**Slate**][**Travertine**]<**Insert type**> pavers specified in Section 321400 "Unit Paving."

C. Plaza-Deck Paver Metal Straps: Securement strapping fabricated from stainless steel, a minimum of **3 inches** wide by **0.031 inch** thick with stainless steel anchors.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

1. Verify that concrete has cured and aged for minimum time period as recommended in writing by waterproofing manufacturer.
2. Verify that substrate is visibly dry and within the moisture limits as recommended in writing by waterproofing manufacturer. Test for capillary moisture by plastic sheet method in accordance with ASTM D4263.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean, prepare, and treat substrates in accordance with waterproofing manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.

B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

C. Close off deck drains and other deck penetrations to prevent spillage and migration of waterproofing fluids.

D. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, acid residues, and other penetrating contaminants or film-forming coatings from concrete.

1. Abrasive blast clean concrete surfaces uniformly to expose top surface of fine aggregate in accordance with ASTM D4259 with a self-contained, recirculating, blast-cleaning apparatus. Remove material to provide a sound surface free of laitance, glaze, efflorescence, curing compounds, concrete hardeners, or form-release agents. Remove remaining loose material and clean surfaces in accordance with ASTM D4258.

E. Remove fins, ridges, and other projections, and fill honeycomb, aggregate pockets, holes, and other voids.

F. Coordinate with Owner for impact to air-intake equipment in the vicinity of the Work. Cover or filter air-intake louvers before proceeding with work that could affect indoor air quality or that could activate smoke detectors in the ductwork.

3.3 PREPARATION AT TERMINATIONS, PENETRATIONS, AND CORNERS

A. Prepare surfaces at terminations and penetrations through waterproofing and at expansion joints, drains, sleeves, and corners in accordance with waterproofing manufacturer's written instructions and to recommendations in [**ASTM C898/C898M**][**and**][**ASTM C1471/C1471M**].

3.4 TREATMENT OF JOINTS AND CRACKS

A. Prepare, treat, rout, and fill joints and cracks in substrate in accordance with waterproofing manufacturer's written instructions and recommendations in [**ASTM C898/C898M**][**and**][**ASTM C1471/C1471M**]. Before coating surfaces, remove dust and dirt from joints and cracks in accordance with ASTM D4258.

1. Comply with ASTM C1193 for joint-sealant installation.
2. Apply bond breaker on sealant surface, beneath preparation strip.
3. Prime substrate along each side of joint and apply a single thickness of preparation strip at least **6 inches** wide along each side of joint. Apply waterproofing in two separate applications and embed a joint-reinforcing strip in first preparation coat.

B. Install sheet flashing and bond to deck and wall substrates where required in accordance with waterproofing manufacturer's written instructions.

1. Extend sheet flashings for [**4 inches**]<**Insert dimension**> onto perpendicular surfaces and items penetrating substrate.

3.5 INSTALLATION OF ELECTRONIC LEAK-DETECTION (ELD) MATERIALS

A. Install conductive medium directly under waterproofing membrane in accordance with ASTM D7877 and ASTM D8231.

B. Install sensors, connections, and accessory items required for complete continuously monitored moisture-detection system in accordance with waterproofing manufacturer's written installation instructions.

3.6 INSTALLATION OF COLD FLUID-APPLIED WATERPROOFING

A. General: Apply waterproofing in accordance with manufacturer's written instructions and to recommendations in [**ASTM C898/C898M**][**and**][**ASTM C1471/C1471M**].

B. Start installing waterproofing in presence of manufacturer's technical representative.

C. Apply primer over prepared substrate at manufacturer's recommended rate and allow it to dry.

D. Unreinforced Waterproofing Membrane Applications: Mix materials and apply waterproofing by spray, roller, notched squeegee, trowel, or other application method suitable to slope of substrate.

1. Apply one or more coats of waterproofing to obtain a seamless membrane free of entrapped gases and pinholes, with a minimum dry film thickness of [**60 mils**][**90 mils**][**120 mils**]<**Insert dimension**>.
2. Apply waterproofing to prepared wall terminations and vertical surfaces.
3. Verify manufacturer's recommended wet film thickness of waterproofing every **100 sq. ft.**.

E. Reinforced Waterproofing Membrane Applications: Mix materials and apply waterproofing by roller, notched squeegee, trowel, or other suitable application method.

1. Apply first coat of waterproofing, embed membrane-reinforcing fabric, and apply second coat of waterproofing to completely saturate reinforcing fabric and to obtain a seamless reinforced membrane free of entrapped gases and pinholes, with an average dry film total thickness of [**70 mils**][**80 mils**][**90 mils**][**120 mils**]<**Insert dimension**>.
2. Apply reinforced waterproofing to prepared wall terminations and vertical surfaces.
3. Verify manufacturer's recommended wet film thickness of waterproofing every **100 sq. ft.**.

F. Cure waterproofing, taking care to prevent contamination and damage to membrane.

3.7 INSTALLATION OF PROTECTION COURSE

A. Cover waterproofing with protection course with butted joints before membrane is subject to [**backfilling**][**construction or vehicular traffic**].

1. For horizontal applications, install protection course loose laid over fully cured membrane.
2. For vertical applications, set protection course in nominally cured membrane, which will act as an adhesive. If membrane cures before application of protection course, use adhesive.

3.8 FIELD QUALITY CONTROL

A. Testing Agency: [**Owner will engage**][**Engage**] a qualified testing agency to perform tests and inspections:

1. Testing agency to verify thickness of waterproofing during application for each [**600 sq. ft.**]<**Insert dimension**> of installed waterproofing or part thereof.

B. Perform the following tests before overlying construction is placed:

1. ELD Testing: Testing agency surveys entire horizontal waterproofed area and flashings to locate discontinuities in the system assembly using ELD in accordance with ASTM D7877 and ASTM D8231.

    a. After testing, repair areas of discontinuities, repeat tests, and make further repairs until waterproofing and flashing installations are contiguous.

        1) Cost of retesting is Contractor's responsibility.

    b. Testing agency to prepare survey report indicating locations of initial discontinuities, if any.

2. Flood Testing: Flood test each completed horizontal waterproofed area for leaks, in accordance with recommendations in ASTM D5957. Install temporary containment assemblies, plug, or dam drains, and flood with potable water.

    a. Flood to an average depth of [**2-1/2 inches**]<**Insert depth**> with a minimum depth of [**1 inch**]<**Insert depth**> and not exceeding a depth of [**4 inches**]<**Insert depth**>. Maintain **2 inches** of clearance from top of base flashing.
    b. Flood each area for [**24**][**48**][**72**] hours.
    c. After flood testing, repair leaks, repeat flood tests, and make further repairs until waterproofing and flashing installations are watertight.

        1) Cost of retesting is the responsibility of Contractor.

    d. Testing agency to prepare survey report indicating locations of initial leaks, if any, and final survey report.

C. Manufacturer's Field Service: Engage a [**full-time**]site representative qualified by waterproofing system manufacturer to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components and to furnish daily reports to Architect.

1. Final Inspection: Arrange for waterproofing system manufacturer's technical personnel to inspect system installation on completion, in presence of Architect, and to prepare inspection report.
2. Notify Architect[**and Owner**] 48 hours in advance of date and time of inspection.
3. Repair or remove and replace components of waterproofing system where inspections indicate that they do not comply with specified requirements.

D. Additional Tests and Inspections:

1. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.
2. Waterproofing system will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.9 PROTECTION, REPAIR, AND CLEANING

A. Protect waterproofing system from damage and wear during remainder of construction period.

B. Protect installed [**protection course**][**drainage panels**] from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where material is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

C. Correct deficiencies in or remove waterproofing system that does not comply with requirements, repair substrates, and repair or reinstall waterproofing system to a condition free of damage and deterioration at time of Substantial Completion and in accordance with warranty requirements.

D. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 071416

SECTION 072119 **- FOAMED-IN-PLACE INSULATION**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Closed-cell spray polyurethane foam insulation.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

PART 2 - PRODUCTS

2.1 CLOSED-CELL SPRAY POLYURETHANE FOAM INSULATION

A. Closed-Cell Spray Polyurethane Foam: ASTM C1029.

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

a. [**AMBIT Polyurethane**]
b. [**Carlisle Spray Foam Insulation**]
c. [**ENVERGE**]
d. [**Gaco; Holcim Building Envelope**]
e. [**Henry, a Carlisle Company (formerly Henry Company and Carlisle Coatings & Waterproofing Inc. brands)**]
f. [**Huntsman Building Solutions**]
g. [**Johns Manville; a Berkshire Hathaway company**]
h. [**NCFI Polyurethanes; a division of Barnhardt Manufacturing Company**]
i. [**Quadrant Performance Materials**]
j. [**SWD Urethane Company**]
k. [**Thermoseal USA**]
l. [**Volatile Free, Inc.**]
m. <**Insert manufacturer's name**>

2. Type and Minimum Compressive Strength:

a. Type II, minimum density of 1.5 lb/cu. ft. and minimum aged R-value at **1-inch** thickness of **6.2 deg F x h x sq. ft./Btu at 75 deg F**.

3. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

    a. Flame-Spread Index: 25 or less.
    b. Smoke-Developed Index: 450 or less.
    c. Fire-Propagation Characteristics: Passes [**NFPA 285**][**and**][**NFPA 276**] testing as part of an approved assembly.

4. Fire-Safety Barriers: Approved assembly as [**thermal barrier**][**and**][**ignition barrier**] with accessory components.

2.2 ACCESSORIES

A. Prescriptive Thermal Barriers: Building-code-approved materials.

1. Gypsum Board: **1/2-inch** minimum thickness.
2. Wood Structural Panels: **23/32-inch** thickness.
3. Plywood: Nominal **1/2-inch** minimum thickness.

B. Prescriptive Ignition Barriers: Building-code-approved materials.

1. Mineral-Fiber Insulation: **1-1/2-inch** minimum thickness.
2. Wood Structural Panel or Hardboard: **1/4-inch** minimum thickness.
3. Gypsum Wallboard: **0.325-inch** minimum thickness.
4. Corrosion-Resistant Steel: **0.016-inch** base metal thickness.

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify that substrates are clean, dry, and free of substances that are harmful to insulation.

B. Priming: Prime substrates where recommended by insulation manufacturer. Apply primer to comply with insulation manufacturer's written instructions. Confine primers to areas to be insulated; do not allow spillage or migration onto adjoining surfaces.

3.2 INSTALLATION OF FOAMED-IN-PLACE INSULATION

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Spray insulation to envelop entire area to be insulated and fill voids.

C. Apply in multiple passes to not exceed maximum thicknesses recommended by manufacturer. Do not spray into rising foam.

D. Framed Construction: Install into cavities formed by framing members to achieve thickness indicated on Drawings.

E. Miscellaneous Voids: Apply according to manufacturer's written instructions.

F. Install [**thermal**][**ignition**] barrier material.

1. Do not cover insulation prior to any required spray foam insulation inspections.

G. Apply barrier coatings in accordance with manufacturer's written instructions and to comply with requirements for listing and labeling for fire-propagation characteristics and surface-burning characteristics specified.

1. Use equipment and techniques best suited for substrate and type of material applied as recommended by coating manufacturer.
2. Apply coatings to prepared surfaces as soon as practical after preparation and before subsequent surface soiling or deterioration.
3. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Produce sharp lines and color breaks.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect spray foam insulation installation, including accessories. Report results in writing.

3.4 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.

END OF SECTION 072119

SECTION 072500 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Building wrap.

1.2 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.

B. Product Data Submittals: For [**building wrap**][**drainage wrap**], include data on air and water-vapor permeance based on testing in accordance with referenced standards.

C. Shop Drawings: Show details of [**building paper**][**building wrap**][**drainage wrap**] at terminations, openings, and penetrations. Show details of flexible flashing applications.

D. Sustainable Design Submittals:

1. Third-Party Certifications: For each product.
2. Third-Party Certified Life Cycle Assessment: For each product.

1.3 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For [**water-resistive barrier**][**and**][**flexible flashing**], from ICC-ES.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, certified, or licensed by the weather barrier system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

1.6 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed in accordance with manufacturer's written installation instructions and warranty requirements.

1.7 WARRANTY

A. Warranty Period: [**10**][**15**][**20**]<**Insert number**> years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 WEATHER BARRIERS

A. Building Wrap: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested in accordance with ASTM E84; UV stabilized; and acceptable to authorities having jurisdiction.

1. Manufacturers: Subject to compliance with requirements, [**provide products by the following**][**provide products by one of the following**][**available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following**]:

a. [**Alpha ProTech**]
b. [**Barricade Building Products**]
c. [**Benjamin Obdyke Incorporated**]
d. [**Dorken Systems Inc.**]
e. [**DuPont de Nemours, Inc.**]
f. [**Kingspan Insulation LLC**]
g. [**PrimeSource Building Products, Inc.**]
h. [**Typar Geosynthetics; a PGI brand**]
i. <**Insert manufacturer's name**>

2. Building Wrap Type: [**Type I, ASTM E2556/E2556M**][**Type I, ASTM E1677**][**Type II, ASTM E2556/E2556M**][**ICC-ES AC38**].
3. Composition Type: [**Perforated woven polyolefin**][**Polypropylene woven fabric with coating**][**Nonperforated, nonwoven polyolefin**].
4. Water-Vapor Permeance: Minimum [**75 perms**][**20 perms**][**11 perms**][**8 perms**]<**Insert value**> in accordance with ASTM E96/E96M, Desiccant Method (Procedure A).
5. Air Permeance: Not more than [**0.001 cfm/sq. ft. at 1.57 lbf/sq. ft.**][**0.004 cfm/sq. ft. at 1.57 lbf/sq. ft.**] when tested in accordance with ASTM E2178.
6. Allowable UV Exposure Time: Not more than [**120**][**180**][**270**]<**Insert number**> days.
7. Flame Propagation Test: Materials and construction to be as tested in accordance with NFPA 285.

2.2 ACCESSORY MATERIALS

A. Requirement: Provide primers, fasteners, seam tapes, flashing, transition strips, termination strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by weather barrier manufacturer to produce a complete weather barrier assembly and that are compatible with primary weather barrier material and adjacent construction to which they may seal.

B. Drainage Accessories: [**Furring strips**]<**Insert component**> installed between water-resistive barrier and exterior cladding to create a continuous open space behind exterior cladding.

PART 3 - EXECUTION

3.1 INSTALLATION OF WEATHER BARRIERS

A. Weather Barriers:

1. Building Paper: Comply with manufacturer's written instructions and warranty requirements.
2. Building Wrap or Drainage Wrap: Comply with manufacturer's written instructions and warranty requirements.
3. Drainage Material: Comply with manufacturer's written instructions.

B. Install weather barrier accessories for a complete installation with weather barriers in accordance with manufacturers written instructions.

END OF SECTION 072500

SECTION 077200 **- ROOF ACCESSORIES**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Manufactured units for the following applications:

1. Roof curbs.
2. Equipment supports.
3. Roof hatches.
4. Heat and smoke vents.
5. Gravity ventilators.
6. Pipe and duct supports.
7. Pipe portals.
8. Preformed flashing sleeves.
9. Roof walkways.
10. Underlayment.
11. Miscellaneous materials.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for metal vertical ladders, ships' ladders, and stairs for access to roof hatches.
2. Section 061000 "Rough Carpentry" for roof cants, nailers, blocking, and other pressure-preservative-treated wood.
3. Section 077100 "Roof Specialties" for manufactured copings, roof-edge specialties, roof-edge drainage systems, reglets, and counterflashing.
4. Section 077253 "Snow Guards" for prefabricated devices designed to hold snow on the roof surface, allowing it to melt and drain off slowly.
5. Section 079200 "Joint Sealants" for field-applied sealants between roof accessories and adjacent materials.
6. Section 099113 "Exterior Painting" for field painting of roof accessories.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of roof accessory.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For roof accessories.

1. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.

C. Delegated Design Submittals: For [**roof curbs**][**equipment supports**][**and**][**walkways**] indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Detail mounting, securing, and flashing of roof-mounted items to roof structure. Indicate coordinating requirements with roof membrane system.
2. Wind-Restraint Details: Detail fabrication and attachment of wind restraints. Show anchorage details and indicate quantity, diameter, and depth of penetration of anchors.

D. Samples: For each type of roof accessory and for each color and texture specified.

E. Samples for Initial Selection: For each type of roof accessory indicated with factory-applied color finishes.

F. Samples for Verification: Include Samples of each type of roof accessory to verify finish and color selection, in manufacturer's standard sizes.

G. Sustainable Design Submittals:

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:

1. Size and location of roof accessories specified in this Section.
2. Method of attaching roof accessories to roof or building structure.
3. Other roof-mounted items, including mechanical and electrical equipment, ductwork, piping, and conduit.
4. Required clearances.

B. Qualification Statements: For [**manufacturer**][**fabricator**][**Installer**][**specialist**][**testing agency**][**manufacturer's technical representative**][**factory-authorized service representative**]<**Insert entity or specialist**>.

C. Delegated Design Engineer Qualifications: For [**Insert product**].

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For roof accessories.

1.5 QUALITY ASSURANCE

A. Delegated Design Engineer Qualifications: A professional engineer who is legally qualified to practice in [**state**]<**Insert jurisdiction**> where Project is located and who is experienced in providing engineering services of the type indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not store roof accessories in contact with other materials that might cause staining, denting, or other surface damage. Store roof accessories in accordance with manufacturer's instructions.

B. Store materials off ground in dry location and in accordance with manufacturer's instructions in well-ventilated area.

C. Store and protect roof accessories from nicks, scratches, and blemishes.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify profiles and tolerances of roof-accessory substrates by field measurements before fabrication, and indicate measurements on Shop Drawings.

1.8 COORDINATION

A. Coordinate layout and installation of roof accessories with [**roofing membrane and base flashing and**]interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Roof accessories to withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

B. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design [**roof curbs**][**and**][**equipment supports**] to comply with wind performance requirements, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

C. Wind-Restraint Performance: [**As indicated on Drawings**]<**Insert requirements**>.

2.2 PIPE AND DUCT SUPPORTS

A. Fixed-Height Cradle-Type Pipe Supports: Polycarbonate pipe stand accommodating up to [**1-1/2-inch-**]<**Insert dimension**> diameter pipe or conduit; with provision for pipe retainer and with manufacturer's support pad or deck plate as recommended for penetration-free installation over roof membrane type; as required for quantity of pipe runs and sizes.

B. Fixed-Height Roller-Bearing Pipe Supports: Polycarbonate pipe stand with [**polycarbonate**][**stainless steel**] roller carrying assembly accommodating up to [**7-inch-**]<**Insert dimension**> diameter pipe or conduit; with provision for pipe retainer and with manufacturer's support pad or deck plate as recommended for penetration-free installation over roof membrane type; as required for quantity of pipe runs and sizes.

C. Adjustable-Height Roller-Bearing Pipe Supports: Polycarbonate pipe stand base, pipe support, and roller housing, with stainless steel threaded rod designed for adjusting support height, accommodating up to [**18-inch**]<**Insert dimension**> diameter pipe or conduit; with provision for pipe retainer and with manufacturer's support pad or deck plate as recommended for penetration-free installation over roof membrane type; as required for quantity of pipe runs and sizes.

D. Adjustable-Height Structure-Mounted Pipe Supports: Extruded-aluminum tube, filled with urethane insulation; [**2 inches**]<**Insert dimension**> in diameter; accommodating up to [**7-inch-**]<**Insert dimension**> diameter pipe or conduit, with provision for pipe retainer; with aluminum baseplate, EPDM base seal, manufacturer's recommended hardware for mounting to structure

or structural roof deck as indicated, stainless steel roller and retainer, and extruded-aluminum carrier assemblies; as required for quantity of pipe runs and sizes.

2.3 PIPE PORTALS

A. Flashing Pipe Portal: Formed aluminum membrane-mounting flashing flange and sleeve with collared opening and pressure-sealed conically shaped EPDM protective rubber cap sized for piping indicated, with stainless steel snaplock swivel clamps.

1. Manufacturers: Subject to compliance with requirements, [**provide products by the following**][**provide products by one of the following**][**available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following**]:

a. [**Portals Plus; Duravent Group**]
b. <**Insert manufacturer's name**>

2.4 METAL MATERIALS

A. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheer complying with minimum ASTM A653/A653M, **G90** coating designation or aluminum-zinc alloy-coated steel sheet complying with minimum ASTM A792/A792M, **Class AZ50** coating designation; structural quality.

1. Mill-Phosphatized Finish: Manufacturer's standard for field painting.
2. Factory Prime Coating: Where field painting is indicated, apply pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat, with a minimum dry film thickness of **0.2 mil**.
3. Powder Coat Finish: After cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat to a minimum dry film thickness of **2 mils**.
4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of **0.5 mil**.

B. Aluminum Sheet: ASTM B209/B209M, manufacturer's standard alloy for finish required, with temper to suit forming operations and performance required.

1. Mill Finish: As manufactured.
2. Factory Prime Coating: Where field painting is indicated, apply pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat, with a minimum dry film thickness of **0.2 mil**.
3. Clear Anodic Finish: AAMA 611, [**AA-M12C22A41, Class I, 0.018 mm**][**AA-M12C22A31, Class II, 0.010 mm**] or thicker.
4. Color Anodic Finish: AAMA 611, [**AA-M12C22A42/A44, Class I, 0.018 mm**][**AA-M12C22A32/A34, Class II, 0.010 mm**] or thicker.
5. Powder Coat Finish: AAMA 2603. After cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat to a minimum dry film thickness of **2 mils**.
6. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of **0.5 mil**.

C. Aluminum Extrusions and Tubes: **ASTM B221**, manufacturer's standard alloy and temper for type of use, finished to match assembly where used; otherwise mill finished.

D. Stainless Steel Sheet and Shapes: ASTM A240/A240M or ASTM A666, Type 304.

E. Steel Shapes: ASTM A36/A36M, hot-dip galvanized in accordance with ASTM A123/A123M unless otherwise indicated.

F. Steel Tube: ASTM A500/A500M, round tube.

G. Galvanized-Steel Tube: ASTM A500/A500M, round tube, hot-dip galvanized in accordance with ASTM A123/A123M.

H. Steel Pipe: ASTM A53/A53M, galvanized.

2.5 UNDERLAYMENT

A. Felt: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felt, nonperforated.

B. Slip Sheet: Rosin-sized building paper, **3 lb/100 sq. ft.** minimum.

2.6 MISCELLANEOUS MATERIALS

A. Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B. Acrylic Glazing: ASTM D4802, thermoformable, monolithic sheet, manufacturer's standard, Type UVA (formulated with UV absorber), Finish 1 (smooth or polished).

C. Polycarbonate Glazing: Thermoformable, monolithic polycarbonate sheets manufactured by extrusion process, burglar-resistance rated in accordance with UL 972 with an average impact strength of [**12 to 16 ft. lbf/in.**]<**Insert value**> of width when tested in accordance with ASTM D256, Method A (Izod).

D. Cellulosic-Fiber Board Insulation: ASTM C208, Type II, Grade 1, thickness as indicated.

E. Glass-Fiber Board Insulation: ASTM C726, nominal density of **3 lb/cu. ft.**, thermal resistivity of **4.3 deg F x h x sq. ft./Btu x in. at 75 deg F**, thickness as indicated.

F. Polyisocyanurate Board Insulation: ASTM C1289, thickness and thermal resistivity as indicated.

G. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, acceptable to authorities having jurisdiction,[**containing no arsenic or chromium,**] and complying with AWPA C2; not less than **1-1/2 inches** thick.

H. Security Grilles: [**3/4-inch**]<**Insert dimension**> diameter, ASTM A1011/A1011M steel bars spaced [**6 inches**]<**Insert dimension**> o.c. in one direction and [**12 inches**]<**Insert dimension**> o.c. in the other; factory finished as follows:

1. Surface Preparation: Remove mill scale and rust, if any, from uncoated steel, complying with SSPC-SP 5/NACE No. 1 or SSPC-SP 8.
2. Factory Priming for Field-Painted Finish: Apply shop primer specified below immediately after surface preparation and pretreatment.

3. Shop Primer: Manufacturer's or fabricator's standard, fast-curing, lead- and chromate-free, universal primer; selected for resistance to normal atmospheric corrosion, for compatibility with substrate and field-applied finish paint system indicated, and for capability to provide a sound foundation for field-applied topcoats under prolonged exposure.

I. Fasteners: Roof accessory manufacturer's recommended fasteners, designed to comply with performance requirements, suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:

1. Fasteners for Metallic-Coated Steel Sheet: Series 300 stainless steel or hot-dip zinc-coated steel in accordance with ASTM A153/A153M or ASTM F2329/F2329M.
2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
3. Fasteners for Stainless Steel Sheet: Series 300 stainless steel.

J. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.

K. Elastomeric Sealant: ASTM C920, elastomeric [**polyurethane**][**silicone**] polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.

L. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.

M. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

N. Asphalt Roofing Cement: ASTM D4586/D4586M, asbestos free, of consistency required for application.

2.7 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA AMP 500, "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.

B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

C. Verify dimensions of roof openings for roof accessories.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Install roof accessories in accordance with manufacturer's written instructions.

1. Install roof accessories level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.
2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.

B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended in writing by manufacturer's written installation instructions.

1. Coat concealed side of [**uncoated aluminum**][**and**][**stainless steel**] roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
2. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof accessories for waterproof performance.

3.3 INSTALLATION OF ROOF ACCESSORIES

A. Roof Curb: Install each roof curb so top surface is level.

B. Equipment Support: Install equipment supports so top surfaces are level with each other.

C. Roof-Hatch:

1. Verify that roof hatch operates properly. Clean, lubricate, and adjust operating mechanism and hardware.
2. Attach safety railing system to roof-hatch curb.
3. Attach ladder-assist post in accordance with manufacturer's written instructions.

D. Heat and Smoke Vent:

1. Install heat and smoke vent so top perimeter surfaces are level.
2. Install and test heat and smoke vents and their components for proper operation in accordance with NFPA 204.

E. Gravity Ventilator: Verify that gravity ventilators operate properly and have unrestricted airflow. Clean, lubricate, and adjust operating mechanisms.

F. Pipe and Duct Support: Comply with MSS SP-58. Install supports and attachments as required to properly support piping. Arrange for grouping of parallel runs of horizontal piping, and support together.

1. Pipes of Various Sizes: Space supports for smallest pipe size or install intermediate supports for smaller-diameter pipes as specified for individual pipe hangers.

G. Preformed Flashing-Sleeve and Flashing-Pipe Portal: Secure flashing sleeve to roof membrane in accordance with flashing-sleeve manufacturer's written instructions; flash sleeve flange to surrounding roof membrane in accordance with roof membrane manufacturer's instructions.

H. Security Grilles: Weld bar intersections and[**, using tamper-resistant bolts, attach the**] ends of bars to structural frame or primary curb walls.

I. Roof Walkway:

1. Verify that locations of access and servicing points for roof-mounted equipment are served by locations of roof walkways.
2. Remove ballast from top surface of low-slope roofing at locations of contact with roof-walkway supports.
3. Install roof-walkway support pads prior to placement of roof-walkway support stands onto low-slope roofing.
4. Redistribute removed ballast after installation of support pads.

J. Seal joints with [**elastomeric**][**or**][**butyl**] sealant as required by roof accessory manufacturer.

3.4 CLEANING AND PROTECTION

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing in accordance with ASTM A780/A780M.

B. Touch up factory-primed surfaces with compatible primer ready for field painting in accordance with Section 099113 "Exterior Painting."

C. On completion of installation, clean exposed surfaces in according with manufacturer's written instructions. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as roof accessories are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof accessories in a clean condition during construction.

E. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures, as determined by Architect.

END OF SECTION 077200

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Penetration firestopping systems.

1. Penetration firestopping systems in fire-resistance-rated walls.
2. Penetration firestopping systems in horizontal assemblies.
3. Penetration firestopping systems in smoke barriers.
4. Exposed penetration firestopping systems.

B. Related Requirements:

1. Section 079200 "Joint Sealants" for non-fire-resistance-rated joint sealants.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.

C. Unlisted Firestopping Systems: Obtain an Engineering Judgment (EJ) from firestopping manufacturer where no UL, FM Approvals, or other listed assembly is available for particular firestop configuration. Follow International Firestop Council (IFC) recommended guidelines for evaluating firestopping systems in EJs.

1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly developed in accordance with current International Firestop Council (IFC) recommended guidelines. Obtain approval of authorities having jurisdiction prior to submittal.

D. Sustainable Design Submittals:

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Listed System Designs: For each penetration firestopping system, for tests performed by a qualified testing agency.

1.4 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Entity that has been approved by FM Approvals in accordance with FM Approvals 4991 or been evaluated by UL Solutions and found to comply with "UL Solutions Qualified Firestop Contractor Program."

B. Manufacturer Qualifications: Entity that has received UL Solutions' "Firestop Movement Certification," which demonstrates that manufacturer's firestopping products designated with M-Ratings are based on exposure to cyclic movement and UL 1479 fire test evaluation when tested in accordance with ASTM E3037.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping systems when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping system materials in accordance with manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be accessed and installed in accordance with specified firestopping system design.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain penetration firestopping systems for each type of opening indicated from single manufacturer.

2.2 PENETRATION FIRESTOPPING SYSTEMS

A. Manufacturers: Subject to compliance with requirements, [**provide products by the following**][**provide products by one of the following**][**available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following**]:

1. [**3M Building and Construction**]
2. [**Balco; a CSW Industrials Company**]
3. [**Everkem Diversified Products, Inc.**]
4. [**FireShield; Fire Rated Solutions LLC**]
5. [**Grabber Construction Products, Inc.**]

6. [**Hilti, Inc.**]
7. [**Holdrite; a division of Reliance Worldwide Corporation**]
8. [**International Fireproof Technology Inc**]
9. [**NUCO Inc**]
10. [**Passive Fire Protection Partners**]
11. [**Roxtec Inc.**]
12. [**Specified Technologies Inc.**]
13. [**STC Sound Control**]
14. [**Tremco Incorporated**]
15. [**Unique Fire Stop Products**]
16. <**Insert manufacturer's name**>

B. Penetration firestopping systems must be compatible with one another, with the substrates forming openings, and with penetrating items if any.

1. Penetration firestopping systems must be installed with products bearing the classification marking of a qualified testing agency.

    a. UL Solutions in its online directory "Product iQ."
    b. Intertek Group in its "Directory of Building Products."
    c. FM Approvals in its "Approval Guide."
    d. <**Insert name of qualified testing and inspecting agency**>.

2. Provide components for each penetration firestopping system that, upon curing, do not re-emulsify, dissolve, leach, break down, or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water, or other forms of moisture characteristic during and after construction.
3. Provide components for each penetration firestopping system that do not contain ethylene glycol.
4. Provide components for each penetration firestopping system that are sufficiently flexible to accommodate movement, such as pipe vibration, water hammer, thermal expansion, and other normal building movement without damage.
5. Provide components for each penetration firestopping system that are appropriately tested for the thickness and type of insulation utilized.

C. Provide penetration firestopping systems that resist spread of fire, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.

D. Penetration Firestopping Systems in Fire-Resistance-Rated Walls: Systems with ratings determined in accordance with ASTM E814 or UL 1479.

1. F-Rating: Not less than the fire-resistance rating of the wall assembly penetrated.
2. Membrane Penetrations: Install recessed fixtures such that the required fire resistance will not be reduced.
3. M-Rating: Provide penetration firestopping systems meeting specified F-Rating after being tested in accordance with ASTM E3037.

E. Penetration Firestopping Systems in Horizontal Assemblies: Systems with ratings determined in accordance with ASTM E814 or UL 1479.

1. F-Rating: At least one hour, but not less than the fire-resistance rating of the floor/ceiling assembly penetrated.
2. T-Rating: At least one hour, but not less than the fire-resistance rating of the floor/ceiling assembly. The following horizontal penetrations do not require a T-rating:

a. Those within the cavity of a wall.
b. Floor, tub, or shower drains within a concealed space.
c. **4-inch** or smaller metal conduit penetrating directly into metal-enclosed electrical switchgear.

3. W-Rating: Provide penetration firestopping systems with a Class 1 W-rating in accordance with UL 1479.
4. M-Rating: Provide penetration firestopping systems meeting specified [**F-Rating,**][**T-Rating,**][**and**][**W-Rating**] after being tested in accordance with ASTM E3037.

F. Penetration Firestopping Systems in Smoke Barriers: Systems with ratings determined in accordance with UL 1479.

1. L-Rating: Not exceeding **5.0 cfm/sq. ft.** of penetration opening and no more than **50-cfm** cumulative total for any **100 sq. ft.** at both ambient and elevated temperatures.
2. M-Rating: Provide penetration firestopping systems meeting specified L-Rating after being tested in accordance with ASTM E3037.

G. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested in accordance with ASTM E84 or UL 723.

1. Product Data: Verify architectural sealant has a VOC content of 250 g/L or less.
2. Verify sealant complies with testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
3. Verify sealant complies with testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Verify formaldehyde emissions do not exceed 9 mcg/cu. m or 7 ppb, whichever is less.
4. Verify sealant complies with testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Verify the building concentration of formaldehyde does not exceed half of the indoor recommended exposure limit, or 33 mcg/cu. m, and that of acetaldehyde does not exceed 9 mcg/cu. m.

2.3 ACCESSORIES

A. Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated, including but not limited to:

1. Permanent forming/damming/backing materials.
2. Substrate primers.
3. Collars.
4. Steel sleeves.

2.4 FILL MATERIALS

A. Cast-in-Place Firestopping Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

C. Firestopping Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.

E. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.

F. Intumescent Wrap Strips: Single-component intumescent elastomeric strips for use around combustible penetrants.

G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.

H. Pillows/Bags: Compressible, removable, and reusable intumescent pillows encased in fire-retardant polyester or glass-fiber cloth. Where exposed, and when required by a listed system, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed or dislodged.

I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

K. Thermal and Endothermic Wraps: Flexible, insulating, and fire-resistant protective wraps tested and listed for up to 2-hour fire ratings in accordance with ASTM E814 or UL 1479; for protecting membrane penetrations of utility boxes, critical electrical circuits, communications lines, and fuel lines, and for thermal barrier and circuit integrity protection in accordance with ASTM E1725 or UL 1724.

L. Fire-Rated Cable Sleeve Kits: Complete kits designed for new or existing cable penetrations through walls which accept standard accessories.

M. Fire-Rated Cable Pathways: Single or gangable device modules composed of a steel raceway with integral intumescent material and requiring no additional action in the form of plugs, twisting closure, putty, pillows, sealant, or otherwise to achieve fire and air-leakage ratings.

1. Fire-rated cable pathway devices are the preferred product for data, video, and communications cable penetrations. Install these devices in locations where frequent cable moves, add-ons, and changes will occur. Such devices must be:

a. Capable of retrofit around existing cables.
b. Designed so that two or more devices can be ganged together.

c. Maintenance-free so no action is required to activate the smoke- and fire-sealing mechanism.

2. Where fire-rated cable pathway devices are not practical, openings within walls and floors designed to accommodate data, video, and communications cabling must be provided with re-enterable products specifically designed for retrofit, such as retrofit devices for cable bundles, firestopping putty, plugs, or pillows.

N. Retrofit Device for Cable Bundles: Factory-made, intumescent, collar-like device for firestopping existing over-filled cable sleeves and capable of being installed around projecting sleeves and cable bundles.

O. Wall-Opening Protective Materials: Intumescent, non-curing putty pads or self-adhesive inserts for protection of electrical switch and receptacle boxes.

P. Fire-Rated HVAC Retaining Angles: Steel angle system with integral intumescent firestopping gasket for use around rectangular steel HVAC ducts without fire dampers.

Q. Firestopping Plugs: Flexible, re-enterable, intumescent, foam-rubber plug for use in blank round openings and cable sleeves.

R. Fire-Rated Cable Grommet: Molded two-piece grommet made of plenum-grade polymer and foam inner core for sealing small cable penetrations in gypsum walls up to **1/2 inch** in diameter.

S. Closet Flange Gasket: Molded, single-component, flexible, intumescent gasket for use beneath a water closet (toilet) flange in floor applications.

2.5 MIXING

A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings in accordance with manufacturer's written instructions and with the following requirements:

1. Remove foreign materials from substrate surfaces that could interfere with adhesion of penetration firestopping materials.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Prime substrates in accordance with penetration firestopping system manufacturer's written installation instructions, using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION OF PENETRATION FIRESTOPPING SYSTEMS

A. General: Install penetration firestopping systems in accordance with manufacturer's written installation instructions and published drawings for products and applications.

B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.

C. Install fill materials by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items to achieve required fire-resistance ratings.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than **3 inches** high and with minimum **0.375-inch** strokes.

1. Locate in accessible concealed floor, floor-ceiling, or attic space at **15 ft.** from end of wall and at intervals not exceeding **30 ft.**.

B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within **6 inches** of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing and inspecting agency.
4. Date of installation.

5. Manufacturer's name.
6. Installer's name.

3.5 FIELD QUALITY CONTROL

A. Owner will engage a qualified inspection agency to conduct and report on inspections in accordance with ASTM E2174.

B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.

C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

END OF SECTION 078413

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Butyl joint sealants.

B. Related Requirements:

1. Section 079100 "Preformed Joint Seals" for preformed compressible foam and precured joint seals.
2. Section 079219 "Acoustical Joint Sealants" for sealing joints in sound-rated construction.
3. Section 321373 "Concrete Paving Joint Sealants" for sealing joints in paved roads, parking lots, walkways, and curbing.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Silicone joint sealants.
2. Nonstaining silicone joint sealants.
3. Urethane joint sealants.
4. Immersible joint sealants.
5. Silane-modified polymer joint sealants.
6. Mildew-resistant joint sealants.
7. Polysulfide joint sealants.
8. Butyl joint sealants.
9. Latex joint sealants.

B. Samples for Initial Selection: Manufacturer's standard color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in **1/2-inch-** wide joints formed between two **6-inch-** long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.3 INFORMATIONAL SUBMITTALS

A. Preconstruction Laboratory Test Schedule: Include the following information for each joint sealant and substrate material to be tested:

1. Joint-sealant location and designation.
2. Manufacturer and product name.
3. Type of substrate material.
4. Proposed test.
5. Number of samples required.

B. Preconstruction Laboratory Test Reports: For each joint sealant and substrate material to be tested from sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.

C. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

D. Field Quality-Control Reports: For field-adhesion-test reports, for each sealant application tested.

E. Sample warranties.

1.4 CLOSEOUT SUBMITTALS

A. Manufacturers' special warranties.

B. Installer's special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Authorized representative who is trained and approved by manufacturer.

B. Testing Agency Qualifications: Qualified in accordance with ASTM C1021 to conduct the testing indicated.

1.6 MOCKUPS

A. Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Adhesion Testing: Use ASTM C794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.

2. Compatibility Testing: Use ASTM C1087 to determine sealant compatibility when in contact with glazing and gasket materials.
3. Stain Testing: Use ASTM C1248 to determine stain potential of sealant when in contact with [**stone**][**masonry**]<**Insert substrate**> substrates.
4. Submit manufacturer's recommended number of pieces of each type of material, including joint substrates, joint-sealant backings, and miscellaneous materials.
5. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
6. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
7. Testing will not be required if joint-sealant manufacturers submit data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.

B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:

1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
2. Conduct field tests for each kind of sealant and joint substrate.
3. Notify Architect seven days in advance of dates and times when test joints will be erected.
4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
5. Test Method: Test joint sealants in accordance with Method A, Tail Procedure, in ASTM C1521.

    a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

6. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
7. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.8 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer[**or are below 40 deg F**].
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.9 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: [**Two**]<**Insert number**> years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: [**Five**]<**Insert number**> years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain joint sealants from single manufacturer[**for each sealant type**].

2.2 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: [**As indicated by manufacturer's designations**][**Match Architect's samples**][**As selected by Architect from manufacturer's full range**].

C. Product Data: Verify architectural sealant has a VOC content of 250 g/L or less.

2.3 SILICONE JOINT SEALANTS

A. Silicone, S, NS, 100/50, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Use NT.

1. Manufacturers: Subject to compliance with requirements, [**provide products by the following**][**provide products by one of the following**][**available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following**]:

a. [**Adfast**]
b. [**GE Construction Sealants; Momentive Performance Materials Inc.**]
c. [**Sika Corporation - Building Components**]
d. <**Insert manufacturer's name**>

2. Basis-of-Design Product: Subject to compliance with requirements, provide <**Insert manufacturer's name; product name or designation**> or comparable product by one of the following:

a. [**Adfast**]
b. [**GE Construction Sealants; Momentive Performance Materials Inc.**]
c. [**Sika Corporation - Building Components**]
d. <**Insert manufacturer's name**>

2.4 NONSTAINING SILICONE JOINT SEALANTS

A. Nonstaining Joint Sealants: No staining of substrates when tested in accordance with ASTM C1248.

2.5 IMMERSIBLE JOINT SEALANTS

A. Immersible Joint Sealants: Suitable for immersion in liquids; ASTM C1247, [**Class 1**][**Class 2**]; tested in deionized water unless otherwise indicated.

2.6 MILDEW-RESISTANT JOINT SEALANTS

A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

2.7 BUTYL JOINT SEALANTS

A. Butyl-Rubber-Based Joint Sealants: ASTM C1311.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Sure-Seal Lap Sealant or comparable product by one of the following:

a. [**Bostik; Arkema**]
b. [**Everkem Diversified Products, Inc.**]
c. [**GSSI Sealants**]
d. [**Pecora Corporation**]
e. [**Sika Corporation - Building Components**]
f. <**Insert manufacturer's name**>

2.8 JOINT-SEALANT BACKING

A. Cylindrical Sealant Backings: ASTM C1330, [**Type C (closed-cell material with a surface skin)**][**Type O (open-cell material)**][**Type B (bicellular material with a surface skin)**][**or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated**], and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.9 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.
    b. Masonry.
    c. Unglazed surfaces of ceramic tile.
    d. Exterior insulation and finish systems.
    e. <**Insert other porous joint substrate**>.

3. Remove laitance and form-release agents from concrete.

4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

    a. Metal.
    b. Glass.
    c. Porcelain enamel.
    d. Glazed surfaces of ceramic tile.
    e. <**Insert other nonporous joint substrate**>.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants in accordance with requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.

2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile in accordance with Figure 8A in ASTM C1193 unless otherwise indicated.
4. Provide flush joint profile at [**locations indicated on Drawings**]<**Insert locations**> in accordance with Figure 8B in ASTM C1193.
5. Provide recessed joint configuration of recess depth and at [**locations indicated on Drawings**]<**Insert locations**> in accordance with Figure 8C in ASTM C1193.

    a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: [**Owner will engage**][**Engage**] a qualified testing agency to perform tests and inspections.

B. Tests and Inspections:

1. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

    a. Extent of Testing: Test completed and cured sealant joints as follows:

        1) Perform [**10**]<**Insert number**> tests for the first [**1000 ft.**]<**Insert dimension**> of joint length for each kind of sealant and joint substrate.
        2) Perform one test for each [**1000 ft.**]<**Insert dimension**> of joint length thereafter or one test per each floor per elevation.

    b. Test Method: Test joint sealants in accordance with Method A, Tail Procedure, in ASTM C1521.

        1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

    c. Inspect tested joints and report on the following:

        1) Whether sealants filled joint cavities and are free of voids.
        2) Whether sealant dimensions and configurations comply with specified requirements.
        3) Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.

    d. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
    e. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

2. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

C. Prepare test and inspection reports.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079200

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Flush access doors with exposed flanges.
2. Fire-rated access doors with exposed flanges.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details[**, fire ratings,**] material descriptions, dimensions of individual components and profiles, and finishes.

B. Samples: For each type of access door and frame and for each finish specified, complete assembly minimum **6 by 6 inches** in size.

C. Product Schedule: For access doors and frames.[**Use same designations indicated on Drawings.**]

1.3 INFORMATIONAL SUBMITTALS

A. Field Quality-Control Reports: For fire-rated door inspections.

B. Qualification Statements: For testing and inspecting agency.

1. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1.
2. Submit copy of DHI Fire and Egress Door Assembly Inspector (FDAI) certificate.

1.4 CLOSEOUT SUBMITTALS

A. Record Documents: For fire-rated doors, list of applicable room name and number in which access door is located.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Access Doors and Frames: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection[**and temperature-rise limit**] ratings indicated, in accordance with NFPA 252 or UL 10B.

2.2 ACCESS DOORS AND FRAMES

A. Flush Access Doors with Exposed Flanges:

1. Manufacturers: Subject to compliance with requirements, [**provide products by the following**][**provide products by one of the following**][**available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following**]:

    a. [**ACUDOR Products, Inc**]
    b. [**Babcock-Davis**]
    c. [**Cendrex Inc.**]
    d. [**Elmdor; Morris Group International, Inc.**]
    e. [**JL Industries; Activar Construction Products Group, Inc.**]
    f. [**Karp Associates, Inc**]
    g. [**Lane-Aire Manufacturing Corp.**]
    h. [**Larsen's Manufacturing Company**]
    i. [**Maxam Metal Products Limited**]
    j. [**Metropolitan Door Industries Corp.**]
    k. [**MIFAB, Inc**]
    l. [**Milcor by Duravent; Duravent Group.**]
    m. [**Nystrom, Inc.**]
    n. [**Williams Brothers Corporation of America**]
    o. **<Insert manufacturer's name>**

2. Description: Face of door flush with frame, with exposed flange and concealed hinge.
3. Optional Features: [**Gasketing**][**Double-leaf doors**][**Piano hinges**][**Louvers**][**Masonry anchors**][**Removable doors**]<**Insert feature**>.
4. Locations: [**Wall**][**Ceiling**][**Wall and ceiling**]<**Insert location or substrate**>.
5. Door Size: <**Insert door size**>.
6. Uncoated Steel Sheet for Door: [**Nominal 0.060 inch, 16 gage**]<**Insert thickness**>, factory [**primed**][**finished**].
7. Metallic-Coated Steel Sheet for Door: [**Nominal 0.064 inch, 16 gage**]<**Insert thickness**>, factory [**primed**][**finished**].
8. Stainless Steel Sheet for Door: [**Nominal 0.062 inch, 16 gage**]<**Insert thickness**>, ASTM A480/A480M No. 4 finish.
9. Frame Material: [**Same material, thickness, and finish as door**]<**Insert material, thickness, and finish**>.
10. Latch and Lock: [**Cam latch, screwdriver operated**][**Cam latch, key operated**][**Cam latch, hex-head wrench operated**][**Cam latch, pinned-hex-head wrench operated**][**Cam latch, spanner-head wrench operated**][**Latch bolt, knurled-knob operated**][**Latch bolt, key operated**][**Prepared for mortise cylinder**][**As indicated on Drawings**][**As indicated in schedule**]<**Insert operator**>[**with interior release**].

2.3 FIRE-RATED ACCESS DOORS AND FRAMES

A. Fire-Rated Access Doors with Exposed Flanges:

1. Manufacturers: Subject to compliance with requirements, [**provide products by the following**][**provide products by one of the following**][**available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following**]:

    a. [**ACUDOR Products, Inc**]

b. [**Babcock-Davis**]
c. [**Cendrex Inc.**]
d. [**Elmdor; Morris Group International, Inc.**]
e. [**JL Industries; Activar Construction Products Group, Inc.**]
f. [**Karp Associates, Inc**]
g. [**Lane-Aire Manufacturing Corp.**]
h. [**Larsen's Manufacturing Company**]
i. [**Maxam Metal Products Limited**]
j. [**Metropolitan Door Industries Corp.**]
k. [**MIFAB, Inc**]
l. [**Milcor by Duravent; Duravent Group.**]
m. [**Nystrom, Inc.**]
n. [**Williams Brothers Corporation of America**]
o. <**Insert manufacturer's name**>

2. Description: Door flush with frame, [**with a core of mineral-fiber insulation enclosed in sheet metal**][**uninsulated**]; with exposed flange, self-closing door, and concealed hinge.
3. Door Type:

   a. Flush.
   b. Recessed [**1/2 inch**][**5/8 inch**][**1 inch**] for [**gypsum board**][**plaster**][**acoustical tile**]<**Insert material**>.

4. Optional Features: [**Upward-opening doors for ceilings**][**Gasketing**][**Double-leaf doors**][**Piano hinges**][**Masonry anchors**]<**Insert feature**>.
5. Locations: [**Wall**][**Ceiling**][**Wall and ceiling**]<**Insert location or substrate**>.
6. Door Size: <**Insert door size**>.
7. Fire-Resistance Rating: Not less than [**that indicated**][**that of adjacent construction**][**45 minutes**][**1 hour**][**1-1/2 hours**][**2 hours**][**3 hours**]<**Insert requirement**>.
8. Temperature-Rise Rating: [**450 deg F**][**250 deg F**] at the end of 30 minutes.
9. Uncoated Steel Sheet for Door: [**Nominal 0.036 inch, 20gage**]<**Insert thickness**>, factory [**primed**][**finished**].
10. Metallic-Coated Steel Sheet for Door: [**Nominal 0.040 inch, 20 gage**]<**Insert thickness**>, factory [**primed**][**finished**].
11. Stainless Steel Sheet for Door: [**Nominal 0.038 inch, 20 gage**]<**Insert thickness**>, ASTM A480/A480M No. 4 finish.
12. Frame Material: [**Same material, thickness, and finish as door**]<**Insert material, thickness, and finish**>.
13. Latch and Lock: Self-latching door hardware, [**operated by knurled-knob**][**operated by key**][**prepared for mortise cylinder**][**as indicated on Drawings**][**as indicated in schedule**]<**Insert operator**>[**with interior release**].

2.4 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A879/A879M, with cold-rolled steel sheet substrate complying with ASTM A1008/A1008M, Commercial Steel (CS), exposed.

C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B; with minimum **G60** or **A60** metallic coating.

D. Stainless Steel Plate, Sheet, and Strip: ASTM A240/A240M or ASTM A666, [**Type 304**][**Type 316**]. Remove tool and die marks and stretch lines, or blend into finish.

E. Stainless Steel Flat Bars: ASTM A666, [**Type 304**][**Type 316**]. Remove tool and die marks and stretch lines, or blend into finish.

F. Aluminum Extrusions: **ASTM B221**, Alloy 6063.

G. Aluminum Sheet: ASTM B209/B209M, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

H. Frame Anchors: Same material as door face.

I. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel in accordance with ASTM A153/A153M or ASTM F2329/F2329M.

2.5 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.

1. For concealed flanges with drywall bead, provide edge trim for gypsum panels securely attached to perimeter of frames.
2. For concealed flanges with plaster bead for full-bed plaster applications, provide zinc-coated expanded-metal lath and exposed casing bead welded to perimeter of frames.

D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling. Provide access sleeves for each latch operator and install in holes cut through finish.

1. For recessed doors with plaster infill, provide self-furring expanded-metal lath attached to door panel.

E. Latch and Lock Hardware:

1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.
2. Keys: Furnish two keys per lock and key all locks alike.
3. Mortise Cylinder Preparation: Where indicated, prepare door panel to accept cylinder specified in [**Section 087100 "Door Hardware."**][**Section 087111 "Door Hardware (Descriptive Specification)."**]

F. Aluminum: After fabrication, apply manufacturer's standard protective coating on aluminum that will come in contact with concrete.

2.6 FINISHES

A. Comply with NAAMM/NOMMA AMP 500 for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
2. Factory Finished: Apply manufacturer's standard baked-enamel or powder-coat finish immediately after cleaning and pretreating, with minimum dry-film thickness of **1 mil** for topcoat.

a. Color: [**As indicated by manufacturer's designations**][**Match Architect's sample**][**As selected by Architect from full range of industry colors**]<**Insert color**>.

E. Stainless Steel Finishes:

1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
2. Polished Finish: ASTM A480/A480M No. 4 finish. Grind and polish surfaces to produce uniform finish, free of cross scratches.

a. Run grain of directional finishes with long dimension of each piece.
b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

3. Bright, Cold-Rolled, Unpolished Finish: ASTM A480/A480M No. 2B.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF ACCESS DOORS AND FRAMES

A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 FIELD QUALITY CONTROL

A. Inspection Agency: [**Owner will engage**][**Engage**] a qualified inspector to perform inspections and to furnish reports to Architect.

B. Inspections:

1. Fire-Rated Door Inspections: Inspect each fire-rated access door in accordance with NFPA 80, Section 5.2.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

E. Prepare and submit separate inspection report for each fire-rated access door indicating compliance with each item listed in [**NFPA 80**][**and**][**NFPA 101**].

3.4 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION 083113

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Locations and installation of control and expansion joints, including plans, elevations, sections, and attachment details.

C. Samples for Initial Selection:

1. Trim Accessories: For [**aluminum**][**and**][**base-of-wall PVC moisture-barrier**]<**Insert requirements**> trim.
2. Texture Finish: For each type required.

D. Samples for Verification: Actual sample of finished products for the following:

1. Trim Accessories: Actual sample of finished products for each profile of [**aluminum**][**and**][**base-of-wall PVC moisture-barrier**]<**Insert requirements**> trim required.

a. Size: Full size profile, [**12 inches**]<**Insert dimension**> long,

2. Textured Finishes: [**Manufacturer's standard size**]<**Insert requirements**> for each textured finish required and on same backing indicated for Work.

E. Sustainable Design Submittals:

1.3 MOCKUPS

A. Build mockups of at least [**100 sq. ft.**]<**Insert dimension**> in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Build mockups for the following:

a. Each level of gypsum board finish required for use in exposed locations.
b. Each texture finish required.

2. Apply or install final decoration required, including painting and wallcoverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.

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

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C840 requirements or manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, or mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain each type of gypsum panel and joint finishing material from single source with resources to provide products of consistent quality in appearance and physical properties.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings in accordance with ASTM E119; tested by a qualified testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings in accordance with ASTM E90 and classified in accordance with ASTM E413; tested by a qualified testing agency.

2.3 GYPSUM BOARD, GENERAL

A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than <**Insert number**> percent.

B. Size: Provide panel products in maximum lengths and widths available that will minimize joints in each area and that correspond with support system specified or indicated on Drawings.

2.4 INTERIOR GYPSUM BOARD

A. Gypsum Board, Type X: ASTM C1396/C1396M.

1. Manufacturers: Subject to compliance with requirements, [**provide products by the following**][**provide products by one of the following**][**available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following**]:

    a. [**American Gypsum**]
    b. [**CertainTeed; SAINT-GOBAIN**]
    c. [**Georgia-Pacific Gypsum LLC**]
    d. [**Gold Bond Building Products, LLC provided by National Gypsum Company**]
    e. [**PABCO Gypsum**]
    f. [**Panel Rey**]
    g. [**USG Corporation**]
    h. <**Insert manufacturer's name**>

2. Thickness: [**As indicated on Drawings**][**5/8 inch**][**3/4 inch**].
3. Long Edges: [**Tapered**][**Tapered and featured (rounded or beveled) for prefilling**]<**Insert requirements**>.

2.5 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047.

1. Material: [**Galvanized-steel sheet or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet**][**Galvanized-steel sheet or aluminum-coated steel sheet or rolled zinc**][**Plastic**][**Paper-faced galvanized-steel sheet**]<**Insert requirements**>.
2. Shapes:

    a. Cornerbead.
    b. Bullnose bead.
    c. LC-Bead: J-shaped; exposed long flange receives joint compound.
    d. L-Bead: L-shaped; exposed long flange receives joint compound.
    e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
    f. Expansion (control) joint.
    g. Curved-Edge Cornerbead: With notched or flexible flanges.

B. Exterior Trim: ASTM C1047.

1. Material: [**Hot-dip galvanized-steel sheet, plastic, or rolled zinc**]<**Insert requirements**>.
2. Shapes:

    a. Cornerbead.
    b. LC-Bead: J-shaped; exposed long flange receives joint compound.
    c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.

2.6 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475/C475M requirements.

1. Mold-Resistant Joint Compound: Use mold-resistant formulations with mold-resistant panel products.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Exterior Gypsum Soffit Board: Paper.
3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
4. Tile Backing Panels: As recommended in writing by panel manufacturer.

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

1. Prefilling: At open joints[**, rounded or beveled panel edges,**] and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use [**setting-type taping**][**drying-type, all-purpose**] compound.

a. Use setting-type compound for installing paper-faced metal trim accessories.

3. Fill Coat: For second coat, use [**setting-type, sandable topping**][**drying-type, all-purpose**] compound.
4. Finish Coat: For third coat, use [**setting-type, sandable topping**][**drying-type, all-purpose**] compound.
5. Skim Coat: For final coat of Level 5 finish, use [**setting-type, sandable topping compound**][**drying-type, all-purpose compound**][**high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish**].

D. Joint Compound for Exterior Applications:

1. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound.
2. Glass-Mat Gypsum Sheathing Board: As recommended in writing by sheathing board manufacturer.

E. Joint Compound for Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended in writing by backing panel manufacturer.
2. Cementitious Backer Units: As recommended in writing by backer unit manufacturer.
3. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.

2.7 AUXILIARY MATERIALS

A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Laminating Adhesive: Adhesive or joint compound recommended in writing by manufacturer for directly adhering gypsum panels to continuous substrate.

C. Steel Drill Screws: ASTM C1002 unless otherwise specified or indicated on Drawings.

1. Use screws complying with ASTM C954 for fastening panels to steel members from **0.033 to 0.112 inch** thick.
2. For fastening cementitious backer units, use screws of type and size recommended in writing by panel manufacturer.

D. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers as follows:

1. Non-Fire-Resistance-Rated Assemblies: [**Glass**][**or**][**slag or rock wool**].
2. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
3. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than <**Insert number**> percent.

E. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."

F. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."

G. Vapor Retarder: As specified in Section 072600 "Vapor Retarders."

2.8 TEXTURE FINISHES

A. Primer: As recommended in writing by textured finish manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION AND FINISHING OF PANELS, GENERAL

A. Comply with ASTM C840 requirements.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than **1/16 inch** of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than **8 sq. ft.** in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow **1/4- to 3/8-inch-** wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide **1/4- to 1/2-inch-** wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.

J. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 requirements and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

K. Install sound-attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Gypsum Wallboard: [**As indicated on Drawings**][**Vertical surfaces unless otherwise indicated**].
2. Lightweight Gypsum Wallboard: [**As indicated on Drawings**][**Vertical surfaces unless otherwise indicated**].
3. Gypsum Board, Type X: [**As indicated on Drawings**][**Where required for fire-resistance-rated assembly**][**Vertical surfaces unless otherwise indicated**]<**Insert requirements**>.
4. Lightweight Gypsum Board, Type X: [**As indicated on Drawings**][**Where required for fire-resistance-rated assembly**][**Vertical surfaces unless otherwise indicated**]<**Insert requirements**>.

5. Gypsum Board, Type C: [**As indicated on Drawings**][**Where required for specific fire-resistance-rated assembly indicated**]<**Insert requirements**>.
6. Flexible Gypsum Board: [**As indicated on Drawings**][**Apply in double layer at curved assemblies**]<**Insert requirements**>.
7. Gypsum Ceiling Board: [**As indicated on Drawings**][**Ceiling surfaces**]<**Insert requirements**>.
8. Foil-Backed Gypsum Board: [**As indicated on Drawings**]<**Insert requirements**>.
9. Abuse-Resistant Gypsum Board: [**As indicated on Drawings**]<**Insert requirements**>.
10. Impact-Resistant Gypsum Board: [**As indicated on Drawings**]<**Insert requirements**>.
11. Mold-Resistant Gypsum Board: [**As indicated on Drawings**]<**Insert requirements**>.
12. Lightweight Mold-Resistant Gypsum Board: [**As indicated on Drawings**]<**Insert requirements**>.
13. Glass-Mat Interior Gypsum Board: [**As indicated on Drawings**]<**Insert requirements**>.
14. Acoustically Enhanced Gypsum Board: [**As indicated on Drawings**]<**Insert requirements**>.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated on Drawings.
2. On partitions/walls, apply gypsum panels [**vertically (parallel to framing)**][**horizontally (perpendicular to framing)**] unless otherwise specified or indicated on Drawings or required by fire-resistance-rated assembly, and minimize end joints.

    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    b. At stairwells and other high walls, install panels horizontally unless otherwise indicated on Drawings or required by fire-resistance-rated assembly.

3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

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

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum

board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.

E. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus **12-inch-** long straight sections at ends of curves and tangent to them.
2. For double-layer construction, fasten base layer to studs with screws **16 inches** o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced **12 inches** o.c.

3.4 APPLICATION OF JOINT TREATMENT MATERIALS

A. Finishing Panel Products: Treat joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare panel surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints[**, rounded or beveled edges,**] and damaged surface areas.

C. Apply joint tape over panel joints, except for trim products specifically indicated as not intended to receive tape.

D. Interior Gypsum Board: Finish panels to levels indicated below and in accordance with ASTM C840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: [**Panels that are substrate for tile**][**Panels that are substrate for acoustical tile**][**Where indicated on Drawings**]<**Insert locations**>.
3. Level 3: [**Where indicated on Drawings**]<**Insert locations**>.

    a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."

4. Level 4: [**At panel surfaces that will be exposed to view unless otherwise indicated**]<**Insert locations**>.

    a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."

5. Level 5: [**Where indicated on Drawings**]<**Insert locations**>.

    a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."

E. Exterior Gypsum Board for Ceilings and Soffits: Finish in accordance with manufacturer's written instructions.

F. Glass-Mat Faced Panels: Finish in accordance with manufacturer's written instructions.

G. Cementitious Backer Units: Finish in accordance with manufacturer's written instructions.

3.5 PROTECTION

A. Protect adjacent surfaces from joint compound and promptly remove from floors and other non-gypsum board surfaces. Repair surfaces stained, marred, or otherwise damaged during gypsum board installation and finishing.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Surface preparation of interior substrates and application of the following:

1. Primers.
2. Water-based finish coatings.
3. Solvent-based finish coatings.
4. Dry fall coatings.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include preparation requirements and application instructions.
2. Indicate VOC content.

B. Samples: For each type of topcoat product.

C. Samples for Initial Selection: For each type of topcoat product.

D. Samples for Verification: For each type of paint system and each color and gloss of topcoat. Submit [**actual paint drawdowns as specified below**][**paint manufacturer's standard printed cards**] for verification Samples.

1. Submit Samples on rigid backing, **8 inches** square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

E. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in applicable interior painting schedule articles to cross-reference paint systems specified in this Section. Include color designations.

F. Sustainable Design Submittals:

1.3 MAINTENANCE MATERIAL SUBMITTALS

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

1. Paint Products: [**5**]<**Insert number**> percent, but not less than [**1 gal.**]<**Insert value**> of each material and color applied.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than **45 deg F**.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.5 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between **50 and 95 deg F**.

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures of less than **5 deg F** above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain each paint product from single source from single manufacturer.

2.2 INTERIOR PAINTS, GENERAL

A. Interior Paints: Subject to compliance with requirements, [**provide product**][**provide one of the products**][**available products that may be incorporated into the Work include but are not limited to products**] listed in product types below and applicable interior painting schedule articles for the paint category indicated.

B. Material Compatibility:

1. Materials for use within each paint system must be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by topcoat manufacturer for use in paint system and on substrate indicated.
3. Flat Paints and Coatings: 50 g/L.
4. Nonflat Paints and Coatings: 50 g/L.
5. Primers, Sealers, and Undercoaters: 100 g/L.
6. Rust-Preventive Coatings: 100 g/L.
7. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
8. Pretreatment Wash Primers: 420 g/L.
9. Floor Coatings: 50 g/L.
10. Shellacs, Clear: 730 g/L.
11. Shellacs, Pigmented: 550 g/L.
12. Low-Emitting Materials: Verify VOC emissions comply with requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Verify formaldehyde emissions do not exceed 9 mcg/cu. m or 7 ppb, whichever is less.

13. Verify VOC content does not exceed limits of authorities having jurisdiction and the following:

    a. Flat Coatings: 50 g/L.
    b. Nonflat Coatings: 50 g/L.
    c. Nonflat - High-Gloss Coatings: 50 g/L.
    d. Concrete/Masonry Sealers: 100 g/L.
    e. Floor Coatings: 100 g/L.
    f. Industrial Maintenance Coatings: 250 g/L.
    g. Low-Solids Coatings: 120 g/L.
    h. Mastic Texture Coatings: 100 g/L.
    i. Metallic Pigmented Coatings: 500 g/L.
    j. Pretreatment Wash Primers: 420 g/L.
    k. Primers, Sealers, and Undercoaters: 100 g/L.
    l. Reactive Penetrating Sealers: 350 g/L.
    m. Recycled Coatings: 250 g/L.
    n. Rust-Preventive Coatings: 250 g/L.

C. Colors: [**As selected by Architect from manufacturer's full range**][**Match Architect's samples**][**As indicated in a color schedule**]<**Insert requirements**>.

    1. [**10**][**20**][**30**]<**Insert number**> percent of surface area will be painted with deep tones.

2.3 WATER-BASED FINISH COATINGS

A. Interior, Latex, Institutional Low-Odor/VOC Paint: White or colored latex coating with low-odor characteristics and a VOC of less than 10 grams per liter, for use in areas, such as hospitals and other occupied buildings, where the odor and VOC levels of conventional latex products would preclude their use.

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

        a. Sherwin-Williams Company (The)

    2. Gloss and Sheen Level: Manufacturer's standard [**flat**][**low sheen**][**eggshell**][**satin**][**semigloss**][**gloss**].

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

    1. Concrete: 12 percent.
    2. Cementitious Composition Board: 12 percent.
    3. Masonry (Clay and CMU): 12 percent.

4. Wood: 15 percent.
5. Gypsum Board: 12 percent. Verify that finishing compound is dry and sanded smooth.
6. Plaster: 12 percent. Verify that plaster is fully cured.

C. Verify suitability of substrates, including surface conditions and compatibility, with finishes and primers. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints to be painted exceeds that permitted in manufacturer's written instructions.

F. Steel Substrates: Remove loose rust, loose mill scale, loose shop primer, and other loose foreign matter. Clean using methods recommended in writing by paint manufacturer[**.**][**but not less than the following:**]

1. SSPC-SP 2.
2. SSPC-SP 3.
3. SSPC-SP 7/NACE No. 4.
4. SSPC-SP 11.

G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

H. Galvanized Metal Substrates: Remove grease and oil residue from galvanized metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

I. Aluminum Substrates: Remove loose surface oxidation.

J. Wood Substrates:

1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for interior use in paint system indicated.
2. Sand surfaces that will be exposed to view and remove sanding dust.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

K. Canvas and Cotton Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

L. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION OF INTERIOR PAINT PRODUCTS

A. Apply paints in accordance with manufacturer's written instructions.

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Paint entire exposed surface of window frames and sashes.
5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
6. Primers specified in the applicable interior painting schedule articles may be omitted on items that are factory primed or factory finished if compatible with intermediate and topcoat coatings and acceptable to intermediate and topcoat paint manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire-Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed to view in equipment rooms:

a. Equipment, including panelboards[**and switch gear**].
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.

g. Tanks that do not have factory-applied final finishes.
h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
i. <**Insert mechanical items to be painted**>.

2. Paint the following work where exposed to view in occupied spaces:

a. Equipment, including panelboards.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
h. Other items as directed by Architect.
i. <**Insert requirements**>.

3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

A. Dry-Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry-film thickness.

1. Touch up and restore painted surfaces damaged by testing.
2. If test results show that dry-film thickness of applied paint does not comply with paint manufacturer's written recommendations, apply additional coats as needed to provide dry-film thickness that complies with paint manufacturer's written recommendations.
3. Cost of retesting is Contractor's responsibility.

3.5 CLEANING AND PROTECTION

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

1. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.
2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.
3. Allow empty paint cans to dry before disposal.
4. Collect waste paint by type and deliver to recycling or collection facility.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE, MASONRY SUBSTRATES

A. CMU Substrates:

1. Institutional Low-Odor/VOC Latex System :

a. Block Filler: Interior/exterior latex block filler.
b. Intermediate Coat: Matching topcoat.
c. Topcoat: Interior, latex, institutional low odor/VOC, [**flat**][**low sheen**][**eggshell**][**satin**][**semigloss**][**gloss**].

3.7 INTERIOR PAINTING SCHEDULE, METAL SUBSTRATES

A. Steel and Iron Substrates:

1. Institutional Low-Odor/VOC Latex System :

a. Prime Coat: Water-based rust-inhibitive primer.
b. Intermediate Coat: Matching topcoat.
c. Topcoat: Interior, latex, institutional low odor/VOC, [**flat**][**low sheen**][**eggshell**][**satin**][**semigloss**][**gloss**].

2. High-Performance Architectural Latex System :

a. Prime Coat: [**Alkyd quick-dry primer for metal**][**Alkyd metal primer**][**Shop primer specified in Section where substrate is specified**].
b. Intermediate Coat: Matching topcoat.
c. Topcoat: Topcoat: Interior, high-performance architectural latex, [**low sheen**][**eggshell**][**satin**][**semigloss**].

3.8 INTERIOR PAINTING SCHEDULE, GYPSUM-BASED SUBSTRATES

A. Gypsum Board and Plaster Substrates:

1. Institutional Low-Odor/VOC Latex System :

a. Prime Coat: Interior, institutional low-odor/VOC primer sealer.
b. Intermediate Coat: Matching topcoat.
c. Topcoat: Interior, latex, institutional low odor/VOC, [**flat**][**low sheen**][**eggshell**][**satin**][**semigloss**][**gloss**].

END OF SECTION 099123

SECTION 10145 - TRAFFIC SIGNAGE

PART 1 GENERAL

1.1 SUMMARY

A. This work shall consist of furnishing and installing traffic and parking signage in pavement surfaces, in the form of traffic lanes, parking bays, areas restricted to handicapped persons, crosswalks, and other signage, in accordance with the details and finishing plan, or as prescribed by the Owner.

1.2 SUBMITTALS

A. In accordance with SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish Manufacturer's Certificates and Data certifying that the following materials conform to the requirements specified.

PART 2 PRODUCTS

2.1 GENERAL

A. All materials and construction shall be in accordance with Build America Buy America requirements.

2.2 SIGNS

A. Signs shall meet the requirements of MnDOT Standard Specifications for Construction, 2020 Edition, Section 3352, the most current MnDOT special provisions, and the MN MUTCD.

2.3 SIGN POSTS

A. Sign posts shall meet the requirements of MnDOT Standard Specifications for Construction, 2020 Edition, Section 3401, 3402, and the most current MnDOT special provisions.

PART 3 EXECUTION

1.1 GENERAL

A. Execution shall be in accordance with MnDOT Standard Specifications for Construction, 2020 Edition, Section 2564, the most current MnDOT special provisions, and the MN MUTCD and as shown in the plans except as modified herein.

1.2 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify location of all undergrounding utilities prior to commencing the work.

1.3 INSTALLATION

A. Locations of signs on the Plans are approximate. Final locations of the signs shall be approved the Engineer or Owner's Representative prior to installation.

B. Posts shall be installed plumb and to the requirements set forth in MnDOT specifications and the plans. Posts that are bent or otherwise damaged shall be removed and replaced at no expense to the Owner.

C. Set posts as shown in the details for signs installed in asphalt, concrete or other pavement surfaces.

A. Prior to completion, remove all rust and clean post and signs of all grease, oil or other contaminating materials.

1.2 PROTECTION

A. Conduct installation operations in such a manner that necessary traffic can move without hindrance.

B. Protect the signs from damage from continuing construction and traffic. Replace damaged signs at no additional cost to the Owner.

1.3 FINAL CLEAN-UP

A. Remove all debris, rubbish and excess material from the Site.

END OF SECTION

SECTION 22 05 29

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Pipe hangers and supports.
2. Hanger rods.
3. Inserts.
4. Flashing.
5. Sleeves.
6. Mechanical sleeve seals.
7. Formed steel channel.
8. Firestopping relating to plumbing work.
9. Firestopping accessories.
10. Equipment bases and supports.

B. Related Sections:
1. Section 22 11 00 - Facility Water Distribution: Execution requirements for placement of hangers and supports specified by this section.
2. Section 22 13 00 - Facility Sanitary Sewerage: Execution requirements for placement of hangers and supports specified by this section.

1.2 REFERENCES

A. American Welding Society:
1. AWS D1.1 - Structural Welding Code - Steel.

B. Manufacturers Standardization Society of the Valve and Fittings Industry:
1. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.

1.3 SUBMITTALS

A. Build America, Buy America (BABA) Documentation: Contractors must comply with and provide documentation that shows compliance with BABA requirements. Product certification letters need to include the following five items:
1. Documentation linked to the project. Identify the project name, project location, contract number, or project number.
2. Documentation linked to the product used on the project. Description of product(s) (simple explanation sufficient to identify product(s)), or an attached purchase order, invoice, or bill of lading.
3. Documentation includes a statement attesting that the products supplied to the Recipient are compliant with BABA requirements. For iron and steel items under BABA, references to the American Iron and Steel (AIS) requirements are also acceptable and reciprocal with BABA for such items.
4. Documentation that manufacturing occurred in the United States, which could include, for example, the location(s) of manufacturing for each manufacturing step that is being certified. It is acceptable for manufactured products to note a single point of manufacturing, documenting that the final point of manufacturing is in the United States. Note that each BABA category may require different determinations for compliance.

5. Signature of company representative (on company letterhead and signature can be electronic). The signatory of the certifying statement affirms their knowledge of the manufacturing processes for the referenced product(s) and attests that the product meets the BABA requirements.

B. Any substitution requests shall meet the BABA requirements listed above.

1.4 QUALITY ASSURANCE

A. Perform Work in compliance with all applicable codes and standards enforced by the Authority Having Jurisdiction, as well as all applicable laws, ordinances, and regulations.

B. Perform Work in accordance with AWS D1.1 for welding hanger and support attachments to building structure.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labeled with manufacturer's identification.

B. Protect from weather and construction traffic, dirt, water, chemical, and damage, by storing in original packaging.

1.7 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.8 COORDINATION

A. Coordinate Work with other trades.

PART 2 PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

A. Manufacturers:
1. Anvil International (Mueller Water Products, Inc.).
2. Carpenter & Paterson Inc.
3. Creative Systems Inc.
4. Flex-Weld, Inc.
5. Globe Pipe Hanger Products Inc.
6. Michigan Hanger Co.
7. Superior Valve Co.

B. Plumbing Piping - DWV:
1. Conform to MSS SP 69.
2. Hangers for Pipe Sizes ½- to 1-½-inch: Malleable iron or Carbon steel, adjustable, clevis.
3. Hangers for Pipe Sizes 2 inches and Larger: Carbon steel, adjustable, clevis.
4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

5. Wall Support for Pipe Sizes 3 inches and Smaller: Cast iron hook.
6. Wall Support for Pipe Sizes 4 inches and Larger: Welded steel bracket and wrought steel clamp.
7. Vertical Support: Steel riser clamp.
8. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
9. Copper Pipe Support: Copper-plated, carbon-steel adjustable, ring.
10. For Exterior and Humid Areas: Furnished hot-dipped galvanized or Type 304 stainless steel or better hangers, support, and hardware.

C. Plumbing Piping - Water:
1. Conform to MSS SP 69.
2. Hangers for Pipe Sizes ½- to 1-½-inch: Malleable iron or Carbon steel, adjustable, clevis.
3. Hangers for Cold Pipe Sizes 2 inches and Larger: Carbon steel, adjustable, clevis.
4. Hangers for Hot Pipe Sizes 2 to 4 inches: Carbon steel, adjustable, clevis.
5. Hangers for Hot Pipe Sizes 6 inches and Larger: Adjustable steel yoke, cast iron roll, double hanger.
6. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
7. Multiple or Trapeze Hangers for Hot Pipe Sizes 6 inches and Larger: Steel channels with welded spacers and hanger rods, cast iron roll.
8. Wall Support for Pipe Sizes 3 inches and Smaller: Cast iron hook.
9. Wall Support for Pipe Sizes 4 inches and Larger: Welded steel bracket and wrought steel clamp.
10. Wall Support for Hot Pipe Sizes 6 inches and Larger: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron roll.
11. Vertical Support: Steel riser clamp.
12. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
13. Floor Support for Hot Pipe Sizes 4 inches and Smaller: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
14. Floor Support for Hot Pipe Sizes 6 inches and Larger: Adjustable cast iron roll and stand, steel screws, and concrete pier or steel support.
15. Copper Pipe Support: Copper-plated, Carbon-steel ring.
16. For Exterior and Humid Areas: Furnished hot-dipped galvanized or Type 304 stainless steel or better hangers, support, and hardware.

D. Plumbing Piping - Storm:
1. Conform to MSS SP 69.
2. Hangers for Pipe Sizes ½- to 1-½-inch: Malleable iron or Carbon steel, adjustable, clevis.
3. Hangers for Pipe Sizes 2 inches and Larger: Carbon steel, adjustable, clevis.
4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
5. Wall Support for Pipe Sizes 3 inches and Smaller: Cast iron hook.
6. Wall Support for Pipe Sizes 4 inches and Larger: Welded steel bracket and wrought steel clamp.
7. Vertical Support: Steel riser clamp.
8. For Exterior and Humid Areas: Furnished hot-dipped galvanized or Type 304 stainless steel or better hangers, support, and hardware.

2.2 HANGER RODS

A. Hanger Rods: Mild steel threaded both ends, threaded on one end, or continuous threaded.

2.3 INSERTS

A. Inserts: Malleable iron case of steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.4 FLASHING

A. See Division 07.

2.5 SLEEVES

A. Sleeves for Pipes Through Non-fire-rated Floors: 18 gage thick galvanized steel.

B. Sleeves for Pipes Through Non-fire-rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage thick galvanized steel.

C. Sealant: Acrylic.

2.6 MECHANICAL SLEEVE SEALS

A. Manufacturers:
   1. Thunderline Link-Seal, Inc.
   2. NMP Corporation.

B. Product Description: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between object and sleeve, connected with bolts and pressure plates causing rubber-sealing elements to expand when tightened, providing watertight seal and electrical insulation.

2.7 FORMED STEEL CHANNEL

A. Product Description: Galvanized 12 gage thick steel with holes 1-½-inches on center.

2.8 FIRESTOPPING

A. Refer to Division 07.

2.9 FIRESTOPPING ACCESSORIES

A. Refer to Division 07.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify openings are ready to receive sleeves.

3.2 PREPARATION

A. Obtain permission from Architect/Engineer before using powder-actuated anchors.

B. Obtain permission from Architect/Engineer before drilling or cutting structural members.

3.3 INSTALLATION - INSERTS

A. Install inserts for placement in concrete forms.

B. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

C. Provide hooked rod to concrete reinforcement section for inserts carrying pipe 4 inches and larger.

D. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

E. Where inserts are omitted, drill through concrete slab from below, and provide through-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.

3.4 INSTALLATION - PIPE HANGERS AND SUPPORTS

A. Install in accordance with MSS SP 69.

B. Support horizontal piping as scheduled. Coordinate with Structural Drawings.

C. Support vertical piping as scheduled.

D. Install hangers with minimum ½-inch space between finished covering and adjacent work.

E. Place hangers within 12 inches of each horizontal elbow.

F. Use hangers with 1-½-inch minimum vertical adjustment.

G. Support horizontal cast iron pipe adjacent to each hub, with 5 feet maximum spacing between hangers.

H. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.

I. Support riser piping independently of connected horizontal piping.

J. Provide copper plated hangers and supports for copper piping.

K. Design hangers for pipe movement without disengagement of supported pipe.

L. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

M. Provide clearance in hangers and from structure and other equipment for installation of insulation. Refer to Section 22 07 00.

N. Provide vibration isolators type hangers or supports for pipes after vibration-isolated equipment is installed.

O. Provide vibration isolators type hangers for pipes 2-inches or larger located below or within 50 feet of noise-sensitive rooms.

3.5 INSTALLATION - EQUIPMENT BASES AND SUPPORTS

A. Refer to Section 23 05 29 for installation requirements.

3.6 INSTALLATION - FLASHING

A. Refer to Division 07.

3.7 INSTALLATION - SLEEVES

A. Exterior watertight entries: Seal with mechanical sleeve seals.

B. Set sleeves in position in forms. Provide reinforcing around sleeves.

C. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.

D. Extend sleeves through floors 1 inch above finished floor level. Caulk sleeves.

E. Where piping penetrates floor, ceiling, or wall, close off space between pipe and adjacent work with insulation and caulk airtight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.

F. Install chrome plated steel escutcheons at finished surfaces.

3.8 INSTALLATION - FIRESTOPPING

A. Install firestopping material at fire and smoke-rated construction perimeters and openings containing penetrating sleeves, piping, and other items that require firestopping.

B. Refer to Division 07.

3.9 PROTECTION OF FINISHED WORK

A. Protect adjacent surfaces from damage by material installation.

3.10 SCHEDULES

HANGERS AND SUPPORTS (TABLE 313.1) MATERIALS	TYPES OF JOINTS	HORIZONTAL	VERTICAL
CAST	LEAD AND OAKUM	5 FEET, EXCEPT 10 FEET WHERE 10 FOOT LENGTHS ARE INSTALLED (NOTES 1,2,3)	BASE AND EACH FLOOR, NOT TO EXCEED 15 FEET
CAST	COMPRESSION GASKET	EVERY OTHER JOINT, UNLESS OVER 4 FEET THEN SUPPORT EACH JOINT (NOTES 1,2,3)	BASE AND EACH FLOOR, NOT TO EXCEED 15 FEET
CAST-IRON HUBLESS	SHEILDED COUPLING	EVERY OTHER JOINT, UNLESS OVER 4 FEET THEN SUPPORT EACH JOINT (NOTES 1,2,3,4)	BASE AND EACH FLOOR, NOT TO EXCEED 15 FEET
COPPER TUBE AND PIPE	SOLDERED OR BRAZED	1-1/2 INCHES AND SMALLER, 6 FEET; 2 INCHES AND LARGER, 10 FEET	EACH FLOOR, NOT TO EXCEED 10 FEET (NOTE 5)
STEEL AND BRASS PIPE FOR WATER OR DWV	THREADED OR WELDED	3/4 INCH AND SMALLER, 10 FEET; 1 INCH AND LARGER, 12 FEET	EVERY OTHER FLOOR, NOT TO EXCEED 25 FEET (NOTE 5)
STEEL, BRASS, AND TINNED COPPER PIPE FOR GAS	THREADED OR WELDED	1/2 INCH, 6 FEET; 3/4 INCH AND 1 INCH, 8 FEET; 1-1/4 INCHES AND LARGER, 10 FEET	1/2 INCH, 6 FEET; 3/4 INCH AND 1 INCH, 8 FEET; 1-1/4 INCHES EVERY FLOOR LEVEL
SCHEDULE 40 PVC AND ABS	SOLVENT CEMENTED	ALL SIZES, 4 FEET; ALLOW FOR EXPANSION EVERY 30	BASE AND EACH FLOOR; PROVIDE MID-STORY GUIDES;

DWV		FEET (NOTES 3,6)	PROVIDE FOR EXPANSION EVERY 30 FEET (NOTE 6)
CPVC	SOLVENT CEMENTED	1 INCH AND SMALLER, 3 FEET; 1-1/4 INCHES AND LARGER, 4 FEET	BASE AND EACH FLOOR; PROVIDE MID-STORY GUIDES (NOTE 6)
COPPER	MECHANICAL	IN ACCORDANCE WITH STANDARDS ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION	IN ACCORDANCE WITH STANDARDS ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION
STEEL AND BRASS	MECHANICAL	IN ACCORDANCE WITH STANDARDS ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION	IN ACCORDANCE WITH STANDARDS ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION
PEX	COLD EXPANSION, INSERT AND COMPRESSION	1 INCH AND SMALLER, 32 INCHES; 1-1/4 INCHES AND LARGER, 4 FEET	BASE AND EACH FLOOR; PROVIDE MID-STORY GUIDES
PEX-AL-PEX	METAL INSERT AND METAL COMPRESSION	1/2 INCH, 3/4 INCH, 1 INCH; ALL SIZES 98 INCHES	BASE AND EACH FLOOR; PROVIDE MID-STORY GUIDES
PE-AL-PE	METAL INSERT AND METAL COMPRESSION	1/2 INCH, 3/4 INCH, 1 INCH; ALL SIZES 98 INCHES	BASE AND EACH FLOOR; PROVIDE MID-STORY GUIDES
POLYPROPYLENE (PP)	FUSION WELD (SOCKET, BUTT, SADDLE, ELECTROFUSION), THREADED (METAL THREADS ONLY), OR MECHANICAL	1 INCH AND SMALLER, 23 INCHES; 1-1/4 INCHES AND LARGER, 4 FEET	BASE AND EACH FLOOR; PROVIDE MID-STORY GUIDES

NOTES:

1. SUPPORT ADJACENT TO JOINT, NOT TO EXCEED 18 INCHES.
2. BRACE NOT TO EXCEED 40 FOOT INTERVALS TO PREVENT HORIZONTAL MOVEMENT.
3. SUPPORT AT EACH HORIZONTAL BRANCH CONNECTION.
4. HANGERS SHALL NOT BE PLACED ON THE COUPLING.
5. VERTICAL WATER LINES SHALL BE PERMITTED TO BE SUPPORTED IN ACCORDANCE WITH RECOGNIZED ENGINEERING PRINCIPLES WITH REGARD TO EXPANSION AND CONTRACTION, WHERE FIREST APPROVED BY THE AUTHORITY HAVING JURISDICTION.
6. SEE THE APPROPRIATE IAPMO INSTALLATION STANDARD FOR EXPANSION AND OTHER SPECIAL REQUIREMENTS.

HANGER AND ROD SIZES (TABLE 313.6)

PIPE AND TUBE SIZE	ROD SIZE
(INCHES)	(INCHES)
1/2 - 4	3/8
5 - 8	1/2
10 - 12	5/8

END OF SECTION

SECTION 22 05 53

IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Nameplates.
   2. Tags.
   3. Stencils.
   4. Pipe markers.
   5. Ceiling tacks.
   6. Labels.
   7. Lockout devices.

B. Related Sections:
   1. NONE.

1.2 REFERENCES

A. American Society of Mechanical Engineers:
   1. ASME A13.1 - Scheme for the Identification of Piping Systems.

B. National Fire Protection Association:
   1. NFPA 99 - Standard for Health Care Facilities.

1.3 SYSTEM DESCRIPTION

A. The Plumbing Contractor is responsible for items in this Section.

1.4 SUBMITTALS

A. Build America, Buy America (BABA) Documentation: Contractors must comply with and provide documentation that shows compliance with BABA requirements. Product certification letters need to include the following five items:
   1. Documentation linked to the project. Identify the project name, project location, contract number, or project number.
   2. Documentation linked to the product used on the project. Description of product(s) (simple explanation sufficient to identify product(s)), or an attached purchase order, invoice, or bill of lading.
   3. Documentation includes a statement attesting that the products supplied to the Recipient are compliant with BABA requirements. For iron and steel items under BABA, references to the American Iron and Steel (AIS) requirements are also acceptable and reciprocal with BABA for such items.
   4. Documentation that manufacturing occurred in the United States, which could include, for example, the location(s) of manufacturing for each manufacturing step that is being certified. It is acceptable for manufactured products to note a single point of manufacturing, documenting that the final point of manufacturing is in the United States. Note that each BABA category may require different determinations for compliance.
   5. Signature of company representative (on company letterhead and signature can be electronic). The signatory of the certifying statement affirms their knowledge of the

manufacturing processes for the referenced product(s) and attests that the product meets the BABA requirements.

B. Any substitution requests shall meet the BABA requirements listed above.

1.5 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of tagged valves; include valve tag numbers.

1.6 QUALITY ASSURANCE

A. Perform Work in compliance with all applicable codes and standards enforced by the Authority Having Jurisdiction, as well as all applicable laws, ordinances, and regulations.

B. Conform to ASME A13.1 for color scheme for identification of piping systems and accessories.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.8 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 NAMEPLATES

A. Product Description: Laminated three-layer plastic with engraved black letters on light contrasting background color.

2.2 TAGS

A. Plastic Tags:
   1. Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inches square.

B. Metal Tags:
   1. Brass, Aluminum, or Stainless Steel with stamped letters; tag size minimum 1-½-inches square with finished edges.

C. Information Tags:
   1. Clear plastic with printed "Danger," "Caution," or "Warning" and message; size 3-¼ x 5-5/8 inches with grommet and self-locking nylon ties.

D. Tag Chart: Typewritten letter size list of applied tags and location in anodized aluminum or plastic laminated frame.

2.3 STENCILS

A. Stencils: With clean cut symbols and letters of following size:
   1. Up to 2 inches Outside Diameter of Insulation or Pipe: ½-inch high letters.
   2. 2-½ to 6 inches Outside Diameter of Insulation or Pipe: 1-inch high letters.
   3. Over 6 inches Outside Diameter of Insulation or Pipe: 1-¾ inches high letters.

4. Ductwork and Equipment: 1-¾ inches high letters.

B. Stencil Paint: As specified in Section 09 90 00, semi-gloss enamel, colors and lettering size conforming to ASME A13.1.

2.4 PLASTIC MARKERS

A. Color and Lettering: Conform to ASME A13.1.

B. Plastic Markers:
1. Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering. Larger sizes may have maximum sheet size with spring fastener.

C. Plastic Tape Markers:
1. Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

D. Plastic Underground Markers:
1. Bright colored continuously printed plastic ribbon tape, minimum 6 inches wide by 4 mil thick, manufactured for direct burial service.

2.5 CEILING TACKS

A. Description: Steel or plastic with ¾-inch diameter color-coded head.

B. Color code as approved by Owner. If no preference by Owner, color as follows:
1. Plumbing valves: Green.
2. Refer to Section 23 05 53 for other equipment.

2.6 LABELS

A. Description: Laminated Mylar, size 1.9 x 0.75 inches, adhesive backed with printed identification and bar code.

2.7 LOCKOUT DEVICES

A. Lockout Hasps:
1. Reinforced nylon hasp with erasable label surface; size minimum 7-¼ x 3 inches.

B. Valve Lockout Devices:
1. Nylon device preventing access to valve operator, accepting lock shackle.

PART 3 EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

A. Install identifying devices after completion of coverings and painting.

B. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive.

C. Install labels with sufficient adhesive for permanent adhesion and seal with clear lacquer. For unfinished canvas covering, apply paint primer before applying labels.

D. Install tags using corrosion resistant chain. Number tags consecutively by location.

E. Install underground plastic pipe markers 6 to 8 inches below finished grade, directly above buried pipe.

F. Identify water heaters, heat exchangers, pumps, tanks, and water treatment devices with plastic nameplates. Identify in-line pumps and other small devices with tags.

G. Identify control panels and major control components outside panels with plastic nameplates.

H. Identify valves in main and branch piping with tags.

I. Identify piping, concealed or exposed, with plastic markers, or plastic tape markers.
   1. Identify service, flow direction, and pressure.
   2. Install in clear view and align with axis of piping.
   3. Locate identification:
      a. Not to exceed 20 feet on straight runs including risers and drops.
      b. Adjacent to each valve and tee.
      c. At each side of penetration of structure or enclosure.
      d. At each obstruction.

J. Provide ceiling tacks to locate valves above T-bar type panel ceilings. Locate in corner of panel closest to equipment.

END OF SECTION

SECTION 22 07 00

PLUMBING INSULATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Piping system insulation.
   2. Equipment insulation.
   3. Pipe insulation jackets.
   4. Equipment insulation jackets.
   5. Insulation accessories including vapor retarders and accessories.

B. Related Sections:
   1. Section 22 05 29 - Hangers and Supports for Plumbing Piping and Equipment: Product and Execution requirements for inserts at hanger locations.
   2. Section 22 05 53 - Identification for Plumbing Piping and Equipment: Product requirements for plumbing piping and equipment identification.
   3. Section 23 07 00 - HVAC Insulation: Pipe insulation thickness requirements.

1.2 REFERENCES

A. ASTM International:
   1. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation.
   2. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
   3. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.

1.3 SUBMITTALS

A. Build America, Buy America (BABA) Documentation: Contractors must comply with and provide documentation that shows compliance with BABA requirements. Product certification letters need to include the following five items:
   1. Documentation linked to the project. Identify the project name, project location, contract number, or project number.
   2. Documentation linked to the product used on the project. Description of product(s) (simple explanation sufficient to identify product(s)), or an attached purchase order, invoice, or bill of lading.
   3. Documentation includes a statement attesting that the products supplied to the Recipient are compliant with BABA requirements. For iron and steel items under BABA, references to the American Iron and Steel (AIS) requirements are also acceptable and reciprocal with BABA for such items.
   4. Documentation that manufacturing occurred in the United States, which could include, for example, the location(s) of manufacturing for each manufacturing step that is being certified. It is acceptable for manufactured products to note a single point of manufacturing, documenting that the final point of manufacturing is in the United States. Note that each BABA category may require different determinations for compliance.
   5. Signature of company representative (on company letterhead and signature can be electronic). The signatory of the certifying statement affirms their knowledge of the

manufacturing processes for the referenced product(s) and attests that the product meets the BABA requirements.

B. Any substitution requests shall meet the BABA requirements listed above.

1.4 QUALITY ASSURANCE

A. Perform Work in compliance with all applicable codes and standards enforced by the Authority Having Jurisdiction, as well as all applicable laws, ordinances, and regulations.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Applicator: Company specializing in performing Work of this section with minimum three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and damage, by storing in original wrapping.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Install insulation only when ambient temperature and humidity conditions are within range recommended by manufacturer.

B. Maintain temperature during and after installation for minimum period as recommended by manufacturer.

1.8 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 PIPE: MAN MADE MINERAL FIBER

A. Insulation: ASTM C547 Mineral Fiber Pipe Insulation, Type I, 850 °F.
   1. Insulation Conductivity Rating: Maximum: 0.28 Btu-in/(h-ft2-°F) at 100-°F mean rating temperature.

B. Applications on Austenitic stainless steel: Conform to ASTM C795.

C. Vapor Retarder Jacket:
   1. White Kraft paper with glass fiber yarn, bonded to aluminized film.
   2. Moisture vapor transmission: ASTM E96; 0.02 perm-inches.

D. Vapor Retarder Lap Adhesive:
   1. Compatible with insulation.

2.2 PIPE INSULATION AND EQUIPMENT JACKETS

A. PVC Plastic Pipe Jacket:

1. Product Description: One-piece molded type fitting covers and sheet material, off-white color.
2. Thickness: 10 mil.
3. Connections: Brush on welding adhesive.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify piping and equipment has been tested before applying insulation materials.

B. Verify surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION – PIPING

A. Exposed Piping: Locate insulation and cover seams in least visible locations.

B. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.

C. Manmade mineral fiber insulated pipes conveying fluids below ambient temperature:
   1. Furnish factory-applied or field-applied vapor retarder jackets. Secure factory-applied jackets with pressure sensitive adhesive self-sealing longitudinal laps and butt strips. Secure field-applied jackets with outward clinch expanding staples and seal staple penetrations with vapor retarder mastic.
   2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor retarder adhesive or PVC fitting covers.

D. For hot piping conveying fluids over 140°F, insulate flanges and unions at equipment.

E. Manmade mineral fiber insulated pipes conveying fluids above ambient temperature:
   1. Furnish factory-applied or field-applied standard jackets. Secure with outward clinch expanding staples or pressure sensitive adhesive system on standard factory-applied jacket and butt strips or both.
   2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

F. Inserts and Shields:
   1. Application: Piping or Equipment 2 inches diameter or larger.
   2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
   3. Insert location: Between support shield and piping and under finish jacket.
   4. Insert configuration: Minimum 6 inches long, of thickness and contour matching adjoining insulation; may be site fabricated or factory fabricated.
   5. Insert material: Compression resistant insulating material suitable for planned temperature range and service.

G. Continue insulation through penetrations of building assemblies or portions of assemblies having fire resistance rating of one hour or less. Provide intumescent firestopping when continuing insulation through assembly. Finish at supports, protrusions, and interruptions. Refer to Division 07 for penetrations of assemblies with fire resistance rating greater than one hour.

H. Exterior Applications: Provide vapor retarder jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor retarder cement. Cover with aluminum jacket with seams located at 3 or 9 o'clock

position on side of horizontal piping with overlap facing down to shed water or on bottom side of horizontal equipment.

I. Buried Piping: Insulate only where insulation manufacturer recommends insulation. Product may be installed in trench, tunnel or direct buried. Install factory fabricated assembly with inner all-purpose service jacket with self-sealing lap, and asphalt impregnated open mesh glass fabric, with 1 mil thick aluminum foil sandwiched between three layers of bituminous compound; outer surface faced with polyester film.

3.3 INSTALLATION - EQUIPMENT

A. Factory Insulated Equipment: Do not insulate.

B. Exposed Equipment: Locate insulation and cover seams in least visible locations.

C. Apply insulation close to equipment by grooving, scoring, and beveling insulation. Fasten insulation to equipment with studs, pins, clips, adhesive, wires, or bands.

D. Fill joints, cracks, seams, and depressions with bedding compound to form smooth surface. On cold equipment, use vapor retarder cement.

E. Insulated equipment containing fluids below ambient temperature: Insulate entire system.

F. Mineral fiber insulated equipment containing fluids below ambient temperature: Provide vapor retarder jackets, factory-applied or field-applied. Finish with glass-cloth and vapor barrier adhesive.

G. For hot equipment containing fluids over 140°F, insulate flanges and unions with removable sections and jackets.

H. Mineral fiber insulated equipment containing fluids above ambient temperature: Provide standard jackets, with or without vapor retarder, factory-applied or field-applied. Finish with glass cloth and adhesive.

I. Finish insulation at supports, protrusions, and interruptions.

J. Nameplates and ASME Stamps: Bevel and seal insulation around. Do not insulate over.

K. Equipment Requiring Access for Maintenance, Repair, or Cleaning: Install insulation for easy removal and replacement without damage.

3.4 SCHEDULES

A. Plumbing Systems:
   1. Domestic Hot Water Systems:
      a. Applications:
         1) Recirculating Systems:
            a) All piping, including the supply, return, and water heater piping.
         2) Pipes that are externally heated (such as heat trace or impedance heating).
      b. Material: Man Made Mineral Fiber Insulation.
      c. Thickness:
         1) Pipe diameter less than 1-1/2 inches: 1 inch.
         2) Pipe diameter 1-1/2 inches and greater: 1.5 inches.
   2. Domestic Cold Water Systems:
      a. Material: Man Made Mineral Fiber Insulation.
      b. Thickness: 1 inch.

3. Plumbing Vents Within 10 feet of Exterior:
    a. Material: Man Made Mineral Fiber Insulation.
    b. Thickness: 1 inch.
4. Roof Drainage:
    a. Material: Man Made Mineral Fiber Insulation.
    b. Thickness: 1 inch.
5. As otherwise required by the current MN Commercial Energy Code.

END OF SECTION

SECTION 22 11 00

FACILITY WATER DISTRIBUTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Domestic water piping, above grade.
2. Unions and flanges.
3. Dielectric fittings.
4. Ball valves.
5. Butterfly valves.
6. Check valves.
7. Pipe hangers and supports.
8. Thermometers.
9. Flow control/balancing valves.
10. Relief valves.
11. Hydrants.
12. Backflow preventers.
13. Water hammer arrestors.
14. Thermostatic mixing valves.
15. In-line circulator pumps.

B. Related Sections:
1. Section 22 05 29 - Hangers and Supports for Plumbing Piping and Equipment: Product requirements for pipe hangers and supports for placement by this section.
2. Section 22 05 53 - Identification for Plumbing Piping and Equipment: Product requirements for pipe identification and valve tags for placement by this section.
3. Section 22 07 00 - Plumbing Insulation: Product and execution requirements for pipe insulation.

1.2 REFERENCES

A. American National Standards Institute:
1. ANSI Z21.22 - Relief Valves for Hot Water Supply Systems.

B. American Society of Mechanical Engineers:
1. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
2. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
3. ASME B31.9 - Building Services Piping.
4. ASME Section VIII - Boiler and Pressure Vessel Code - Pressure Vessels.
5. ASME Section IX - Boiler and Pressure Vessel Code - Welding and Brazing Qualifications.

C. American Society of Sanitary Engineering:
1. ASSE 1010 - Performance Requirements for Water Hammer Arresters.
2. ASSE 1012 - Performance Requirements for Backflow Preventer with Intermediate Atmospheric Vent.
3. ASSE 1013 - Performance Requirements for Reduced Pressure Principle Backflow Preventers and Reduced Pressure Fire Protection Principle Backflow Preventers.
4. ASSE 1052 - Performance Requirements for Hose Connection Backflow Preventers.

5. ASSE 1061 - Performance Requirements for Removable and Non-Removable Push-Fit Fittings.

D. ASTM International:
1. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
2. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
3. ASTM A395/A395M - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.
4. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
5. ASTM E1 - Standard Specification for ASTM Thermometers.

E. American Water Works Association:
1. AWWA C651 - Disinfecting Water Mains.

F. Manufacturers Standardization Society of the Valve and Fittings Industry:
1. MSS SP 67 - Butterfly Valves.
2. MSS SP 71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.
3. MSS SP 80 - Bronze Gate, Globe, Angle and Check Valves.
4. MSS SP 110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

G. National Electrical Manufacturers Association:
1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

H. NSF International:
1. NSF 14 - Plastics Piping System Components and Related Materials.
2. NSF 61 - Drinking Water System Components – Health Effects.
3. NSF 372 - Drinking Water Components – Lead Content.

I. Plumbing and Drainage Institute:
1. PDI WH201 - Water Hammer Arrester Standard.

1.3 SYSTEM DESCRIPTION

A. The Plumbing Contractor is responsible for items in this Section.

B. The water distribution system shall be copper ASTM B88 Type L copper. No other pipe materials will be approved.

1.4 SUBMITTALS

A. Product Data:
1. Domestic Water Specialties: Submit manufacturers catalog information, component sizes, rough-in requirements, service sizes, and finishes.
2. Pumps: Submit pump type, capacity, certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements.

B. Build America, Buy America (BABA) Documentation: Contractors must comply with and provide documentation that shows compliance with BABA requirements. Product certification letters need to include the following five items:

1. Documentation linked to the project. Identify the project name, project location, contract number, or project number.
2. Documentation linked to the product used on the project. Description of product(s) (simple explanation sufficient to identify product(s)), or an attached purchase order, invoice, or bill of lading.
3. Documentation includes a statement attesting that the products supplied to the Recipient are compliant with BABA requirements. For iron and steel items under BABA, references to the American Iron and Steel (AIS) requirements are also acceptable and reciprocal with BABA for such items.
4. Documentation that manufacturing occurred in the United States, which could include, for example, the location(s) of manufacturing for each manufacturing step that is being certified. It is acceptable for manufactured products to note a single point of manufacturing, documenting that the final point of manufacturing is in the United States. Note that each BABA category may require different determinations for compliance.
5. Signature of company representative (on company letterhead and signature can be electronic). The signatory of the certifying statement affirms their knowledge of the manufacturing processes for the referenced product(s) and attests that the product meets the BABA requirements.

C. Any substitution requests shall meet the BABA requirements listed above.

1.5 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of valves and equipment.

B. Operation and Maintenance Data: Submit spare parts list, exploded assembly views and recommended maintenance intervals.

C. Pressure Test Report: Submit verification of pressure test report. Include test type, testing pressure, and length of time.

1.6 QUALITY ASSURANCE

A. Perform Work in compliance with all applicable codes and standards enforced by the Authority Having Jurisdiction, as well as all applicable laws, ordinances, and regulations.

B. Lead-free: All fittings, valves, fixtures, and accessories that contact potable water shall be lead-free compliant per NSF 61 and NSF 372.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Accept valves and equipment on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Do not install underground piping when bedding is wet or frozen.

1.10 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 DOMESTIC WATER PIPING, ABOVE GRADE

A. Copper Tubing: ASTM B88, Type L, hard drawn.
   1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
   2. Joints: Solder, lead free, 95-5 tin-antimony, or tin and silver, with melting range 430 to 535 °F.

2.2 UNIONS AND FLANGES

A. Unions for Pipe 2 inches and Smaller:
   1. Copper Piping: Class 150, bronze unions with soldered.
   2. Dielectric Connections: Dielectric union connections are NOT permitted.

B. Flanges for Pipe 2-½-inches and Larger:
   1. Ferrous Piping: Class 150, forged steel, slip-on flanges.
   2. Gaskets: 1/16 inch thick preformed neoprene gaskets.

2.3 DIELECTRIC FITTINGS

A. Dielectric Waterway Connectors:
   1. Manufacturers:
      a. ClearFlow (Elstel Perfection).
   2. Dissimilar metals shall be separated with a dielectric waterway connector
   3. Material: Electro-zinc-plated steel casing, insert plastic lining, threaded ends.

2.4 BALL VALVES

A. Manufacturers:
   1. Crane Valve, North America.
   2. Hammond Valve.
   3. Milwaukee Valve Company.
   4. NIBCO, Inc.
   5. Stockham Valves & Fittings.

B. 2 inches and Smaller: MSS SP 110, one-piece bronze body, chrome plated brass ball, regular port, Teflon seats, blowout proof stem, solder or threaded ends with lever handle.

2.5 BUTTERFLY VALVES

A. Manufacturers:
   1. Crane Valve, North America.
   2. Hammond Valve.
   3. Milwaukee Valve Company.
   4. NIBCO, Inc..

5. Stockham Valves & Fittings.
6. Victaulic Co.

B. 2-½-inches and Larger: MSS SP 67, Class 150.
1. Body: Cast or ductile iron, wafer lug or grooved ends, stainless steel stem, extended neck.
2. Disc: Nickel-plated ductile iron.
3. Seat: Resilient replaceable EPDM.
4. Handle and Operator: 10 position lever handle.

2.6 CHECK VALVES

A. Horizontal Swing Check Valves:
1. Manufacturers:
a. Crane Valve, North America.
b. Hammond Valve.
c. Milwaukee Valve Company.
d. NIBCO, Inc.
e. Stockham Valves & Fittings.
2. 2 inches and Smaller: MSS SP 80, bronze body and cap, bronze seat, Buna-N disc, solder or threaded ends.
3. 2-½-inches and Larger: MSS SP 71, cast iron body, bolted cap, bronze or cast iron disc, flanged ends.

2.7 PIPE HANGERS AND SUPPORTS

A. Refer to Section 22 05 29.

2.8 STEM TYPE THERMOMETERS

A. Manufacturers:
1. Ashcroft, Inc.
2. H. O. Trerice Company.
3. Weiss Instruments, Inc.

B. Thermometer: ASTM E1, adjustable angle, red appearing mercury, lens front tube, cast aluminum case with enamel finish, cast aluminum adjustable joint with positive locking device.
1. Size: 9 inch scale.
2. Window: Clear Lexan.
3. Stem: Brass, ¾-inch NPT, Length as required for proper fluid sensing.
4. Accuracy: 2 percent.
5. Calibration: Both °F and °C.
6. Range:
a. Hot Water: 30 °F to 160°F.
b. Cold Water: 0 °F to 100°F.

C. Light-Powered Digital Thermometer: NEMA-4X, adjustable angle, LCD digits display, cast aluminum case with epoxy finish, cast aluminum adjustable joint with positive locking device.
1. Size: 7 inch scale.
2. Window: Clear Lexan.
3. Stem: Brass, 3/4 inch NPT, Length as required for proper fluid sensing.
4. Accuracy: 1 percent.
5. Units of Measure: Both °F and °C.
6. Range:

a. Hot Water: 30°F to 160°F.
b. Cold Water: 0°F to 100°F.

2.9 FLOW CONTROL/BALANCING VALVES

A. Manufacturers:
1. Bell & Gossett (Xylem, Inc).
2. Danfoss.
3. Griswold Controls.
4. Taco, Inc.
5. Victaulic Co.

B. Type: Flow control valve shall be manual balancing valve.

C. Construction: Brass, bronze, or stainless-steel body with union and isolation ball valve on inlet and outlet, and temperature and pressure test plugs.

D. Each domestic hot water recirculation branch return line shall be provided with a balancing valve and an in-line spring check valve to prevent reverse flow between branches. Balancing valve shall have readout ports for flow verification. Check valve shall be low cracking pressure, silent type.

2.10 RELIEF VALVES

A. Pressure Relief:
1. ANSI Z21.22 certified, bronze body, Teflon seat, steel stem and springs, automatic, direct pressure actuated.

B. Temperature and Pressure Relief:
1. ANSI Z21.22 certified, bronze body, Teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, temperature relief maximum 210°F, capacity ASME certified and labeled.

2.11 HYDRANTS

A. Manufacturers:
1. Woodford Manufacturing Company.
2. Zurn Wilkins (Zurn Industries, LLC).
3. Leonard Valve Company.

B. Exterior Freezeproof Wall Hydrant: Automatic draining with anti-siphon vacuum breaker (ASSE 1011). ASSE Standard 1019-B approved. ¾" inlet and outlet. Hardened stainless steel operating stem and one-piece valve plunger to control both flow and drain functions. Exterior finish to be chrome plated. Loose tee key to be furnished with each hydrant.

2.12 BACKFLOW PREVENTERS

A. Manufacturers:
1. Apollo Valves (Aalberts Industries N.V.)
2. Watts Water Technologies, Inc.
3. Zurn Wilkins (Zurn Industries, LLC).

B. Reduced Pressure Backflow Preventers:
1. Comply with ASSE 1013.
2. Bronze body, with bronze internal parts and stainless-steel springs.

3. Two independently operating, spring loaded check valves; diaphragm type differential pressure relief valve located between check valves; third check valve opening under back pressure in case of diaphragm failure; non-threaded vent outlet; assembled with two gate valves, strainer, and four test cocks.

C. Double Check Valve Assemblies: Comply with ASSE 1015; Bronze body with corrosion resistant internal parts and stainless-steel springs; two independently operating check valves with intermediate atmospheric vent.

2.13 WATER HAMMER ARRESTORS

A. ASSE 1010; copper construction, piston type sized in accordance with PDI WH-201.

B. Pre-charged suitable for operation in temperature range 34 to 250˚F and maximum 150 psi working pressure.

2.14 THERMOSTATIC MIXING VALVES

A. (TMV-1) Thermostatic Mixing Valve, Point-of-Use:
   1. Basis of Design: Leonard, Model 170A-LF.
   2. Manufacturers:
      a. Leonard Valve Company.
      b. Approved equal.
   3. Description: Provide a point-of-use thermostatic mixing valve for installation at individual public lavatories to control mixed water temperature and provide scald protection in accordance with ASSE 1070.
   4. Performance:
      a. Comply with ASSE 1070.
      b. Certified lead-free per NSF/ANSI 372.
      c. Control mixed water temperature to a maximum of 105°F; factory preset, field adjustable.
      d. Maintain outlet temperature within +/-3°F under varying inlet pressures and temperatures.
      e. Flow Capacity: 0.5 gpm minimum to 2.2 gpm maximum.
      f. Provide automatic shutoff of hot water if cold water supply fails.
   5. Mounting: Integral wall support.
   6. Construction:
      a. Lead-free brass body.
      b. Internal thermostatic element.
      c. Integral inlet check valves to prevent cross-flow.
      d. Inlet strainers to protect internal components.
      e. Tamper-resistant temperature adjustment cap.
      f. 3/8-inch compression or NPT connections, as required for faucet connection.
      g. Factory assembled and tested.
   7. Accessories:
      a. Provide isolation valves and union fittings if required for serviceability.
      b. Provide mounting bracket or support hardware as needed for under-deck installation.

2.15 IN-LINE CIRCULATOR PUMPS

A. Basis of Design: B&G ecoCircXL Series.

B. Manufacturers:
   1. Bell & Gosset (Xylem).
   2. Grundfos Pumps Corp.
   3. Taco, Inc.
   4. Armstrong Fluid Technology.
   5. Wilo.

C. Description: Provide electronically commutated motor (ECM) inline wet rotor circulator pumps suitable for domestic hot water recirculation. Pump construction shall be suitable for potable water and continuous circulation service.

D. Performance:
   1. Maximum operating temperature: 230°F.
   2. Maximum operating pressure: 145 psig.
   3. Pump performance shall meet project-specific duty points shown on drawings and schedules.
   4. Variable speed control with integrated differential pressure or constant pressure control modes.
   5. Energy-efficient ECM motor with automatic night setback and soft-start functionality.
   6. Comply with ANSI/NSF 61 and NSF 372 for potable water systems.

E. Construction:
   1. Body Material:
      a. Bronze or stainless steel.
      b. Suitable for potable water and non-corrosive DHW recirculation.
   2. Impeller: Corrosion-resistant composite.
   3. Shaft: Ceramic or stainless steel.
   4. Bearings: Maintenance-free, self-lubricating.
   5. Electrical: As shown on drawings; integrated motor and control module.
   6. Motor Enclosure: TEFC or IP44 minimum.
   7. Display: LED or digital display for pump status, head, and flow rate.

F. Control Features:
   1. Built-in control logic with selectable modes:
      a. Proportional differential pressure.
      b. Constant differential pressure.
      c. Constant speed.
   2. Manual and automatic operation modes.
   3. Alarm relay or fault output for BMS integration.
   4. BACnet or Modbus communication capability.

G. Accessories:
   1. Isolation valves and unions for serviceability.
   2. Mounting brackets or supports as required.
   3. Check valve (where specified or required by application).
   4. Insulating jacket (where required by code or energy standards).

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Remove scale and dirt, on inside and outside, before assembly.

3.3 INSTALLATION - THERMOMETERS AND GAUGES

A. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2-½-inches for installation of thermometer sockets. Allow clearance from insulation.

B. Provide instruments with scale ranges selected according to service with largest appropriate scale.

C. Install gauges and thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.

D. Adjust gauges and thermometers to final angle, clean windows and lenses, and calibrate to zero.

3.4 INSTALLATION - HANGERS AND SUPPORTS

A. Refer to Section 22 05 29.

3.5 INSTALLATION - ABOVE GROUND PIPING

A. For non-metallic pipe, verify nominal pipe size of equivalent pressure drop, flow rate, and velocity.

B. Install non-conducting dielectric connections wherever jointing dissimilar metals.

C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

D. Install piping to maintain headroom without interfering with use of space or taking more space than necessary.

E. Group piping whenever practical at common elevations.

F. Slope piping and arrange systems to drain at low points.

G. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 23 05 16.

H. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 22 07 00.

I. Provide access where valves and fittings are not accessible.

J. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

K. Provide support for utility meters in accordance with requirements of utility companies.

L. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting. Refer to Division 09.

M. Install domestic water piping in accordance with ASME B31.9.

N. Sleeve pipes passing through partitions, walls and floors. Refer to Section 22 05 29.

1. Where piping penetrates floor, ceiling, or wall, close off space between pipe and adjacent work with insulation and caulk airtight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.
2. For large holes in wall, floor, and ceiling assemblies: Infill, patch, and seal the annular space around pipe penetration. Match materials and finishes of adjacent work.

O. Install firestopping at fire rated construction perimeters and openings containing penetrating sleeves and piping. Refer to Division 07.

P. Install unions downstream of valves and at equipment or apparatus connections.

Q. Install valves with stems upright or horizontal, not inverted.

R. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

S. Install ball valves for shut-off and to isolate equipment, parts of systems, or vertical risers.

T. Install butterfly valves for throttling, bypass, or manual flow control services.

U. Provide check valves on discharge of water pumps.

V. Provide flow controls in water circulating systems as indicated on Drawings.

W. Install potable water protection devices on plumbing lines where contamination of domestic water may occur: on boiler feed water lines, janitor rooms, fire sprinkler systems, premise isolation, irrigation systems, flush valves, interior and exterior hose bibs.

X. Pipe relief from valves, back-flow preventers and drains to nearest floor drain.

Y. Install water hammer arrestors complete with isolation valve.
1. Water hammer arrestor and isolation valve shall be installed in accessible locations.
   a. Walls and hard ceilings are not considered accessible locations.
2. Refer to Drawings for water hammer arrestor locations. Provide water hammer arrestors on domestic cold and hot water piping systems where quick-closing or solenoid-type valves are installed, including but not limited to clothes washers, dishwashers, flush valves, ice makers, emergency showers/eyewashes, and other similar devices.

Z. Water supply connections to fixtures or equipment which have inlets below the spill line, must be provided with an approved backflow preventer.

AA. Valves shall be installed permitting the water supply to each individual fixture to be shut off without disrupting any other portion of the building. An accessible control valve shall be installed ahead of each slip joint connection at a plumbing fixture.

BB. Lead-free: all fittings, valves, and fixtures and accessories that contact potable water shall be lead-free compliant per NSF 61 and NSF 372.

CC. Where two separate handles control the hot and cold water, the left-handed control of the faucet where facing the fixture fitting outlet shall control the hot water. Faucets and diverter shall be connected to the water distribution system so that hot water corresponds to the left side of the fittings.

DD. The installation of reduced pressure zone assemblies, double check valve assemblies, pressure vacuum breakers, spill-proof vacuum breakers, reduced pressure detector fire protection assemblies, or double check detector fire protection assemblies is permitted only when a testing and inspection program acceptable to the administrative authority is provided (see Minnesota rules, chapter 4714, section 603.5.23). The administrative authority and water

purveyor must be notified prior to installation. Devices must be tested upon initial installation and not less than annually, and records must be kept. Installations must be at least 12-inches and not more than 5-feet above finished floor or ground level unless a permanent platform for access is provided.

EE. Wall hydrants must meet ASSE Standard 1019. Where permitted by the administrative authority, wall hydrants may utilize non-removable ASSE 1052 backflow preventers or non-removable ASSE 1011 vacuum breakers and provision is made to protect from freezing (see Minnesota Rules, Chapter 4714, Sections 603.5.7, 312.6, and 301.1.2).

FF. Water heaters must be accessible with sufficient clearance for maintenance and repair. Unlisted water heaters must have 12-inches minimum clearance on all sides (see Minnesota Rules, Chapter 4714, Sections 507.26 and 504.3.2).

3.6 INSTALLATION - PUMPS

A. Provide pumps to operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.

B. Install domestic hot water circulation pump in accordance with manufacturer's instructions, the contract documents, and all applicable codes.

C. Provide proper clearances for service access to pump, motor, and controls.

D. Install pump in horizontal pipe runs unless otherwise approved for vertical installation per manufacturer.

E. Install pump with motor shaft in horizontal position unless manufacturer permits vertical motor orientation.

F. Mount pump with vibration isolation pads or resilient supports where installed on building structure.

G. Coordinate with adjacent piping, valves, and equipment to ensure unobstructed pump removal and maintenance.

H. Provide dielectric isolation fittings where dissimilar metals are connected.

I. Install shutoff/isolation valves on inlet and outlet of each pump.

J. Provide unions or flanged connections at pump to facilitate removal.

K. Install check valve downstream of pump where required by design or to prevent reverse flow.

L. Install drain valves as necessary to allow pump and piping section to be drained without removing components.

M. Coordinate with Division 26 for wiring of pump motors and controls.

N. Verify correct pump rotation and operation modes upon startup.

O. Integrate pump with BAS where specified.

3.7 INSTALLATION - SERVICE CONNECTIONS

A. Connect to existing water service inside of building.

B. New reduced pressure zone backflow preventers to be tested by a certified backflow prevention tester. Copies of each backflow test to be submitted to the Building Official prior to final plumbing inspection.

3.8 FIELD QUALITY CONTROL

A. Test domestic water piping system in accordance with local Authority Having Jurisdiction.

3.9 CLEANING

A. Prior to starting work, verify system is complete, flushed, and clean.

B. Verify pH of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).

C. Inject disinfectant, free chlorine in liquid, powder and tablet or gas form, throughout system to obtain residual from 50 to 80 mg/L.

D. Bleed water from outlets to obtain distribution and test for disinfectant residual at minimum 15 percent of outlets.

E. Maintain disinfectant in system for 24 hours.

F. When final disinfectant residual tests less than 25 mg/L, repeat treatment.

G. Flush disinfectant from system until residual concentration is equal to incoming water or 1.0 mg/L.

H. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

END OF SECTION

SECTION 22 11 23

DOMESTIC WATER PACKAGED BOOSTER PUMPS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Packaged Domestic Water Booster Pumps.

B. Where utility water pressure cannot adequately meet the pressure requirements of the domestic water systems, furnish and install a factory packaged and tested, duplex variable-speed domestic water pressure boosting system including pumps, motors, controls, valves, interconnecting piping, bypass piping, wiring and all required accessories for a fully-functional, code-compliant system.

C. Related Sections:
   1. Section 22 05 29 - Hangers and Supports for Plumbing Piping and Equipment: Product requirements for pipe hangers and supports for placement by this section.
   2. Section 22 05 53 - Identification for Plumbing Piping and Equipment: Product requirements for pipe identification and valve tags for placement by this section.
   3. Section 22 07 00 - Plumbing Insulation: Product and execution requirements for pipe insulation.
   4. Section 23 05 13 - Common Motor Requirements for HVAC Equipment: Product requirements for motors for placement by this section.
   5. Section 23 05 16 - Expansion Fittings and Loops for HVAC Piping: Execution requirements for pipe expansion devices for placement by this section.
   6. Section 23 05 48 - Vibration and Seismic Controls for HVAC Piping and Equipment: Product requirements for vibration isolators for placement by this section.

1.2 REFERENCES

A. American Society of Mechanical Engineers:
   1. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
   2. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
   3. ASME B31.9 - Building Services Piping.

B. ASTM International:
   1. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
   2. ASTM B88 - Standard Specification for Seamless Copper Water Tube.

C. American Water Works Association:
   1. AWWA C651 - Disinfecting Water Mains.

D. Manufacturers Standardization Society of the Valve and Fittings Industry:
   1. MSS SP 67 - Butterfly Valves.
   2. MSS SP 71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.
   3. MSS SP 80 - Bronze Gate, Globe, Angle and Check Valves.
   4. MSS SP 110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

E. National Electrical Manufacturers Association:

1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

F. NSF International:
1. NSF 14 – Plastics Piping System Components and Related Materials.
2. NSF 61 – Drinking Water System Components – Health Effects.
3. NSF 372 – Drinking Water Components – Lead Content.

1.3 SYSTEM DESCRIPTION

A. The Plumbing Contractor is responsible for items in this Section.

1.4 SUBMITTALS

A. Product Data:
1. Pumps: Submit pump type, capacity, certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements. Show layout and connections for packaged booster pumps. Include setting drawings with templates, directions for installation of foundation and anchor bolts, and other anchorages. Wiring diagrams shall detail wiring for power, signal, and control systems and shall differentiate between manufacturer-installed and field-installed wiring.

B. Build America, Buy America (BABA) Documentation: Contractors must comply with and provide documentation that shows compliance with BABA requirements. Product certification letters need to include the following five items:
1. Documentation linked to the project. Identify the project name, project location, contract number, or project number.
2. Documentation linked to the product used on the project. Description of product(s) (simple explanation sufficient to identify product(s)), or an attached purchase order, invoice, or bill of lading.
3. Documentation includes a statement attesting that the products supplied to the Recipient are compliant with BABA requirements. For iron and steel items under BABA, references to the American Iron and Steel (AIS) requirements are also acceptable and reciprocal with BABA for such items.
4. Documentation that manufacturing occurred in the United States, which could include, for example, the location(s) of manufacturing for each manufacturing step that is being certified. It is acceptable for manufactured products to note a single point of manufacturing, documenting that the final point of manufacturing is in the United States. Note that each BABA category may require different determinations for compliance.
5. Signature of company representative (on company letterhead and signature can be electronic). The signatory of the certifying statement affirms their knowledge of the manufacturing processes for the referenced product(s) and attests that the product meets the BABA requirements.

C. Any substitution requests shall meet the BABA requirements listed above.

1.5 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of valves and equipment.

B. Operation and Maintenance Data: Submit spare parts list, exploded assembly views, recommended maintenance intervals, manufacturer's instructions, start-up data, and trouble-shooting check lists.

C. Provide full written description of manufacturer's warranty.

D. Field Reports: Submit verification statement, signed by system manufacturer's representative, of start-up, adjustment service and acceptance of installation. Indicate summary of hydrostatic test and field acceptance tests performed.

1.6 QUALITY ASSURANCE

A. Perform Work in compliance with all applicable codes and standards enforced by the Authority Having Jurisdiction, as well as all applicable laws, ordinances, and regulations.

B. The manufacturer of the domestic water pressure boosting system shall be responsible for compliance with all applicable codes and regulations and be held accountable for the complete pump package and installation.

C. Lead-Free: The pumping package shall be certified by an approved independent testing and certification organization as being compliant with the requirements of NSF 61 and 372 for potable drinking water and low lead content for a wetted area, weighted average lead content less than 0.25%. Packages that are not certified will not be considered equal.

D. Source Limitations: Obtain same type of packaged booster pumps through one source from a single manufacturer.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA by a testing agency acceptable to authorities having jurisdiction.

F. All disconnects, transformers, and control devices shall be installed to provide minimum wire bending clearances per N.E.C. The entire assembly shall be wired and tested in accordance with the N.E.C. All components shall be built to NEMA standards and the UL approved. The entire control panel shall bear the UL label for enclosed control panels.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Accept pumps and components on site in factory packaging. Inspect for damage.

B. Retain shipping flange protective covers and protective coatings during storage.

C. Protect pumps and components from physical damage including effects of weather, water, and construction debris.

D. Comply with pump manufacturer's rigging instructions for handling.

PART 2 PRODUCTS

2.1 GENERAL

A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

B. Pressure ratings of pumps, pipe, fittings, valves, gauges and all other water carrying appurtenances shall be suitable for the anticipated system pressures in which they are installed.

C. The Contractor shall ascertain the space and access available for the installation of a factory assembled packaged unit.

D. The booster system shall be factory assembled including pumps, motors, shut-off valves, check valves, Type 'L' copper or Schedule 40 300 series stainless steel suction and discharge manifolds, all interconnecting piping, wiring, variable frequency drives with logic and power controls.

E. The discharge of each pump shall be fitted with a control valve appropriate for station operation. Each pump and discharge valve assembly shall also be equipped with isolation valves so that the pump can be serviced while system is still filled.

F. The pump logic control system shall include at a minimum drive integrated programmable logic station controller with multi-pump and multi-master capability, motor mounted/integrated variable frequency drives, manifold mounted 4-20mA pressure transducers, one per pump, and any additional equipment as specified or as required to properly execute the sequence of operation.

G. Pressure gauges shall be installed on the suction and discharge headers. Accuracy shall be ±1.5%.

H. All skid-mounted components shall be factory finished in high quality epoxy or enamel paint. The base shall be suitable for grouting.

I. The packaged pumping system shall include all electrical wiring between components and shall be completed and tested at the factory prior to shipment.

J. Unions or flanges shall be provided for easy removal of pumps.

K. System shall be arranged such that single point connections are required for piping and electrical power supply.

L. Individual pumps, motors, and pressure regulating or check valves shall be serviceable with the booster system in operation.

M. All similar components shall be of one manufacturer.

N. Piping shall be sized so that water velocity shall not exceed 10.0 FPS in either the branches or manifolds.

O. Refer to equipment schedules on Drawings for required pump capacities and electrical characteristics.

2.2 ACCEPTABLE MANUFACTURERS

A. The following manufacturers are acceptable provided their products meet or exceed these Specifications and the requirements of the Drawings:
   1. Delta P.
   2. Bell and Gossett.
   3. Grundfos.
   4. Patterson Pump.
   5. Armstrong.

6. Aurora.
7. Quantumflo.
8. Or equal if BABA Compliant.

2.3 PUMPS AND MOTORS

A. System shall include two stainless steel vertical multi-stage pumps with ANSI flanged connections.

B. Components.
1. Impellers: AISI 304.
2. Diffuser: AISI 304.
3. External Sleeve: AISI 304.
4. Pump Body: AISI 304.
5. Seal Housing: AISI 304.
6. Mechanical Seal: Carb-Silcarb-Viton.

C. Access to the mechanical seal shall not require removing the motor.

D. Flange bolts shall be zinc plated and shall meet ASTM Grade A193 B7.

E. Pumps shall be protected from thermal accumulation via individual thermal relief mechanisms.

2.4 VARIABLE FREQUENCY DRIVES

A. Provide a completely integrated variable speed pump logic controller per pump, including the variable frequency drive, programmable pump specific control logic, and UL Type 1 / IP55 enclosure. Standard variable frequency drives that do not incorporate pump control logic as the primary control software, programming and features directly applicable to booster pump applications will not be considered equal.

B. Additional control panels, PLCs or other external controls shall not be necessary to accomplish complete pump programming and variable speed control of the pump system.

C. The integrated microprocessor shall provide automatic start and stop of at least 3 variable speed controlled pumps, and enable automatic changeover for lead and lag pump sequencing, with out the use of external devices or timers.

D. The pump controller shall function to a proven program that safeguards the pumps/system against damaging hydraulic conditions.

E. The pump controller shall be capable of accepting individual analog inputs from up to 2 zone sensor/transmitters as indicated on the plans. Analog input resolution shall be 12-bit minimum, and the controller shall scan each analog input a minimum of once every 100 milliseconds. All sensor/transmitter inputs shall be individually wired to the pump logic controller for continuous scan and comparison function. All analog inputs shall be provided with current limit circuitry to provide short circuit protection and safeguard against incorrect wiring of sensors.

F. Hydraulic stabilization program shall utilize a proportional-integral-derivative control function. The proportional, integral and derivative values shall be user adjustable over an infinite range. The scan and compare rate that selects the command set point and process variable signal shall be continuous and automatically set for optimum performance. Each sensor shall be scanned at least once every 100 milliseconds.

G. The pump controller shall provide an LCD display with programming keypad for data entry in plain English or other optional language pumping terms.

H. The system shall utilize the QuickStart feature to simplify programming and startup of the pump control system. The feature shall be specific to pump systems and use suitable pump terminology.

I. The pump controller shall be capable of communicating with the Building Automation System (BAS) by both hard-wired and serial communications.

J. The following communication features shall be provided to the Building Automation System via an onboard RS-485 port utilizing Modbus RTU, Modbus ASCII, or BACnet MS/TP protocol.

K. The VFD and pump controller shall be rated to operate from 3-phase power at 208-240VAC, +15%, 48Hz to 62Hz. The drive shall employ a full wave rectifier to prevent input line notching and operate at a fundamental (displacement) input power factor of 0.98 at all speeds and nominal load. The drive efficiency shall be 98% or better at full speed and load.

L. Built in Total Harmonic Distortion filters (TDHi) shall reduce harmonic interference.

M. The VFD shall have the ability to automatically restart after a motor Overload, Over-Voltage, Under-Voltage, Inverter Overheat, Phase Loss, Communication Loss, Lack of Water, and Failure of Sensor 1. When enabled, the VFD will allow an automatic restart five (5) times when an error occurs. On the sixth occurrence, the VFD will shut-off and display an error message with the appropriate terminology.

N. Protective Functions
   1. Built-in protection for following conditions:
      a. Over/under voltage.
      b. Overcurrent/output short.
      c. Low water (requires low water pressure switch).
      d. Sensor failure.
      e. Motor over-temperature.
      f. Inverter over-temperature.
      g. Minimum threshold/conveyer limit.
   2. For each programmed warning and fault protection function, the Drive shall display a message in complete English words or Standard English abbreviations. The three (3) most recent fault messages along with time, current, speed, voltage, frequency and DI Status shall be stored in the Drive's fault history. The last five (5) fault names shall be stored in Drive memory.
   3. The Drive shall include internal MOV's for phase to phase and phase to ground line voltage transient protection.
   4. Output short circuit withstand rating and ground fault protection rated for 100,000 AIC shall be provided without relying on line fuses. Motor phase loss protection shall be provided.
   5. The Drive shall provide electronic motor overload protection.
   6. Protection shall be provided for AC line or DC bus overvoltage at 130% of maximum rated or under voltage at 65% of min. rated and input phase loss.

O. BAUD rate setting for communication shall be 1200 minimum and 115,200 maximum.

2.5 SEQUENCE OF OPERATION

A. The lead pump shall run only as necessary to maintain system pressure and will be controlled automatically by means of a pressure sensor/transmitter, pump controller, and VFD. System shall be programmed to prevent short cycling. When the set point is satisfied by the process variable, the pump speed shall remain constant at the optimum energy consumption level. If the lead pump is unable to maintain system pressure, the lag pump(s) will be called on after a time delay and will operate in parallel with the lead pump in accordance with the pump controller logic. When one pump can handle the system demand the controls will shut down the lag pump(s). When a low or no flow condition is reached, the controls will accelerate the lead pump to charge the system and hydro-pneumatic tank, and then shut the lead pump down and alternate. When the system is satisfied, the pump controller shall shut down the single running lead pump and enter energy saving / no flow shutdown mode.

B. System shall include both Local and Remote modes of operation. When the pump logic controller mode is in Local, the pumping system shall operate automatically.

C. In the event of a pump failure or a VFD fault, the pump logic controller automatically initiates a timed sequence of operation to start the redundant pump/VFD set in the variable speed mode.

D. In the event of the failure of a zone sensor/transmitter, its process variable signal shall be removed from the scan/compare program. The redundant zone sensor/transmitters, if available, shall remain in the scan/compare program for control.

E. PUMP or VFD fault shall be continuously scrolled through the display on the operator interface of the pump logic controller until the fault has been corrected and the controller has been manually reset.

2.6 ELECTRICAL

A. Station Panel Enclosure.
   1. The main station disconnect shall have a through-door operator and shall be sized as shown in the technical data sheet. Individual integrated circuit breaker disconnects shall have exterior operators, and shall be sized as shown in the technical data sheet. Station disconnect panel shall be housed in a NEMA 12 enclosure with integral latches. 2 inches and Smaller: MSS SP 110, one-piece bronze body, chrome plated brass ball, regular port, Teflon seats, blowout proof stem, solder or threaded ends with lever handle.

B. Controls and Enclosure.
   1. The control panel with controls shall be built in accordance with NEC, and shall comply with UL standards. Pump station manufacturer shall be authorized under UL508A to manufacture its own control panels. All equipment and wiring shall be mounted within the enclosure and each device shall be labeled with proper identification. All adjustments and maintenance shall be accessible from the front of the control enclosure. A complete wiring circuit diagram and legend with terminals, components, and wiring completely identified shall be provided. Main disconnect shall be interlocked with door.

C. Pumps Disconnects.
   1. Individual circuit breaker service disconnects for each pump are provided in the main station panel. The disconnects are approved under UL and CSA for use in systems rated up to 600VAC and are sized accordingly up to 200A. Disconnects are accessible without disengaging the main station disconnect to ensure that operation of the Booster is not

interrupted during individual pump service. Stations that do not provide external access to individual pump disconnects without disengaging the main station disconnect shall NOT be considered equal.

D. Sensor / Transmitters.
   1. Pressure transducers shall be utilized for providing all pressure signals for the pump control logic. Pressure transducer shall be a solid-state bonded strain gage type with an accuracy of < ±0.5% BFSL and constructed of 316 stainless steel. Transducer shall be rated for a pressure of 300 psi and shall provide gauge pressure output, rather than an absolute. Pressure transducer constructed of plastic is not acceptable. Pressure transducer shall be 4-20mA analog type with 10-28 VDC supply range shall utilize a packard type connector to prevent moisture intrusion and include surge protection against voltage spikes.
   2. Provide a low pressure switch, with a 6-90 PSI range. The switch shall be mounted to the suction manifold and provide protection against low inlet pressure.

2.7 MECHANICAL

A. Station Frame.
   1. The pump station frame shall be constructed from 304 stainless steel and designed to provide structural support for all attached equipment and provide anchor bolt support. The base shall supply sufficient rigidity to withstand the stresses of reasonable and competent transportation to site, off-loading, installation and operation.

B. Manifolds and Piping.
   1. All piping shall be constructed from 304 stainless steel, schedule 10 or heavier pipe as required to maintain a 3 to 1 pressure safety factor (including 0.062 in corrosion allowance).

C. Isolation Ball Valves.
   1. Isolation ball valves shall be certified to NSF-61 for use with potable drinking water.
   2. Isolation ball valves shall be certified as low lead having wetted surface area with a weighted average lead content<0.25%.
   3. Valves shall be rated for 600.0 psi g WOG / 150.0 psi g WSP for valves 0.25 in to 2.0 in and 400.0 psi g WOG / 125.0 psi g WSP for valves 2.5 in to 4.0 in.
   4. Seats and stem packing shall be virgin PTFE. Stem shall be bottom loaded blowout proof design with fluorocarbon elastomer O-ring to prevent stem leaks.
   5. Valves shall be 2-piece full port design.

D. Isolation Grooved Butterfly Valves.
   1. Valves shall be certified to NSF-61 for use with potable drinking water.
   2. Valve bodies shall be nylon coated ductile iron conforming to ASTM A536 with integral neck and ISO mounting top.
   3. The disc shall be encapsulated with Gr. E EPDM for cold and hot water services.
   4. Valves shall be rated for 300.0 psi g CWP

E. Threaded Check Valves.
   1. Body shall be stainless steel.
   2. Dome shall be Delrin.
   3. Disc shall be Buna-n.
   4. Guide shall be Delrin.

5. Screw shall be stainless steel.
6. Spring shall be stainless steel

F. Wafer Style Silent Check Valves.
1. The valve body shall be constructed of ASTM A126 Class B cast iron for Class 125/250 (Lead free).
2. The seat and double guided disc shall be ASTM B584, C87600 silicon bronze.
3. The compression spring shall be ASTM A313 Type 316 Stainless Steel.
4. Valve shall be NSF/ANSI 61 & 372 certified.
5. The valve design shall incorporate a center guided, spring loaded disc, guided at opposite ends and having a short linear stroke that generates a flow area equal to the nominal valve size.
6. The operation of the valve shall not be affected by the position of installation. The valve shall be capable of operating in the horizontal or vertical positions with the flow up or down.
7. All component parts shall be field replaceable without the need of special tools. A replaceable guide bushing shall be provided and held in position by the spring. The spring shall be designed to withstand 100,000 cycles without failure and provide a cracking pressure of 0.5 psi g.
8. The valve disc shall be concave to the flow direction providing for disc stabilization, maximum strength, and a minimum flow velocity to open the valve.
9. The valve disc and seat shall have a seating surface finish of 16 micro-inch or better to ensure positive seating at all pressures. The leakage rate shall not exceed the allowable rate for metal seated valves allowed by AWWA Standard C508 or 1 oz (30 ml) per hour per inch (mm) of valve diameter.
10. The valve flow way shall be contoured and unrestricted to provide full flow areas at all locations within the valve. Cv flow coefficients shall be equal to or greater than specified below and verified by an independent testing laboratory.
11. The valves shall be hydrostatically tested at 1.5 times their rated cold working pressure and seat tested at the valve CWP.

Valve Size Inches (mm)	**Wafer Style Cv**
2 (50)	43
2.5 (65)	88
3 (80)	130
4 (100)	228
5 (125)	350
6 (150)	520

PART 3 EXECUTION

3.1 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances.

B. Install the system level and in accordance with manufacturer's published recommendations.

C. Set entire unit on 4" high reinforced concrete equipment housekeeping pad. Provide vibration isolation if specified and bolt skid to pad. Structurally connect equipment pad to building slab to prevent movement.

D. Pipe discharge from all relief valves, drains and individual pump thermal purge protection solenoid valves, indirectly to floor drain having adequate capacity to accept discharge.

E. Provide valved Type 'L' copper branch feed to the hydro-pneumatic tank from the system distribution main as shown on the Drawings.

F. The booster system shall be hydrostatically tested and shall undergo a complete electric and hydraulic test from 0 – 100% design flow at the factory. All control devices including transmitters and all safety features shall be factory calibrated and tested.

G. The contractor shall align the pump and motor shafts to within the manufacturer's recommended tolerances prior to start-up.

H. Power wiring, as required, shall be the responsibility of the electrical contractor. All wiring shall be performed per manufacturer's instructions and applicable state, federal, and local codes.

I. Control wiring for remote mounted switches and sensors / transmitters shall be the responsibility of the controls contractor. All wiring shall be performed per manufacturer's instructions and applicable state, federal, and local codes.

J. Demonstration.
   1. The system manufacturer's factory qualified representative shall be capable of providing optional start-up of the packaged pumping system. This start-up shall include verification of proper installation, system initiation, adjustment and fine tuning. Start-up shall not be considered complete until the sequence of operation, including all alarms, has been sufficiently demonstrated to the owner or owner's designated representative. This job site visit shall occur only after all hook-ups, tie-ins, and terminations have been completed and signed-off on the manufacturer's start-up request form.
   2. The system manufacturer's factory qualified representative shall be capable of providing on-site training for owner's personnel. This training shall fully cover maintenance and operation of all system components.
   3. The system manufacturer must have an optional complete pressure booster training program available for owner's personnel. The training sessions shall take place at the manufacturer's facility and cover all aspects of pressure booster system design, service and operation.

K. Warranty.
   1. The manufacturer shall warrant the water pumping system to be free of defects in material and workmanship for one year (12 months) from date of authorized start-up, not to exceed eighteen (18) months from date of manufacturer's invoice. Complete terms and conditions will be provided upon request.

L. Start-up Service.
   1. Owner start up assistance will be provided by a manufacturer-qualified representative and will be limited to one 8-hour day, unless previously negotiated by the factory representative. When discharge piping, electrical connections, and electrical inspection have been completed, the pump station representative shall be contacted for start-up.

A minimum two-week notice shall be given to manufacturer representative prior to scheduled start up date. During start-up, the complete pumping system shall be given a running test of normal start and stop, and fully loaded operating conditions. During this test, each pump shall demonstrate its ability to operate without undue vibration, or overheating, and shall demonstrate its general fitness for service. All defects shall be corrected and adjustments shall be made to the pumping station for satisfactory operation. System problems or concerns will be corrected by the general contractor or site station staff, in conjunction with the appropriate factory representative. Testing shall be repeated until satisfactory results are obtained, as determined by the engineer.

END OF SECTION

SECTION 22 13 00

FACILITY SANITARY SEWERAGE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Sanitary sewer piping below grade.
2. Sanitary sewer piping above grade.
3. Pipe hangers and supports.
4. Floor drains.
5. Cleanouts.

B. Related Sections:
1. Section 22 05 29 - Hangers and Supports for Plumbing Piping and Equipment: Product requirements for pipe hangers and supports for placement by this section.
2. Section 22 05 53 - Identification for Plumbing Piping and Equipment: Product requirements for pipe identification for placement by this section.
3. Section 22 07 00 - Plumbing Insulation: Product and execution requirements for pipe insulation.

1.2 REFERENCES

A. American Society of Mechanical Engineers:
1. ASME A112.6.3 - Floor Drains and Trench Drains.
2. ASME A112.14.1 - Backwater Valves.
3. ASME A112.36.2M - Cleanouts.

B. ASTM International:
1. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings.
2. ASTM A888 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
3. ASTM C1540 - Standard Specification for Heavy-Duty Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings.
4. ASTM D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
5. ASTM D2665 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.
6. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.

C. Cast Iron Soil Pipe Institute:
1. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
2. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.

1.3 SUBMITTALS

A. Product Data:

1. Sanitary Drainage Specialties: Submit manufacturers catalog information, component sizes, rough-in requirements, service sizes, and finishes.

B. Build America, Buy America (BABA) Documentation: Contractors must comply with and provide documentation that shows compliance with BABA requirements. Product certification letters need to include the following five items:
   1. Documentation linked to the project. Identify the project name, project location, contract number, or project number.
   2. Documentation linked to the product used on the project. Description of product(s) (simple explanation sufficient to identify product(s)), or an attached purchase order, invoice, or bill of lading.
   3. Documentation includes a statement attesting that the products supplied to the Recipient are compliant with BABA requirements. For iron and steel items under BABA, references to the American Iron and Steel (AIS) requirements are also acceptable and reciprocal with BABA for such items.
   4. Documentation that manufacturing occurred in the United States, which could include, for example, the location(s) of manufacturing for each manufacturing step that is being certified. It is acceptable for manufactured products to note a single point of manufacturing, documenting that the final point of manufacturing is in the United States. Note that each BABA category may require different determinations for compliance.
   5. Signature of company representative (on company letterhead and signature can be electronic). The signatory of the certifying statement affirms their knowledge of the manufacturing processes for the referenced product(s) and attests that the product meets the BABA requirements.

C. Any substitution requests shall meet the BABA requirements listed above.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of equipment and clean-outs.

B. Operation and Maintenance Data: Submit frequency of treatment required for interceptors. Include, spare parts lists, exploded assembly views for pumps and equipment.

1.5 QUALITY ASSURANCE

A. Perform Work in compliance with all applicable codes and standards enforced by the Authority Having Jurisdiction, as well as all applicable laws, ordinances, and regulations.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Do not install underground piping when bedding is wet or frozen.

1.9 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 SANITARY SEWER PIPING, BELOW GRADE

A. Cast Iron Pipe: CISPI 301, ASTM A888, hub-less, service weight.
   1. Fittings: Cast iron, CISPI 301.
   2. Joints: CISPI 310, neoprene gaskets and stainless-steel clamp-and-shield assemblies.
   3. Cast iron piping shall be used in locations where drainage temperature exceeds 140F.

B. Plastic Pipe: ASTM D2665, polyvinyl chloride (PVC) material.
   1. Fittings: PVC, ASTM D2665.
   2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

2.2 SANITARY SEWER PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, ASTM A888, hub-less, service weight.
   1. Fittings: Cast iron, CISPI 301.
   2. Joints: CISPI 310, neoprene gaskets and stainless-steel clamp-and-shield assemblies.
   3. Cast iron piping shall be used in locations where drainage temperature exceeds 140F.

B. PVC Pipe: ASTM D2665, polyvinyl chloride (PVC) material.
   1. Fittings: ASTM D2665, PVC.
   2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

C. Cast iron pipe is required for mains and risers. PVC pipe is allowed in apartment units at branches leading to mains and risers.

2.3 PIPE HANGERS AND SUPPORTS

A. Refer to Section 22 05 29.

2.4 FLOOR DRAINS

A. Manufacturers:
   1. Josam Co.
   2. Jay R. Smith Manufacturing Co.
   3. MIFAB, Inc.
   4. Sioux Chief Manufacturing Co.
   5. Watts Water Technologies Co.
   6. Zurn Industries, LLC.

A. Floor Drain (FD-1): ASME A112.21.1; round strainer, cast iron floor drain with nickel bronze grate (adjustable).

B. Trench Drains: Cast in place sidewalk trench drain with ADA compliant grate. Coordinate with general contractor.

2.5 CLEANOUTS

   1. Josam Co.
   2. Jay R. Smith Manufacturing Co.
   3. MIFAB, Inc.
   4. Sioux Chief Manufacturing Co.

5. Watts Water Technologies Co.
6. Zurn Industries, LLC.

B. Exterior Surfaced Areas: Epoxy coated cast iron access housing with anchor flanges and extra heavy-duty ductile iron cover.

C. Exterior Unsurfaced Areas (Yard Cleanout): PVC threaded tee.

D. Interior Finished Floor Areas: Epoxy coated cast iron floor cleanout with 5-inch round adjustable gasketed nickel bronze top, stainless steel carpet marker, removable gas tight gasketed brass cleanout plug, and no hub outlet.

E. Interior Finished Wall Areas: Epoxy coated cast iron floor cleanout with 5-inch round adjustable gasketed heavy-duty stainless-steel top, removable gas tight gasketed brass plug, and no hub outlet.

F. Interior Finished Floor Areas: epoxy coated cast iron floor cleanout with 5-inch x 5-inch square adjustable gasketed heavy-duty stainless-steel top, removable gas tight gasketed brass plug, and no hub outlet.

G. Interior Finished Wall Areas: wall cleanout with two-piece expandable cleanout plug, stainless steel access cover, and vandal proof stainless steel screw.

H. Interior Unfinished Accessible Areas: Cast iron stack cleanout with threaded brass raised head cleanout plug, and no hub connections.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

3.3 INSTALLATION - HANGERS AND SUPPORTS

A. Refer to Section 22 05 29.

3.4 INSTALLATION - BURIED PIPING SYSTEMS

A. Verify existing piping system connection size, location, and invert is as indicated on Drawings.

B. Establish invert elevations, sloped for drainage to ¼-inch per foot minimum of buried piping with not less than 5 ft of cover. Maintain gradients.

C. Establish minimum separation of drainage piping from other services piping in accordance with local code.

D. Remove scale and dirt on inside of piping before assembly.

E. Excavate pipe trench in accordance with Division 31.

F. Install pipe to elevation required to maintain slope.

G. Place bedding material at trench bottom to provide uniform bedding for piping, level bedding materials in one continuous layer not exceeding 4 inches compacted depth.

H. Install pipe on prepared bedding.

I. Route pipe in straight line.

J. Install trace wire continuous buried 6 inches below finish grade, above pipeline; coordinate with Division 31.

K. All horizontal branch drains shall be uniformly pitched at ¼-inch per foot.

L. The building sewer must be installed with a uniform slope of at least ¼-inch per foot. Where municipal sewer depth, structural features, or building arrangement preclude this slope, a slope of 1/8-inch per foot minimum may be utilized if approved by the authority having jurisdiction.

M. All sinks, except for lavatories and private-use bar sinks, must be provided with 2-inch minimum vertical fixture drains. Laundry tubs, domestic clothes washers, and urinals also require 2-inch minimum vertical drains.

N. Pipe Cover and Backfilling:
   1. Backfill trench in accordance with Division 31.
   2. Maintain optimum moisture content of fill material to attain required compaction density.
   3. After hydrostatic test, evenly backfill entire trench width by hand placing backfill material and hand tamping in 6 inches compacted layers to 6 inches minimum cover over top of jacket. Compact to 95 percent maximum density.
   4. Evenly and continuously backfill remaining trench depth in uniform layers with backfill material.
   5. Do not use wheeled or tracked vehicles for tamping.

3.5 INSTALLATION - ABOVE GROUND PIPING

A. Establish invert elevations, slopes for drainage to ¼-inch per foot minimum unless noted otherwise. Maintain gradients.

B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Provide clearances at cleanout for snaking drainage system.

C. Encase exterior cleanouts in concrete flush with grade.

D. Install floor cleanouts at elevation to accommodate finished floor.

E. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

F. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

G. Install piping to maintain headroom. Do not spread piping, conserve space.

H. Group piping whenever practical at common elevations.

I. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 23 05 16.

J. Provide clearance in hangers and from structure and other equipment for installation of insulation. Refer to Section 22 07 00.

K. Provide access where valves and fittings are not accessible.

L. Install piping penetrating roofed areas to maintain integrity of roof assembly.

M. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

N. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting. Refer to Division 09.

O. Install bell and spigot pipe with bell end upstream.

P. Sleeve pipes passing through partitions, walls, and floors.
   1. Where piping penetrates floor, ceiling, or wall, close off space between pipe and adjacent work with insulation and caulk airtight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.
   2. For large holes in wall, floor, and ceiling assemblies: Infill, patch, and seal the annular space around pipe penetration. Match materials and finishes of adjacent work.

Q. Install firestopping at fire rated construction perimeters and openings containing penetrating sleeves and piping. Refer to Division 07.

R. Support cast iron drainage piping at every joint.

S. Installation standards for ABS and PVC allow the use of offsets, expansion joints, or restraints provided conditions of proper support and movement are met. Accordingly, aboveground horizontal and vertical plastic piping must be installed with restraint fittings or a minimum 24-inch, 45-degree offset every 30 feet.

3.6 FIELD QUALITY CONTROL

A. Cast iron soil pipe and fittings must be marked with their country of origin, the collective trademark of the Cast Iron Soil Pipe Institute, and identification of the original manufacturer in addition to markings required by reference standards (See Minnesota Rules, Chapter 4714, Section 701.0). They shall also be listed by NSF International.

B. Test sanitary waste and vent piping system in accordance with local Authority Having Jurisdiction.

END OF SECTION

SECTION 22 40 00

PLUMBING FIXTURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Water closets.
   2. Lavatories.
   3. Sinks.
   4. Service sinks.
   5. Showers.
   6. Bathtubs.
   7. Valve Boxes.

B. Related Sections:
   1. Section 22 11 00 - Facility Water Distribution: Supply connections to plumbing fixtures.
   2. Section 22 13 00 - Facility Sanitary Sewerage: Waste connections to plumbing fixtures.

1.2 REFERENCES

A. American National Standards Institute:
   1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
   2. ANSI Z124.1 - Plastic Bathtub Units.
   3. ANSI Z124.2 - Plastic Shower Units.
   4. ANSI Z358.1 - Emergency Eyewash and Shower Equipment.

B. Air-Conditioning and Refrigeration Institute:
   1. ARI 1010 - Self-Contained, Mechanically Refrigerated Drinking-Water Coolers.

C. American Society of Mechanical Engineers:
   1. ASME A112.6.1 - Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use.
   2. ASME A112.18.1 - Plumbing Supply Fittings.
   3. ASME A112.19.1 - Enameled Cast Iron and Enameled Steel Plumbing Fixtures.
   4. ASME A112.19.2 - Ceramic Plumbing Fixtures.
   5. ASME A112.19.3 - Stainless Steel Plumbing Fixtures.
   6. ASME A112.19.4 - Porcelain Enameled Formed Steel Plumbing Fixtures.
   7. ASME A112.19.5 – Flush Valves and Spuds for Water Closets, Urinals, and Tanks.

D. NSF International:
   1. NSF 61 – Drinking Water System Components – Health Effects.
   2. NSF 372 – Drinking Water Components – Lead Content.

1.3 SUBMITTALS

A. Product Data: Submit catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.

B. Build America, Buy America (BABA) Documentation: Contractors must comply with and provide documentation that shows compliance with BABA requirements. Product certification letters need to include the following five items:

1. Documentation linked to the project. Identify the project name, project location, contract number, or project number.
2. Documentation linked to the product used on the project. Description of product(s) (simple explanation sufficient to identify product(s)), or an attached purchase order, invoice, or bill of lading.
3. Documentation includes a statement attesting that the products supplied to the Recipient are compliant with BABA requirements. For iron and steel items under BABA, references to the American Iron and Steel (AIS) requirements are also acceptable and reciprocal with BABA for such items.
4. Documentation that manufacturing occurred in the United States, which could include, for example, the location(s) of manufacturing for each manufacturing step that is being certified. It is acceptable for manufactured products to note a single point of manufacturing, documenting that the final point of manufacturing is in the United States. Note that each BABA category may require different determinations for compliance.
5. Signature of company representative (on company letterhead and signature can be electronic). The signatory of the certifying statement affirms their knowledge of the manufacturing processes for the referenced product(s) and attests that the product meets the BABA requirements.

C. Any substitution requests shall meet the BABA requirements listed above.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit fixture, trim, exploded view, and replacement parts lists.

1.5 QUALITY ASSURANCE

A. Perform Work in compliance with all applicable codes and standards enforced by the Authority Having Jurisdiction, as well as all applicable laws, ordinances, and regulations.

B. Provide products requiring electrical connections listed and classified by testing firm acceptable to Authority Having Jurisdiction as suitable for purpose specified and indicated.

C. Lead-free: All fittings, valves, fixtures, and accessories that contact potable water shall be lead-free compliant per NSF 61 and NSF 372.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Accept fixtures on site in factory packaging. Inspect for damage.

B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

PART 2 PRODUCTS

2.1 WATER CLOSETS

A. Manufacturers:
1. Sloan Valve Co.
2. Toto USA.
3. Kohler.
4. American Standard.
5. Mansfield Plumbing.
6. ProFlo.
7. Zurn Industries, LLC.
8. Beneke Magnolia (Sanderson).
9. Church (Bemis Manufacturing Co.)
10. Olsonite (Bemis Manufacturing Co.)
11. Or equal if BABA Compliant.

2.2 LAVATORIES

A. Manufacturers:
1. Kohler.
2. Chicago Faucets.
3. American Standard.
4. ProFlo.
5. Sterling.
6. Zurn.
7. Elkay.
8. Sloan.
9. Delta.
10. Or equal if BABA Compliant.

2.3 SINKS

A. Manufacturers:
1. Kohler.
2. American Standard.
3. ProFlo.
4. Sterling.
5. Zurn.
6. Elkay.
7. Sloan.
8. Delta.
9. Chicago Faucets.
10. Or equal if BABA Compliant.

2.4 SERVICE SINKS

A. Manufacturers:
1. Fiat.
2. Chicago Faucets.
3. Or equal if BABA Compliant.

2.5 SHOWERS

A. Manufacturers:
   1. Warm Rain.
   2. Oasis.
   3. Chicago Faucets.
   4. Or equal if BABA Compliant.

2.6 BATHTUBS

A. Manufacturers:
   1. Warm Rain.
   2. Oasis.
   3. Chicago Faucets.
   4. Or equal if BABA Compliant.

B. Bathtubs shall be provided with an above-floor rough-in drain configuration suitable for installation where slab penetration or below-floor drainage is not available. Configuration shall match existing conditions and allow for connection to above-slab or furred-out drain piping without slab core drilling or structural floor modifications.

2.7 VALVE BOX

A. (WB-1) Laundry Valve and Drain Box – Washer:
   1. Manufacturers:
      a. Guy Gray; IPS Corporation.
      b. Water Tite.
      c. Oatey.
      d. Or equal if BABA Compliant.

2.8 LAVATORY INSULATION KIT

A. Product Description: Where Lavatories are noted to be insulated for ADA compliance, furnish the following: Safety Covers conforming to ANSI A177.1 and consisting of insulation kit of molded closed cell vinyl construction, 3/16 inch thick, white color, for insulating tailpiece, P-trap, valves, and supply piping. Furnish with weep hole and angle valve access covers.

2.9 GENERAL REQUIREMENTS

A. Refer to plumbing fixture schedule on Drawings for basis of design requirements. Verify plumbing fixtures with architect and general contractor prior to ordering.

B. General intent is for all fixtures to be WaterSense labeled (except for kitchen faucets which are not available with WaterSense label) and to meet the minimum prescriptive flow requirements of the April 2025 – 2026 MN Overlay and Guide to the 2020 Enterprise Green Communities Criteria (EGCC), Section 4.1 (Water-Conserving Fixtures). The project shall comply with the Minnesota Housing Sustainability Requirements for Limited Scope Rehabilitation Projects.
   1. Water Closets: 1.28 gpf.
   2. Urinals: 0.5 gpf.
   3. Showerheads: 2.0 gpm.
   4. Kitchen Faucets: 2.0 gpm.
   5. Lav Faucets: 1.5 gpm.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify walls and floor finishes are prepared and ready for installation of fixtures.

B. Verify electric power is available and of correct characteristics.

C. Confirm millwork is constructed with adequate provision for installation of counter-top lavatories and sinks.

3.2 PREPARATION

A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.3 INSTALLATION

A. Install Work in accordance with all applicable codes and standards enforced by the Authority Having Jurisdiction, as well as all applicable laws, ordinances, and regulations.

B. Install each fixture with trap, easily removable for servicing and cleaning.

C. Provide chrome plated rigid or flexible supplies to fixtures with screwdriver stops, reducers, and escutcheons.

D. Install components level and plumb.

E. Install and secure fixtures in place with wall supports or wall carriers and bolts.

F. Seal fixtures to wall and floor surfaces with sealant as specified in , color to match fixture.

3.4 INSTALLATION – WATER CLOSETS

A. Solidly attach water closets to floor with lag screws. Flashing is not intended hold fixture in place.

B. For ADA accessible water closets, install flush valve with handle to wide side of stall.

3.5 INTERFACE WITH OTHER PRODUCTS

A. Review millwork shop-drawings. Confirm location and size of fixtures and openings before rough in and installation.

3.6 ADJUSTING

A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.7 CLEANING

A. Clean plumbing fixtures and equipment.

3.8 PROTECTION OF FINISHED WORK

A. Do not permit use of fixtures before final acceptance.

3.9 SCHEDULES

A. Fixture Mounting Heights: Refer to Architectural Drawings and Specifications.

B. Fixture Rough-In: Refer to Drawings.

END OF SECTION

SECTION 23 05 13

COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section includes single and three-phase motors for applications on equipment provided under other sections.

B. Related Sections:
   1. NONE.

1.2 REFERENCES

A. American Bearing Manufacturers Association:
   1. ABMA 9 - Load Ratings and Fatigue Life for Ball Bearings.

B. National Electrical Manufacturers Association:
   1. NEMA MG 1 - Motors and Generators.

C. International Electrical Testing Association:
   1. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.3 SYSTEM DESCRIPTION

A. The Mechanical Contractor is responsible for items in this Section.

1.4 SUBMITTALS

A. Build America, Buy America (BABA) Documentation: Contractors must comply with and provide documentation that shows compliance with BABA requirements. Product certification letters need to include the following five items:
   1. Documentation linked to the project. Identify the project name, project location, contract number, or project number.
   2. Documentation linked to the product used on the project. Description of product(s) (simple explanation sufficient to identify product(s)), or an attached purchase order, invoice, or bill of lading.
   3. Documentation includes a statement attesting that the products supplied to the Recipient are compliant with BABA requirements. For iron and steel items under BABA, references to the American Iron and Steel (AIS) requirements are also acceptable and reciprocal with BABA for such items.
   4. Documentation that manufacturing occurred in the United States, which could include, for example, the location(s) of manufacturing for each manufacturing step that is being certified. It is acceptable for manufactured products to note a single point of manufacturing, documenting that the final point of manufacturing is in the United States. Note that each BABA category may require different determinations for compliance.
   5. Signature of company representative (on company letterhead and signature can be electronic). The signatory of the certifying statement affirms their knowledge of the manufacturing processes for the referenced product(s) and attests that the product meets the BABA requirements.

B. Any substitution requests shall meet the BABA requirements listed above.

1.5 QUALITY ASSURANCE

A. Perform Work in compliance with all applicable codes and standards enforced by the Authority Having Jurisdiction, as well as all applicable laws, ordinances, and regulations.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Testing Agency: Company member of International Electrical Testing Association and specializing in testing products specified in this section with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Lift only with lugs provided. Handle carefully to avoid damage to components, enclosure, and finish.

B. Protect products from weather and moisture by covering with plastic or canvas and by maintaining heating within enclosure.

C. For extended outdoor storage, remove motors from equipment and store separately.

PART 2 PRODUCTS

2.1 PRODUCT REQUIREMENTS FOR MOTORS FURNISHED WITH EQUIPMENT

A. Three-Phase Motors: NEMA MG 1, Design B, energy-efficient squirrel-cage induction motor, with windings to accomplish starting methods and number of speeds as indicated on Drawings.
   1. Voltage: As indicated on Drawings.
   2. Service Factor: 1.15 or as provided by equipment manufacturer.
   3. Enclosure: Meet conditions of installation..
   4. Design for continuous operation in 40 degrees C environment, with temperature rise in accordance with NEMA MG 1 limits for insulation class, service factor, and motor enclosure type.
   5. Insulation System: NEMA Class F for chillers, class B for pumps, fans, and other equipment.
   6. Motor Frames: NEMA Standard T-Frames of steel, aluminum, or cast iron with end brackets of cast iron or aluminum with steel inserts.
   7. Thermistor System (Motor Frame Sizes 254T and Larger): Three PTC thermistors embedded in motor windings and epoxy encapsulated solid-state control relay with wiring to terminal box.
   8. Bearings: Grease lubricated anti-friction ball bearings with housings equipped with plugged provision for relubrication, rated for minimum ABMA 9, L-10 life of 200,000 hours. Stamp bearing sizes on nameplate.
   9. Sound Power Levels: Conform to NEMA MG 1.

B. Single Phase Motors:
   1. Electronically commutated (EC) type where available, otherwise use permanent split-capacitor (PSC) type motor.
   2. Voltage: As indicated on Drawings, single phase, 60 Hz.

C. Wiring Terminations: Furnish terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated.

2.2 SOURCE QUALITY CONTROL

A. Test motors in accordance with NEMA MG 1, including winding resistance, no-load speed and current, locked rotor current, insulation high-potential test, and mechanical alignment tests.

PART 3 EXECUTION

3.1 EXISTING WORK

A. Disconnect and remove abandoned motors.

B. Maintain access to existing motors and other installations remaining active and requiring access. Modify installation or provide access panel.

3.2 INSTALLATION

A. Install securely on firm foundation. Mount ball bearing motors with shaft in any position.

B. Install engraved plastic nameplates in accordance with Division 26.

C. Ground and bond motors in accordance with Division 26.

3.3 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.15.

END OF SECTION

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SECTION 23 05 16

EXPANSION FITTINGS AND LOOPS FOR HVAC PIPING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Flexible pipe connectors.
   2. Expansion joints.
   3. Expansion compensators.
   4. Pipe alignment guides.
   5. Swivel joints.
   6. Pipe anchors.

B. Related Sections:
   1. Section 22 05 29 - Hangers and Supports for Plumbing Piping and Equipment: Product and installation requirements for piping hangers and supports.
   2. Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment: Product and installation requirements for piping hangers and supports.
   3. Section 23 05 48 - Vibration and Seismic Controls for HVAC Piping and Equipment: Product and installation requirements for vibration isolators used in piping systems.

1.2 REFERENCES

A. American Society of Mechanical Engineers:
   1. ASME B31.1 - Power Piping.
   2. ASME B31.5 - Refrigeration Piping and Heat Transfer Components.
   3. ASME B31.9 - Building Services Piping.
   4. ASME BPVC Section IX - Boiler and Pressure Vessel Code - Welding and Brazing Qualifications.

B. American Welding Society:
   1. AWS D1.1/D1.1M - Structural Welding Code - Steel.

1.3 SYSTEM DESCRIPTION

A. The Mechanical Contractor is responsible for items in this Section.

1.4 DESIGN REQUIREMENTS

A. General Requirements:
   1. All vertical PLBG & HVAC piping risers subject to thermal movement shall be supported and restrained using a coordinated system of anchors, guides, and expansion fittings.
   2. The expansion compensation system shall be designed and supplied by a qualified manufacturer or vendor specializing in piping movement and isolation systems.
   3. All specialty supports, brackets, and devices required for thermal expansion design shall be furnished by the vendor and installed under their supervision.
   4. Piping systems shall be installed and adjusted in accordance with vendor recommendations and approved submittals.
   5. Submittals shall be approved by the Engineer prior to any field installation of thermal expansion components.
   6. Thermal expansion fittings shall be installed in accessible locations.

B. Provide structural work and equipment required for expansion and contraction of piping. Verify anchors, guides, and expansion joints are provided and adequately protect system.

C. Expansion Compensation Design Criteria:
   1. Tepid Water Systems (Including Division 21 and 22)
      a. Expansion:
         1) Minimum Installation Temperature: 40 degrees F.
         2) Maximum System Temperature: 90 degrees F.
      b. Contraction:
         1) Maximum Installation Temperature: 85 degrees F.
         2) Minimum System Temperature: 35 degrees F.
      c. Safety Factor: 30 percent.
   2. Hot Water Systems (Including Division 22):
      a. Installation Temperature: 40 degrees F.
      b. Maximum System Temperature: 210 degrees F.
      c. Safety Factor: 30 percent.
   3. Chilled Water Systems:
      a. Installation Temperature: 85 degrees F.
      b. Minimum System Temperature: 40 degrees F.
      c. Safety Factor: 30 percent.
   4. Condenser Water Systems:
      a. Installation Temperature: 40 degrees F.
      b. Maximum System Temperature: 120 degrees F.
      c. Safety Factor: 30 percent.
   5. Refrigerant Piping Systems:
      a. Liquid Line
         1) Installation Temperature: 40 degrees F.
         2) Maximum System Temperature: 120 degrees F.
      b. Suction Line
         1) Installation Temperature: 85 degrees F.
         2) Minimum System Temperature: 40 degrees F.
      c. Safety Factor: 30 percent.

1.5 SUBMITTALS

A. Design Data: Indicate criteria and show calculations supporting location of anchors, supports/guides, and thermal expansion loops/fittings based on actual pipe materials, lengths, temperatures, configurations.
   1. Submit shop drawings indicating exact locations, types, and details of all anchors, guides, expansion loops, and joints.
   2. Identify all required structural attachments and coordination with building structural elements.
   3. Submit manufacturer’s product data and installation instructions for all expansion compensators, flexible connectors, and pipe supports.
   4. For all vertical piping risers subject to thermal expansion and contraction, submit a complete engineered design prepared and sealed by a professional engineer registered in the project state.

a. Design shall include load calculations, stress analysis, anchor and guide locations, expected deflections, and verification that all loads imposed on the structure are within allowable limits.
b. Submit manufacturer's data and calculations for expansion fittings, anchors, and guides.
c. Include installation drawings and instructions showing pipe routing, support spacing, and required clearances.

B. Manufacturer's Installation Instructions: Submit special procedures.

C. Welders' Certificate: Include welders' certification of compliance with ASME BPVC Section IX, AWS D1.1/D1.1M, or equivalent.

D. Build America, Buy America (BABA) Documentation: Contractors must comply with and provide documentation that shows compliance with BABA requirements. Product certification letters need to include the following five items:
1. Documentation linked to the project. Identify the project name, project location, contract number, or project number.
2. Documentation linked to the product used on the project. Description of product(s) (simple explanation sufficient to identify product(s)), or an attached purchase order, invoice, or bill of lading.
3. Documentation includes a statement attesting that the products supplied to the Recipient are compliant with BABA requirements. For iron and steel items under BABA, references to the American Iron and Steel (AIS) requirements are also acceptable and reciprocal with BABA for such items.
4. Documentation that manufacturing occurred in the United States, which could include, for example, the location(s) of manufacturing for each manufacturing step that is being certified. It is acceptable for manufactured products to note a single point of manufacturing, documenting that the final point of manufacturing is in the United States. Note that each BABA category may require different determinations for compliance.
5. Signature of company representative (on company letterhead and signature can be electronic). The signatory of the certifying statement affirms their knowledge of the manufacturing processes for the referenced product(s) and attests that the product meets the BABA requirements.

E. Any substitution requests shall meet the BABA requirements listed above.

1.6 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of flexible pipe connectors, expansion joints, anchors, and guides.

B. Operation and Maintenance Data: Submit adjustment instructions.

1.7 QUALITY ASSURANCE

A. Perform Work in compliance with all applicable codes and standards enforced by the Authority Having Jurisdiction, as well as all applicable laws, ordinances, and regulations.

B. Perform Work in accordance with ASME B31.9 (and ASME B31.1 and ASME B31.5 as applicable) code for installation of piping systems and ASME Section BPVC IX for welding materials and procedures.

1.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Accept expansion joints on site in factory packing with shipping bars and positioning devices intact. Inspect for damage.

B. Protect equipment from exposure by leaving factory coverings, pipe end protection, and packaging in place until installation.

1.10 WARRANTY

A. Furnish five-year manufacturer warranty for leak free performance of packed expansion joints.

PART 2 PRODUCTS

2.1 FLEXIBLE PIPE CONNECTORS

A. Steel Piping:
   1. Inner Hose: Carbon Steel or Stainless Steel.
   2. Exterior Sleeve: Double braided or stainless steel.
   3. Pressure Rating:
      a. Steam Systems: 125 psig WSP and 450 degrees F
      b. Hydronic, Fuel, and Refrigerant Systems: 200 psig WOG and 250 degrees F
   4. Joint: As specified for pipe joints.
   5. Size: Use pipe-sized units.
   6. Maximum offset: 1 inch on each side of installed centerline.

B. Copper Piping:
   1. Inner Hose: Bronze
   2. Exterior Sleeve: Braided bronze.
   3. Pressure Rating:
      a. Steam Systems: 125 psig WSP and 450 degrees F
      b. Hydronic, Fuel, and Refrigerant Systems: 200 psig WOG and 250 degrees F
   4. Joint: As specified for pipe joints.
   5. Size: Use pipe sized units
   6. Maximum offset: 1 inch on each side of installed center line

C. Plastic Piping, including Polypropylene-Random (PP-R):
   1. Inner Hose: Carbon Steel or Stainless Steel.
   2. Exterior Sleeve: Double braided or stainless steel.
   3. Pressure Rating:
      a. Hydronic, Fuel, and Refrigerant Systems: 200 psig WOG and 250 degrees F
   4. Joint: As specified for pipe joints.
   5. Size: Use pipe-sized units.
   6. Maximum offset: 1 inch on each side of installed centerline.

2.2 EXPANSION JOINTS

A. Single or Double Sphere, Elbow or Flexible Compensators:
   1. Body: Teflon or Neoprene and nylon.
   2. Pressure Rating:
      a. Steam Systems: 125 psig WSP and 450 degrees F
      b. Hydronic, Fuel, and Refrigerant Systems: 200 psig WOG and 250 degrees F
   3. Maximum Compression: 1 inch.
   4. Maximum Elongation: 1/2 inch.
   5. Maximum Offset: 3/4 inch.
   6. Maximum Angular Movement: 30 degrees.
   7. Joint: Galvanized flanges or unions.
   8. Size: Use pipe sized units.
   9. Accessories: Control rods or control cables, as required.
   10. Application: Steel piping 2 inch and larger.

B. Copper with Packed Sliding Sleeve:
   1. Maximum Temperature: 250 degrees F.
   2. Joint: As specified for pipe joints.
   3. Size: Use pipe sized units.
   4. Copper or steel piping 2 inches and larger.
   5. Application: Copper or steel piping 2 inch and larger.

2.3 ACCESSORIES

A. Pipe Alignment Guides: Two piece welded steel with enamel paint, bolted, with spider to fit standard pipe, frame with four mounting holes, clearance for minimum 1-inch thick insulation, minimum 3 inch travel.

B. Swivel Joints: Fabricated steel, bronze, ductile iron, or cast steel body, double ball bearing race, field lubricated, with rubber (Buna-N) O-ring seals.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install Work in accordance with ASME B31.9 (and ASME B31.1 and ASME B31.5 as applicable).

B. Install flexible pipe connectors on pipes connected to equipment supported by vibration isolation. Refer to Section 23 05 48. Provide line size flexible connectors.

C. Install flexible connectors at right angles to displacement. Install one end immediately adjacent to isolated equipment and anchor other end. Install in horizontal plane unless indicated otherwise.

D. Rigidly anchor pipe to building structure. Provide pipe guides to direct movement only along axis of pipe. Erect piping so strain and weight is not on cast connections or apparatus.

E. Provide support and anchors for controlling expansion and contraction of piping. Provide loops, pipe offsets, and swing joints, or expansion joints where required. Refer to Section 23 05 29 (or 21 05 00 or 22 05 29 as applicable) for pipe hanger installation requirements.

F. Provide grooved piping systems with minimum one joint per inch pipe diameter instead of flexible connector supported by vibration isolation. Grooved piping systems need not be anchored.

G. Contractor Responsibility: Contractor shall be fully responsible for the final selection, sizing, and placement of all pipe anchors, guides, expansion joints, and expansion loops to ensure proper accommodation of thermal expansion and contraction for all piping systems. Contractor shall base final design on actual installed pipe routing, material types, building expansion characteristics, and anticipated operating temperatures.

H. Coordination: Refer to Construction Drawings including riser diagrams and floor plans for design intent regarding approximate locations of expansion loops, expansion joints, anchors, and guides. These drawings indicate general intent only and do not relieve the Contractor of the responsibility to ensure proper functionality and system protection. Deviations from indicated intent shall be identified and submitted for review.

I. Calculations: Contractor shall submit thermal expansion calculations for all piping systems subject to temperature-induced movement. Calculations shall demonstrate adequacy of proposed expansion fittings or loops and shall identify required forces at anchors and allowable movement at guides.

J. Installation Requirements:
   1. Install anchors guides, and supports per approved submittals and manufacturer instructions.
   2. Install pipe guides to allow free axial movement while restricting lateral displacement as required.
   3. Install pipe anchors at locations that restrict movement and absorb expansion forces, and ensure they are properly braced to structural framing capable of resisting anticipated loads.
   4. Install expansion loops or joints in accordance with manufacturer requirements, maintaining clearances and offsets for expected movement.

K. Field Adjustments: Verify alignment and position of all pipe guides and anchors after hydrostatic testing and system pressurization. Adjust spring hangers and supports as required to final positions.

3.2 MANUFACTURER'S FIELD SERVICES

A. Furnish inspection services by flexible pipe manufacturer's representative for final installation and certify installation is in accordance with manufacturer's recommendations and connectors are performing satisfactorily.

END OF SECTION

SECTION 23 05 48

VIBRATION CONTROLS FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Inertia bases.
   2. Vibration isolators.

B. Related Sections:
   1. Section 22 05 29 - Hangers and Supports for Plumbing Piping and Equipment: Product requirements for pipe hangers and supports.
   2. Section 23 05 16 - Expansion Fittings and Loops for HVAC Piping: Product requirements for anchors and piping expansion compensation.
   3. Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment: Product requirements for pipe hangers and supports.

1.2 REFERENCES

A. Air Movement and Control Association International, Inc.:
   1. AMCA 300 - Reverberant Room Method for Sound Testing of Fans.

B. American National Standards Institute:
   1. ANSI S1.4 - American National Standard Specification for Sound Level Meters.
   2. ANSI S1.8 - Reference Quantities for Acoustical Levels.
   3. ANSI S1.13 - Measurement of Sound Pressure Levels in Air.
   4. ANSI S12.60 - American National Standard Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools.

C. Air Conditioning, Heating, & Refrigeration Institute:
   1. AHRI 575 - Method of Measuring Machinery Sound Within an Equipment Space.

D. American Society of Heating, Refrigerating and:
   1. ASHRAE 68 - Laboratory Method of Testing to Determine the Sound Power in a Duct.
   2. ASHRAE Handbook - HVAC Applications.

E. ASTM International:
   1. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
   2. ASTM E477 - Standard Test Method for Measuring Acoustical and Airflow Performance of Duct Liner Materials and Prefabricated Silencers.
   3. ASTM E596 - Standard Test Method for Laboratory Measurement of the Noise Reduction of Sound-Isolating Enclosures.

F. International Organization for Standardization:
   1. ISO 3747 - Determination of Sound Power Levels and Sound Energy Levels of Noise Sources Using Sound Pressure - Engineering/Survey Methods for use in Situ in a Reverberant Environment.

G. Sheet Metal and Air Conditioning Contractors':
   1. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

1.3 SYSTEM DESCRIPTION

A. The Mechanical Contractor is responsible for items in this Section.

1.4 PERFORMANCE REQUIREMENTS

A. Provide vibration isolation on motor driven equipment over 0.5 hp, plus connected piping and ductwork.

B. Provide minimum static deflection of isolators for equipment per Vibration Isolation Schedule at end of Section.

C. Consider upper floor locations critical unless otherwise indicated.

D. Use concrete inertia bases for fans having static pressure in excess of 3.5 inches water column or motors in excess of 40 hp, and on base mounted pumps over 10 hp.

E. Maintain sound level of spaces at levels not to exceed those listed below by utilizing acoustical devices.

F. Maintain rooms at following maximum sound levels, in Room Criteria (RC) as defined by ASHRAE Handbook., HVAC Applications and ANSI S1.8. See Room Sound Level Schedule at end of Section.

1.5 SUBMITTALS

A. Shop Drawings: Indicate assembly, materials, thickness, dimensional data, pressure losses, acoustical performance, layout, and connection details for sound attenuation products fabricated for this project.

B. Build America, Buy America (BABA) Documentation: Contractors must comply with and provide documentation that shows compliance with BABA requirements. Product certification letters need to include the following five items:
   1. Documentation linked to the project. Identify the project name, project location, contract number, or project number.
   2. Documentation linked to the product used on the project. Description of product(s) (simple explanation sufficient to identify product(s)), or an attached purchase order, invoice, or bill of lading.
   3. Documentation includes a statement attesting that the products supplied to the Recipient are compliant with BABA requirements. For iron and steel items under BABA, references to the American Iron and Steel (AIS) requirements are also acceptable and reciprocal with BABA for such items.
   4. Documentation that manufacturing occurred in the United States, which could include, for example, the location(s) of manufacturing for each manufacturing step that is being certified. It is acceptable for manufactured products to note a single point of manufacturing, documenting that the final point of manufacturing is in the United States. Note that each BABA category may require different determinations for compliance.
   5. Signature of company representative (on company letterhead and signature can be electronic). The signatory of the certifying statement affirms their knowledge of the manufacturing processes for the referenced product(s) and attests that the product meets the BABA requirements.

C. Any substitution requests shall meet the BABA requirements listed above.

1.6 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of hangers including attachment points.

1.7 QUALITY ASSURANCE

A. Perform Work in compliance with all applicable codes and standards enforced by the Authority Having Jurisdiction, as well as all applicable laws, ordinances, and regulations.

B. Perform Work in accordance with ANSI S1.13 and AHRI 575 standards and recommendations of ASHRAE 68.

C. School Buildings: Perform Work in accordance with ANSI S12.60 standard.

1.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.9 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 INERTIA BASES

A. Selection:
   1. Specific equipment base requirements per Base Schedule at the end of this Section.

B. No Base (Type A):
   1. Construction: Isolators attached directly to equipment.

C. Structural Bases (Type B):
   1. Design: Sufficiently rigid to prevent misalignment or undue stress on machine, and to transmit design loads to isolators and snubbers.
   2. Construction: Welded structural steel with gusset brackets, supporting equipment and motor with motor slide rails.

D. Concrete Inertia Bases (Type C):
   1. Mass: Minimum of 1.5 times weight of isolated equipment.
   2. Construction: Structured steel channel perimeter frame, with gusset brackets and anchor bolts, adequately reinforced, concrete filled.
   3. Connecting Point: Reinforced to connect isolators and snubbers to base.
   4. Concrete: Reinforced 3,000-psi concrete.

E. Curb-Mounted Base (Type D):
   1. Design: Sufficiently rigid to prevent misalignment or undue stress on machine, and to transmit design loads to isolators and snubbers.
   2. Construction: Welded structural steel with gusset brackets, supporting equipment, with watertight assembly. Airside equipment shall have airtight assembly.
   3. Coordination: Coordinate size and location with architectural roof curb.

2.2 VIBRATION ISOLATORS

A. Selection:
   1. Specific equipment isolator and deflection requirements per Isolator Schedule at the end of this Section.

B. Neoprene Pad Isolators (Type 1):
   1. Rubber or neoprene-waffle pads.
      a. 30 durometer minimum.
      b. Minimum 1/2 inch thick.
      c. Maximum loading 40 psi.
      d. Height of ribs: not to exceed 0.7 times width.
   2. Configuration: Single layer or 1/2 inch thick waffle pads bonded each side of 1/4 inch thick steel plate.

C. Glass Fiber Pads (Type 1): Neoprene jacketed pre-compressed molded glass fiber.

D. Rubber Mount or Hanger (Type 2): Molded rubber with threaded insert.

E. Open Spring Isolators (Type 3):
   1. Spring Isolators:
      a. For Exterior and Humid Areas: Furnish hot dipped galvanized housings and neoprene coated springs.
      b. Code: Color code springs for load carrying capacity.
   2. Springs: Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection.
   3. Spring Mounts: Furnish with leveling devices, minimum 0.25-inch thick neoprene sound pads, and zinc chromate plated hardware.
   4. Sound Pads: Size for minimum deflection of 0.05 inch; meet requirements for neoprene pad isolators.

F. Closed Spring Isolators (Type 3):
   1. Spring Isolators:
      a. For Exterior and Humid Areas: Furnish hot dipped galvanized housings and neoprene coated springs.
      b. Code: Color code springs for load carrying capacity.
   2. Type: Closed spring mount with top and bottom housing separated with neoprene rubber stabilizers.
   3. Springs: Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection.
   4. Housings: Incorporate neoprene isolation pad meeting requirements for neoprene pad isolators, and neoprene side stabilizers with minimum 0.25-inch clearance.

G. Spring Hanger (Type 3):
   1. Spring Isolators:
      a. For Exterior and Humid Areas: Furnish hot dipped galvanized housings and neoprene coated springs.
      b. Code: Color code springs for load carrying capacity.
   2. Springs: Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection.
   3. Housings: Incorporate neoprene isolation pad meeting requirements for neoprene pad isolators or rubber hanger with threaded insert.

4. Misalignment: Capable of 20-degree hanger rod misalignment.

H. Restrained Spring Isolators (Type 4):
1. Spring Isolators:
a. For Exterior and Humid Areas: Furnish hot dipped galvanized housings and neoprene coated springs.
b. Code: Color code springs for load carrying capacity.
2. Springs: Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection.
3. Spring Mounts: Furnish with leveling devices, minimum 0.25-inch thick neoprene sound pads, and zinc chromate plated hardware.
4. Sound Pads: Size for minimum deflection of 0.05 inch; meet requirements for neoprene pad isolators.
5. Restraint: Furnish mounting frame and limit stops.

I. Restrained Closed Spring Isolators (Type 4):
1. Spring Isolators:
a. For Exterior and Humid Areas: Furnish hot dipped galvanized housings and neoprene coated springs.
b. Code: Color code springs for load carrying capacity.
2. Type: Closed spring mount with top and bottom housing separated with neoprene rubber stabilizers.
3. Springs: Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection.
4. Housings: Incorporate neoprene isolation pad meeting requirements for neoprene pad isolators, and neoprene side stabilizers with minimum 0.25-inch clearance and limit stops.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify equipment, ductwork and piping is installed before work in this section is started.

3.2 EXISTING WORK

A. Provide access to existing piping and ductwork and other installations remaining active and requiring access.

B. Extend existing piping and ductwork installations using materials and methods specified.

3.3 INSTALLATION – VIBRATION ISOLATION

A. Install isolation for motor driven equipment.

B. Bases:
1. Set steel bases for 1 inch clearance between housekeeping pad and base.
2. Set concrete inertia bases for 2 inch clearance between housekeeping pad and base.

C. Adjust equipment level.

D. Install spring hangers without binding.

E. On closed spring isolators, adjust so side stabilizers are clear under normal operating conditions.

F. Prior to making piping connections to equipment with operating weights substantially different from installed weights, block up equipment with temporary shims to final height. When full load is applied, adjust isolators to load to allow shim removal.

G. Provide pairs of horizontal limit springs on fans with more than 6.0 inch static pressure, and on hanger supported, horizontally mounted axial fans.

H. Support piping connections to isolated equipment resiliently as follows:
   1. Suspended piping: All piping in mechanical rooms and within 50 feet of vibration-isolated equipment.
   2. Select three hangers closest to vibration source for minimum static deflection equivalent to isolated equipment deflection, with a 2-inch maximum. Select remaining isolators for minimum 0.75-inch static deflection.
   3. Suspended piping: Suspended below or within 50 feet of noise-sensitive areas.

I. Piping over 2-inch diameter suspended below or within 50 feet of noise-sensitive areas shall be hung with isolation hangers.

3.4 SCHEDULES

A. Room Sound Level:

Room Types	Description	Noise/Room Criterion (NC/RC)
Residences	Living areas	30
	Bathrooms, kitchens, utility	35
Office Buildings	Executive and private offices	30
	Conference rooms	30
	Teleconference rooms	25
	Open-plan offices	40
	Corridors and lobbies	40

B. Pipe Isolation Schedule:

Pipe Size Inch	Isolated Distance from Equipment diameters
1	120
2	90 diameters
3	80 diameters
4	75 diameters
6	60 diameters
8	60 diameters
10	54 diameters
12	50 diameters

C. Equipment Isolation Schedule:

Isolated Equipment	Slab on Grade		Floor Span Up to 20 ft		Floor Span 20 to 30 ft		Floor Span 30 to 40 ft	
	Base & Isolator Type[1]	Min. Defl. (In.)	Base & Isolator Type[1]	Min. Defl. (In.)	Base & Isolator Type[1]	Min. Defl. (In.)	Base & Isolator Type[1]	Min. Defl. (In.)
Pumps								
Closed-coupled, ≤ 7.5 HP	B-2	0.25	C-3	0.75	C-3	0.75	C-3	0.75
Closed-coupled, ≥ 10 HP	C-3	0.75	C-3	0.75	C-3	1.50	C-3	1.50
Inline, ≤25 HP	A-3	0.75	A-3	1.50	A-3	1.50	A-3	1.50
Inline, ≥30 HP	A-3	1.50	A-3	1.50	A-3	1.50	A-3	2.50
End suction and double-section/split case, ≤40 HP	A-3	0.75	C-3	0.75	C-3	1.50	C-3	1.50
Axial Fans, Plenum Fans, Cabinet Fans, Fan Sections, Centrifugal Inline Fans								
≤ 22-inch diameter	A-2	0.25	A-3	0.75	A-3	0.75	C-3	0.75
≥ 24-inch diameter, ≤ 2-in. SP HP, ≤300 RPM	B-3	2.50	C-3	3.50	C-3	3.50	C-3	3.50
≥ 24-inch diameter, ≤ 2-in. SP, 301 to 500 RPM	B-3	0.75	B-3	1.50	C-3	2.50	C-3	2.50
≥ 24-inch diameter, ≤ 2-in. SP HP, ≥ 500 RPM	B-3	0.75	B-3	1.50	B-3	2.50	B-3	2.50
≥ 24-inch diameter, > 2-in. SP, ≤ 300 RPM	C-3	2.50	C-3	3.50	C-3	3.50	C-3	3.50
≥ 24-inch diameter, > 2-in. SP, 301 to 500 RPM	C-3	1.50	C-3	1.50	C-3	2.50	C-3	2.50
≥ 24-inch diameter, > 2-in. SP, ≥ 500 RPM	C-3	0.75	C-3	1.50	C-3	1.50	C-3	2.50
Centrifugal Fans								
≤ 22-inch diameter	B-2	0.25	B-3	0.75	B-3	0.75	B-3	1.50
≥ 24-inch diameter, ≤ 40 HP, ≤ 300 RPM	B-3	2.50	B-3	3.50	B-3	3.50	B-3	3.50
≥ 24-inch diameter, ≤ 40 HP, 301 to 500 RPM	B-3	0.75	B-3	1.50	B-3	2.50	B-3	2.50

Isolated Equipment	Slab on Grade		Floor Span Up to 20 ft		Floor Span 20 to 30 ft		Floor Span 30 to 40 ft	
	Base & Isolator Type[1]	Min. Defl. (In.)	Base & Isolator Type[1]	Min. Defl. (In.)	Base & Isolator Type[1]	Min. Defl. (In.)	Base & Isolator Type[1]	Min. Defl. (In.)
≥ 24-inch diameter, ≤ 40 HP, ≥ 500 RPM	B-3	0.75	B-3	0.75	B-3	0.75	B-3	1.50
Packaged Rooftop Equipment								
All	A-1	0.25	A-4	0.75	A-4	1.50	A/D-4	1.50
Ducted Rotating Equipment – Small Fans, Fan-Powered Boxes								
≤ 600 CFM	A-3	0.50	A-3	0.50	A-3	0.50	A-3	0.50
> 600 CFM	A-3	0.75	A-3	0.75	A-3	0.75	A-3	0.75

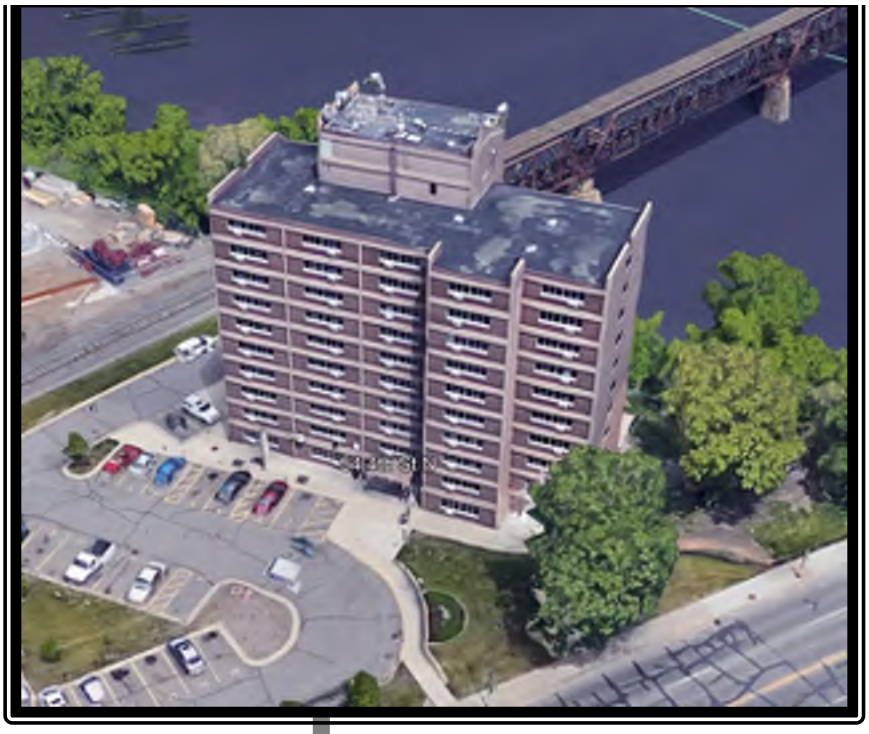
Note 1: Base type & isolator type correspond with equipment listed in Part 2 of this Section.

END OF SECTION

LEAD-BASED PAINT INSPECTION REPORT

Empire Apartments

54 4th Street North, St. Cloud, MN 56303



Source: Google Earth

Submitted to:
St. Cloud Housing and Redevelopment Authority

Submitted by:
Environmental Health Testing Services
2950 Aquila Avenue South
Minneapolis, Minnesota 55426

EHTS Project Number: 014-18

Submittal Date: April 2, 2018

Environmental Health Testing Services
2950 Aquila Avenue South, Minneapolis, MN • Phone: (952) 297-5169
E-mail: kris@EHTservices.com • Website: www.EHTservices.com

April 2, 2018

Mr. Paul Soenneker
St. Cloud Housing and Redevelopment Authority
1225 West St. Germain Street
St. Cloud, Minnesota 56301

Telephone: 320-252-0880 (Office), 320-202-3147 (Direct)
E-mail: psoenneker@stcloudhra.com

RE: Lead Paint Inspection
Empire Apartments
54 4th Street North, St. Cloud, Minnesota 56303

Dear Mr. Soenneker:

Per your request, a lead-based paint inspection was performed at Empire Apartments located at 54 4th Street North, St. Cloud, Minnesota (Figure 1*, Site Location Map*.) The purpose of this project was to determine whether lead-based paints (a lead concentration above the action level of 1.0 mg/cm^2) are present in the building components at Empire Apartments. This report contains the results of the paint inspection.

Property Information

Empire Apartments is a 1971-constructed ten-story apartment building with an asphalt parking lot. The structure includes a total of eighty-nine apartment units; one two-bedroom unit and eighty-eight one-bedroom units. Common areas within the building includes an office, a community room, a community kitchen, two stairways, two restrooms, a lobby, a meeting room, a mechanical room, a riser room, two elevators and a shop/mechanical room. Building materials within the structures appear of similar age, of similar construction, and of similar materials. Building materials within the structure consisted of dry-wall and popcorn-textured ceilings; drywall walls; wood and

metal door components; metal and vinyl window components; wood cabinets; vinyl, wood, and carpet baseboards; ceramic shower tile; one metal tub; and vinyl, linoleum, ceramic tile and carpet flooring. Exterior building materials included brick, metal and vinyl building components.

Scope of Services

A lead-based paint inspection is a surface-by-surface investigation to determine the presence of lead-based paint and includes a comprehensive inspection of the dwelling units, individual areas (such as offices or storage rooms), common areas, and exterior areas. For multi-family buildings, the number of units are randomly selected and the number of similar units, similar common areas or exterior sites to be tested (the sample size) is based on the total number units, similar common areas or exterior sits in the building, as specified in HUD's Chapter 7, Table 7.3. Units that have different sizes, floor plans and number of bedrooms may still be grouped allowing use of table 7.3 to determine the minimum number to be inspected.

Table 7.3

Number of Units to be Tested in Multi-Family Buildings or Development

HUD Guildelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing

Office of Healthy Homes and Lead Hazard Control, Second Edition, July 2012

Number of Similar Units, Similar Common Areas, or Similar Exterior Sites	1960-1977 Building Or Development: Number of Units to Test
1-10	All
11-13	10
89-95	25

HUD's protocol provides a 95% level of confidence for the conducted sampling meaning if lead levels in all units, common areas or exterior sites tested are found to be below the 1.0 mg/cm^2 standard, these sample sizes provide 95 percent confidence that for 1960-1977 housing units, less than 10 percent of the units , common areas or exterior sites, have lead at or above the standard.

Environmental Sampling Plan

The on-site inspection was conducted on March 1, March 8, and March 12, 2018 by Kristine Stahl, Certified Lead Inspector, State of Minnesota #LR944 (Appendix A, *Certification Certificate*.) Sampling protocols were performed in accordance with HUD Guidelines, Chapter 7, *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*, the requirements of the Performance Characteristic Sheet, and the Niton requirements for the use of the XRF unit. Sampling for this project included 25 randomly selected apartment units and all common areas. This project included the testing of approximately 1,850 surfaces using an X-Ray Fluorescence Spectroscopy (XRF) to determine lead concentrations. Building components included the ceilings, the walls, window components, the door components, the cabinets, the flooring, the showers, a bathroom tub and exterior building components. Additional information on procedures, statues, and rules followed for this inspection can found in Appendix B, *Standard Operating Procedures*.

Randomly Selected Apartment Units

Apt. No.
201
203
401
402
409
501
502
506
601
603
606
607
608
610
701
705
706
708
803
804
810
901
907
909
1005

- Units/apartments were randomly selected using the Excel Random Function.

Sampling Results

The XRF results indicated lead-based paints (a lead concentration above the action level of 1.0 mg/cm^2) are present on the following:

building component		development-wide
• white popcorn-textured ceilings		yes
• flooring	carpet flooring (see discussion below)	yes
	white vinyl floor tiles	yes
	brown linoleum flooring	yes
• brown vinyl baseboards		yes
• white & beige ceramic shower tile (see Figures 4 & 5)		yes
• white hallway walls (sides B & D, window sides only)		yes
• white bathroom tub (2nd floor common bathroom)		no

A floor plan sketch of the main-level of the apartment building depicting a majority of the common areas, a general floor plan layout of an apartment unit and photographs of the ceramic shower tiles are shown on Figures, 2, 3, 4 and 5 respectively (Figures). The XRF testing locations and results are summarized on Table 1 (Appendix C, *Downloaded XRF Readings*.)

A development-wide determination indicates the percentage of positive readings for a particular component type has been attained where the same component type in the unsampled units is classified as positive. Calculated percentages for the lead-based building components identified for this project are shown on Table 2 (Appendix D, *Calculated Percentages of Lead-Based Building Components*).

The development-wide determination does not apply for building components with "negative" readings for lead-based paints. For the sampled units, Table 2 may be used to determine the lead concentration for a particular component tested for this project. If the XRF reading indicates a negative result with a lead concentration below the action level of 1.0 mg/cm^2, the component is not considered a lead-based building component in the room or area tested.

The carpeted flooring tested for this project resulted in positive readings for lead. However, the management of Empire Apartments reported the flooring underlying the carpet consists of concrete with no paint or other surface coating. Lead-based paint is defined as "**paint or other surface coating**" that contains lead equal to or exceeding 1.0 milligram per square centimeter or 0.5 percent by weight or 5,000 parts per million (ppm) by weight. Therefore, if paint or surface coating, including latex, oil-based paints, varnishes, sealants or other coatings is **not** present on the flooring underlying the carpeting, , the flooring would not fall within the definition of a building component with "lead-based paint" under 24 CFR § 35.85 and 40 CFR § 745.103.

Conclusion

Based on the findings of the lead-based paint inspection, lead safe practices will be required if this project involves activities that will disturb any of the building components identified with lead-based painted surfaces identified above.

> ***Painted surface to be disturbed means a paint surface that is to be scraped, sanded, cut, penetrated or otherwise affected by rehabilitation work in a manner that could potentially create a lead-based paint hazard by generating dust, fumes, or paint chips*** **(24 CFR § 35.110 Definitions.)**

If the components identified with lead-based paint are disturbed, certified lead safe contractors should use extreme care and lead safe work practices should be followed during any repair or rehabilitation work (Appendix E, *Lead Safe Work Practices*.)

This report should be kept by the inspector, by the management of Empire Apartments, the owner of Empire Apartments, and all future owners for the life of the structure. All available records and reports concerning leaded-based paint and/or lead-based paint hazards are required to be disclosed to purchasers and tenants at the time of sale or lease or upon lease renewal. Disclosure Information is attached to this report (Appendix F, *Disclosure Information*.)

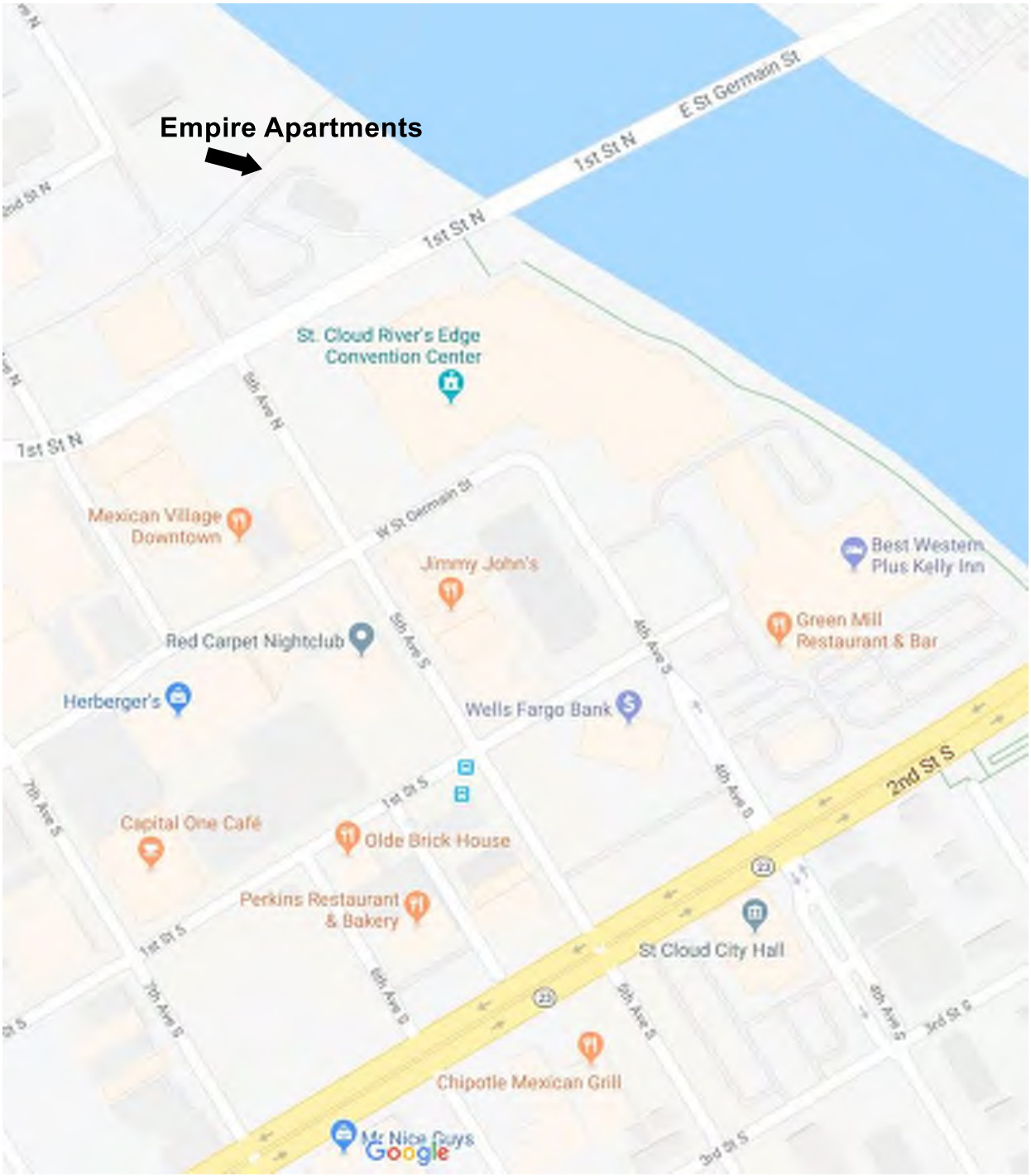
I appreciate the opportunity in providing this lead paint inspection for St. Cloud Housing and Redevelopment Authority. If additional information or assistance is needed, I may be reached at 952-297-5169.

Sincerely,

Kristine Stahl
MN-Licensed Lead Risk Assessor
State of Minnesota #LR944

Attachments:
Figures
Appendix A: Lead Inspector Certificate
Appendix B: SOP
Appendix C: Table 1: Downloaded XRF Readings
Appendix D: Table 2: Percentages for Lead-Based Building Components
Appendix E: Lead Safe Work Practices
Appendix F: Disclosure Information

FIGURE 1
Site Location Map
54 4th Street North, St. Cloud, MN 56303



Source: https://www.google.com/maps

FIGURE 2

First Floor Plan Sketch

54 4th Street North, St. Cloud, MN 56303

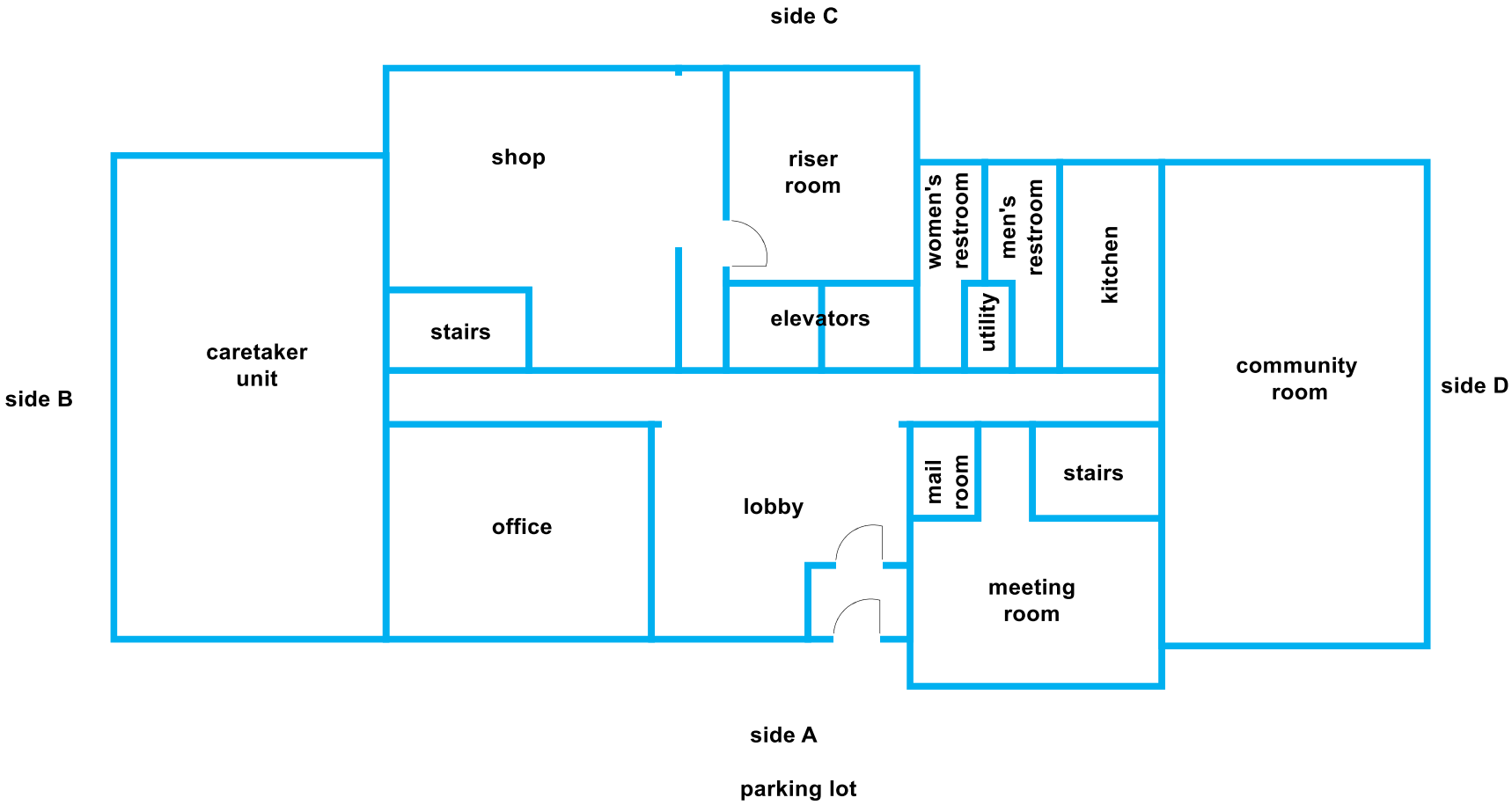


FIGURE 3

Apartment Floor Plan Sketch

54 4th Street North, St. Cloud, MN 56303

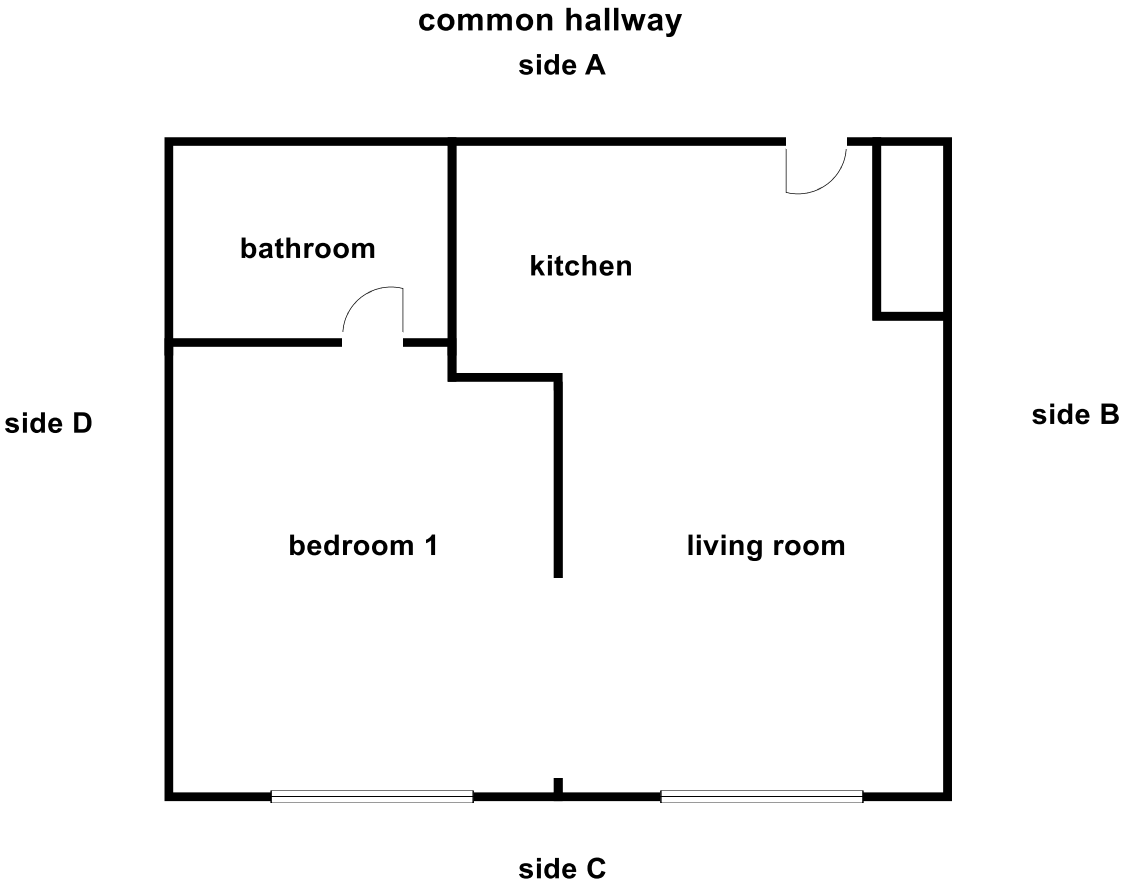
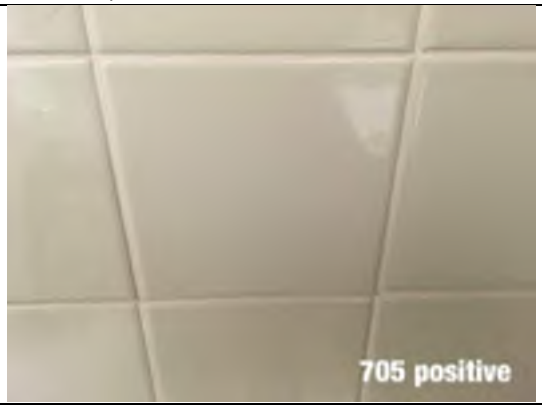


FIGURE 4	
Photographs of Ceramic Shower Tile 54 4th Street North, St. Cloud, MN 56303	
	
Apartment 608 Shower Tile Negative for Lead-Based Paint	Apartment 705 Shower Tile Positive for Lead-Based Paint
	
Apartment 706 Shower Tile Negative for Lead-Based Paint	Apartment 803 Shower Tile Positive for Lead-Based Paint
	
Apartment 810 Shower Tile	Apartment 907 Shower Tile

Positive for Lead-Based Paint	Negative for Lead-Based Paint
FIGURE 5	
Photographs of Ceramic Shower Tile 54 4th Street North, St. Cloud, MN 56303	
	
Apartment 909 Shower Tile Negative for Lead-Based Paint	Apartment 803 Shower Tile Positive for Lead-Based Paint
	
Apartment 1005 Shower Tile Positive for Lead-Based Paint	Apartment 804 Shower Tile Negative for Lead-Based Paint



MINNESOTA DEPARTMENT OF HEALTH

has authorized

ENVIRONMENTAL HEALTH TESTING SERVICES
2950 AQUILA AVE S
ST LOUIS PARK, MINNESOTA 55426

In accordance with Minnesota Statutes, section 144.9505 and Minnesota Rules, part 4761.2200, to practice in the State of Minnesota as a

CERTIFIED LEAD FIRM

LICENSE NO: LF3281
EXPIRES: 02/24/2019

THIS CERTIFICATE IS NONTRANSFERABLE

DEPARTMENT OF HEALTH

Thomas P. Hogan, Director
Environmental Health Division

Standard Operating Procedures

Inspections and assessments are conducted in accordance with the following statues and rules:

- The Housing and Urban Development (HUD) Guidelines for Evaluation and Control of Lead-Based Paint Hazards in Housing;
- HUD Lead Safe Housing Rule, 24 CFR Part 35;
- Environmental Protection Agency 40 CFR Part 745 Lead-Based Paint Poisoning Prevention in Certain Residential Structures;
- Minnesota Statues 144.9501-09; and
- Minnesota Rules 4761.

HUD and the United States Environmental Protection Agency (EPA) guidelines specify a positive determination of lead in paint when the lead content is equal to or greater than 1.0 milligrams of lead per square centimeter of painted surface (mg/cm2) when measured by X-ray Fluorescence (XRF). The lead based paint testing performed for this project used a NITON XLP Series X-ray Fluorescence Analyzer (Serial Number 25591, K + L Mode).

Delineation of Room Equivalents: A room equivalent is identified as a room, a house exterior, a foyer, staircase, hallway, or an exterior area. Closets or other similar areas adjoining rooms are not considered as separate room equivalents unless they are obviously dissimilar from the adjoining room equivalent.

Room equivalents are generally listed by number, starting with the 1st room on the main entrance and proceeding clockwise on each floor. Refer to drawings to confirm room number assignments. Walls are listed in each room by letter with wall "A" being closest to the street of address, proceeding clockwise to "B, C, D" etc. Multiple components (i.e. windows or doors) are listed moving right to left along each external wall, and left to right on internal walls. E.g. moving from the "D-A" corner to the "A-B" corner.

Components: Each room equivalent is made up of components. Components in a room include the ceiling, floor, walls, a door and its casing, the window sash, and window casings, etc. In general, the first occurrence of a component moving from corner to corner on each wall is tested, and represents all components of that type in the room. If multiples of a component type are observed, the first occurrence moving from corner to corner on each wall is labeled component 1, the second component is labeled component 2, etc. (e.g. door 1, then door 2 or window 1, then window 2).

Substrate: The substrate is the material underneath the paint. Many substrates exist, however, the HUD Final Guidelines recommend classifying substrates into one of six substrate types: brick,

concrete, drywall, metal, plaster, and wood. These substrate types are intended to include a broad range of materials. If the true substrate is not one of the six types, the substrate that most closely matches the true substrate is selected.

XRF Testing: Lead-based paint inspections and assessment involve testing surfaces using an X-Ray Fluorescence Spectroscopy (XRF) to determine lead concentrations. Sampling protocols are performed in accordance with HUD Guidelines, *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*(Chapter 5, Lead-Based Paint Risk Assessments, and Chapter 7, Lead-Based Paint Inspections), the requirements of the Performance Characteristic Sheet (*Performance Characteristic Sheet for the Niton XLp Portable XRF Spectrum Analyzer*) and Niton's requirements of the XRF unit. Three calibration check readings on a 1.02 mg/cm^2 NIST SRM film are taken before and after obtaining the XRF readings. The Niton XRF instrument is determined to be in calibration if the difference between the first calibration check average and 1.02 mg/cm^2 (NIST SRM) is not greater than the 0.3 mg/cm^2 calibration check tolerance limit obtained from the XRF Performance Characteristic Sheet.

Dust Wipe Sampling: Sampling protocols for dust wipe sampling are performed in accordance with *Protocols for Dust and Soil Sampling, Final Report* (EPA report number 7474-R-95-001, March 1995.) Dust wipe sampling also includes collecting one blank sample per single-family residence for quality assurance. Dust wipe and blank samples collected for laboratory analysis are submitted to an NLLAP (National Lead Laboratory Accreditation Program) laboratory for analysis in accordance with EPA SW846 7420.

Soil Sampling: Assessment may include collecting composite soil samples for laboratory analysis of lead in soil. Sampling protocols are performed in accordance with HUD Guidelines Chapter 5 Appendix 13.3, *Soil Sampling Protocol for Housing* and the Minnesota Department of Health Lead Poisoning Prevention Rules 461.200 – 7461.2700. Soil samples are submitted to an accredited NLLAP laboratory for analysis performed in accordance with US EPA Method 6010B, *the Analysis of Lead using Inductively Coupled Plasma-Atomic Emission*.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
1									3.77	cps	0	
2			CALIBRATION CHECK					Negative	0.9	mg / cm ^2	0.1	1.07
3			CALIBRATION CHECK					Positive	1.1	mg / cm ^2	0.1	1.13
4			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.1
5	Empire apt 203	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
6	Empire apt 203	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1.17
7	Empire apt 203	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0.03	mg / cm ^2	0.05	1
8	Empire apt 203	LIVING ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.06	mg / cm ^2	0.08	1.49
9	Empire apt 203	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.03	1.47
10	Empire apt 203	LIVING ROOM	CLOSET DOOR	BROWN	WOOD	B	INTACT	Negative	0.04	mg / cm ^2	0.06	1.15
11	Empire apt 203	LIVING ROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.02	1.64
12	Empire apt 203	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
13	Empire apt 203	LIVING ROOM	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
14	Empire apt 203	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.03	mg / cm ^2	0.02	1.99
15	Empire apt 203	LIVING ROOM	BASEBOARD	BROWN	VINYL	D	INTACT	Negative	0.12	mg / cm ^2	0.05	2.03
16	Empire apt 203	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
17	Empire apt 203	BEDROOM 1	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.04	1.64
BEDROOM 1	Empire apt 203		DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
19	Empire apt 203	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.12	mg / cm ^2	0.12	2.04

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
20	Empire apt 203	BEDROOM 1	CLOSET DOOR	BROWN	WOOD	A	INTACT	Negative	0.04	mg / cm ^2	0.05	1
21	Empire apt 203	BEDROOM 1	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1.85
22	Empire apt 203	BEDROOM 1	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.09	mg / cm ^2	0.18	5.83
23	Empire apt 203	BEDROOM 1	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1.11
24	Empire apt 203	BEDROOM 1	BASEBOARD	BROWN	VINYL	A	INTACT	Negative	0.23	mg / cm ^2	0.2	3.37
25	Empire apt 203	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
26	Empire apt 203	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
27	Empire apt 203	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.24	mg / cm ^2	0.71	2.64
28	Empire apt 203	BATHROOM	WALL	WHITE	CERAMIC TILES	A	INTACT	Negative	0.6	mg / cm ^2	0.1	2.16
29	Empire apt 203	BATHROOM	SHOWER FLOOR	WHITE	CERAMIC TILES		INTACT	Negative	0	mg / cm ^2	0.02	1.22
30	Empire apt 203	BATHROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.04	mg / cm ^2	0.08	2.22
31	Empire apt 203	BATHROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1
32	Empire apt 203	BATHROOM	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
33	Empire apt 203	BATHROOM	DOOR	BROWN	METAL	C	INTACT	Negative	0.07	mg / cm ^2	0.08	1.52
34	Empire apt 203	BATHROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.06	mg / cm ^2	0.12	3.67
35	Empire apt 203	BATHROOM	BASEBOARD	BROWN	VINYL	C	INTACT	Negative	0.15	mg / cm ^2	0.06	1.47
36	Empire apt 203	BATHROOM	FLOOR	WHITE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
37	Empire apt 203	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
38	Empire apt 203	KITCHEN	WALL	WHITE	VINYL	A	INTACT	Negative	0.01	mg / cm ^2	0.04	1.92
39	Empire apt 203	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
40	Empire apt 203	KITCHEN	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1.63
41	Empire apt 203	KITCHEN	CLOSET DOOR	BROWN	WOOD	C	INTACT	Negative	0.05	mg / cm ^2	0.03	1.28
42	Empire apt 203	KITCHEN	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.02	1.76
43	Empire apt 203	KITCHEN	BASEBOARD	BROWN	VINYL	D	INTACT	Positive[1]	1.9	mg / cm ^2	0.9	2.47
44	Empire apt 203	KITCHEN	BASEBOARD	BROWN	VINYL	D		Positive	1.9	mg / cm ^2	0.7	2.23
45	Empire apt 203	KITCHEN	FLOOR	WHITE	LINOLEUM		POOR	Negative	0	mg / cm ^2	0.02	1
46	Empire apt 203	KITCHEN	BASEBOARD	BROWN	VINYL	C	INTACT	Negative	0.08	mg / cm ^2	0.04	1.52
47	Empire apt 201	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Positive	1.4	mg / cm ^2	0.4	1
48	Empire apt 201	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
49	Empire apt 201	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Positive	1.3	mg / cm ^2	0.3	1
50	Empire apt 201	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.07	mg / cm ^2	0.15	5.39
51	Empire apt 201	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0.17	mg / cm ^2	0.12	1.22
52	Empire apt 201	LIVING ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.04	mg / cm ^2	0.05	1.11
53	Empire apt 201	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1
54	Empire apt 201	LIVING ROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1
55	Empire apt 201	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
56	Empire apt 201	LIVING ROOM	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
57	Empire apt 201	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0	mg / cm ^2	0.02	1

[1] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
58	Empire apt 201	LIVING ROOM	BASEBOARD	BROWN	VINYL	D	INTACT	Null	0	mg / cm ^2	0.02	1
59	Empire apt 201	LIVING ROOM	BASEBOARD	BROWN	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
60	Empire apt 201	LIVING ROOM	FLOOR	BEIGE	CARPET		INTACT	Positive[2]	1.4	mg / cm ^2	0.4	1
61			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.08
62			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.07
63			CALIBRATION CHECK					Positive	1.1	mg / cm ^2	0.1	1.13
64	Empire apt 201	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Positive	1.3	mg / cm ^2	0.3	1
65	Empire apt 201	KITCHEN	WALL	BEIGE	VINYL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1.2
66	Empire apt 201	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
67	Empire apt 201	KITCHEN	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.02	1.19
68	Empire apt 201	KITCHEN	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.02	1.96
69	Empire apt 201	KITCHEN	CLOSET DOOR	BROWN	WOOD	C	INTACT	Negative	0.03	mg / cm ^2	0.04	1
70	Empire apt 201	KITCHEN	BASEBOARD	BROWN	VINYL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
71	Empire apt 201	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
72	Empire apt 201	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
73	Empire apt 201	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Positive	1.5	mg / cm ^2	0.5	1
74	Empire apt 201	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.04	1.83
75	Empire apt 201	BATHROOM	SHOWER	WHITE	CERAMIC TILES	A	INTACT	Negative	0.6	mg / cm ^2	0.2	1.7

[2] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
76	Empire apt 201	BATHROOM	FLOOR shower	BLUE	CERAMIC TILES		INTACT	Negative	0.02	mg / cm ^2	0.06	1.47
77	Empire apt 201	BATHROOM	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.03	mg / cm ^2	0.05	1.89
78	Empire apt 201	BATHROOM	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.03	1
79	Empire apt 201	BATHROOM	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
80	Empire apt 201	BATHROOM	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.05	mg / cm ^2	0.06	1.31
81	Empire apt 201	BATHROOM	WALL	BEIGE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.03	1.03
82	Empire apt 201	BATHROOM	BASEBOARD	BROWN	VINYL	D	INTACT	Negative	0.23	mg / cm ^2	0.07	2.07
83	Empire apt 201	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
84	Empire apt 201	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
85	Empire apt 201	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
86	Empire apt 201	BEDROOM 1	WALL	BEIGE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.05	1.8
87	Empire apt 201	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
88	Empire apt 201	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.04	mg / cm ^2	0.05	1
89	Empire apt 201	BEDROOM 1	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.07	2.66
90	Empire apt 201	BEDROOM 1	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.02	1.56
91	Empire apt 201	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
92	Empire apt 201	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Null	0	mg / cm ^2	0.02	1
93	Empire apt 201	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
94	Empire apt 201	BEDROOM 1	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.02	1.48
95	Empire apt 201	BEDROOM 1	DOOR CASING	BROWN	WOOD	D	INTACT	Negative	0.04	mg / cm ^2	0.05	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
96	Empire apt 201	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Null	0	mg / cm ^2	0.02	1
97	Empire apt 201	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
98	Empire apt 201	BEDROOM 1	BASEBOARD	BROWN	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
99	Empire apt 401	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
100	Empire apt 401	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.03	mg / cm ^2	0.02	1.42
101	Empire apt 401	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0.04	mg / cm ^2	0.06	1.07
102	Empire apt 401	LIVING ROOM	DOOR	BROWN	METAL	A	INTACT	Negative	0.03	mg / cm ^2	0.04	1.06
103	Empire apt 401	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1.16
104	Empire apt 401	LIVING ROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.05	1.61
105	Empire apt 401	LIVING ROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.03	1
106	Empire apt 401	LIVING ROOM	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1.09
107	Empire apt 401	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
108	Empire apt 401	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.03	mg / cm ^2	0.07	1.96
109	Empire apt 401	LIVING ROOM	CLOSET DOOR	BROWN	WOOD	D	INTACT	Negative	0.03	mg / cm ^2	0.05	1
110	Empire apt 401	LIVING ROOM	BASEBOARD	BLUE	VINYL	D	INTACT	Negative	-0.15	mg / cm ^2	0.67	10
111	Empire apt 401	LIVING ROOM	FLOOR	BLUE	CARPET		INTACT	Null	0	mg / cm ^2	0.02	1
112	Empire apt 401	LIVING ROOM	FLOOR	BLUE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
113	Empire apt 401	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
114	Empire apt 401	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
115	Empire apt 401	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Positive	1.4	mg / cm ^2	0.4	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
116	Empire apt 401	KITCHEN	WALL	WHITE	VINYL	A	INTACT	Negative	0.03	mg / cm ^2	0.11	4.5
117	Empire apt 401	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
118	Empire apt 401	KITCHEN	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.03	1.14
119	Empire apt 401	KITCHEN	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1.21
120	Empire apt 401	KITCHEN	CLOSET DOOR	BROWN	WOOD	C	INTACT	Negative	0.04	mg / cm ^2	0.07	1.49
121	Empire apt 401	KITCHEN	BASEBOARD	BLUE	VINYL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
122	Empire apt 401	KITCHEN	FLOOR	WHITE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
123	Empire apt 401	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
124	Empire apt 401	BEDROOM 1	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.03	1
125	Empire apt 401	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.05	mg / cm ^2	0.07	1.34
126	Empire apt 401	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
127	Empire apt 401	BEDROOM 1	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.03	1.07
128	Empire apt 401	BEDROOM 1	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.03	1.13
129	Empire apt 401	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
130	Empire apt 401	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
131	Empire apt 401	BEDROOM 1	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1
132	Empire apt 401	BEDROOM 1	CLOSET DOOR	BROWN	WOOD	D	INTACT	Negative	0.03	mg / cm ^2	0.05	1
133	Empire apt 401	BEDROOM 1	BASEBOARD	BLUE	VINYL	D	INTACT	Negative	0.01	mg / cm ^2	0.03	1.77
134	Empire apt 401	BEDROOM 1	FLOOR	BLUE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
135	Empire apt 401	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
136	Empire apt 401	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Null	0.03	mg / cm ^2	0.05	1.4
137	Empire apt 401	BATHROOM	WALL	WHITE	DRYWALL	A		Negative	0.05	mg / cm ^2	0.03	1.8
138	Empire apt 401	BATHROOM	SHOWER	WHITE	CERAMIC TILES	A	INTACT	Negative	0.06	mg / cm ^2	0.1	1.99
139	Empire apt 401	BATHROOM	SHOWER FLOOR	BROWN	CERAMIC TILES		INTACT	Negative	0	mg / cm ^2	0.02	1
140	Empire apt 401	BATHROOM	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.04	mg / cm ^2	0.06	1.47
141	Empire apt 401	BATHROOM	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0.04	mg / cm ^2	0.06	1.93
142	Empire apt 401	BATHROOM	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
143	Empire apt 401	BATHROOM	DOOR CASING	BROWN	METAL	C	INTACT	Null	0.04	mg / cm ^2	0.11	1
144	Empire apt 401	BATHROOM	DOOR CASING	BROWN	METAL	C		Null	0.03	mg / cm ^2	0.14	1
145	Empire apt 401	BATHROOM	DOOR CASING	BROWN	METAL	C		Negative	0.03	mg / cm ^2	0.04	1
146	Empire apt 401	BATHROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.03	mg / cm ^2	0.04	1.14
147	Empire apt 401	BATHROOM	BASEBOARD	BLUE	VINYL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
148	Empire apt 401	BATHROOM	FLOOR	WHITE	LINOLEUM		INTACT	Negative	0.19	mg / cm ^2	0.76	1
149	Empire apt 402	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
150	Empire apt 402	LIVING ROOM	CEILING	WHITE	POPCORN			Negative	0	mg / cm ^2	0.02	1
151	Empire apt 402	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.02	1.87
152	Empire apt 402	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0.04	mg / cm ^2	0.04	1
153	Empire apt 402	LIVING ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.02	mg / cm ^2	0.03	1
154	Empire apt 402	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.02	1.59
155	Empire apt 402	LIVING ROOM	CLOSET DOOR	BROWN	WOOD	B	INTACT	Negative	0.03	mg / cm ^2	0.04	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
156	Empire apt 402	LIVING ROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.03	1.83
157									3.61	cps	0	
158			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.08
159			CALIBRATION CHECK					Positive	1.1	mg / cm ^2	0.1	1.16
160			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.08
161	Empire apt 402	LIVING ROOM	WINDOW SASH	GRAY	METAL		INTACT	Negative	0	mg / cm ^2	0.02	1
162	Empire apt 402	LIVING ROOM	WINDOW CASING	GRAY	METAL		INTACT	Negative	0	mg / cm ^2	0.02	1
163	Empire apt 402	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.04	mg / cm ^2	0.12	4.28
164	Empire apt 402	LIVING ROOM	BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
165	Empire apt 402	LIVING ROOM	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
166	Empire apt 402	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
167	Empire apt 402	BEDROOM 1	WALL	WHITE	DRYWALL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
168	Empire apt 402	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
169	Empire apt 402	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.04	mg / cm ^2	0.05	1
170	Empire apt 402	BEDROOM 1	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1.46
171	Empire apt 402	BEDROOM 1	CLOSET DOOR	BROWN	WOOD	B	INTACT	Negative	0.03	mg / cm ^2	0.05	1.02
172	Empire apt 402	BEDROOM 1	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.06	mg / cm ^2	0.06	4.58
173	Empire apt 402	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
174	Empire apt 402	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
175	Empire apt 402	BEDROOM 1	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.04	mg / cm ^2	0.09	3.51

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
176	Empire apt 402	BEDROOM 1	BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
177	Empire apt 402	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
178	Empire apt 402	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
179	Empire apt 402	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1
180	Empire apt 402	BATHROOM	SHOWER	BEIGE	CERAMIC TILES	A	INTACT	Null	0.8	mg / cm ^2	0.1	2.39
181	Empire apt 402	BATHROOM	SHOWER	BEIGE	CERAMIC TILES	A		Negative	0.7	mg / cm ^2	0.1	2.31
182	Empire apt 402	BATHROOM	SHOWER FLOOR	BEIGE	CERAMIC TILES		INTACT	Negative	0	mg / cm ^2	0.02	1
183	Empire apt 402	BATHROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.03	mg / cm ^2	0.05	1.68
184	Empire apt 402	BATHROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.07	mg / cm ^2	0.14	5.08
185	Empire apt 402	BATHROOM	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.03	mg / cm ^2	0.04	1
186	Empire apt 402	BATHROOM	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
187	Empire apt 402	BATHROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1
188	Empire apt 402	BATHROOM	BASEBOARD	BROWN	VINYL	C	INTACT	Negative	0	mg / cm ^2	0.02	1.27
189	Empire apt 402	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
190	Empire apt 402	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
191	Empire apt 402	KITCHEN	WALL	BEIGE	VINYL	A	INTACT	Negative	0.08	mg / cm ^2	0.1	1.82
192	Empire apt 402	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
193	Empire apt 402	KITCHEN	WALL	WHITE	DRYWALL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
194	Empire apt 402	KITCHEN	CLOSET DOOR	BROWN	WOOD	C	INTACT	Negative	0.05	mg / cm ^2	0.06	1.28
195	Empire apt 402	KITCHEN	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.06	mg / cm ^2	0.19	7.93

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
196	Empire apt 402	KITCHEN	BASEBOARD	BROWN	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
197	Empire apt 402	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
198	Empire apt 409	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
199	Empire apt 409	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
200	Empire apt 409	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
201	Empire apt 409	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
202	Empire apt 409	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
203	Empire apt 409	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Null	0.01	mg / cm ^2	0.06	3.19
204	Empire apt 409	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
205	Empire apt 409	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Null	0.02	mg / cm ^2	0.37	10
206	Empire apt 409	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
207	Empire apt 409	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0.5	mg / cm ^2	0.4	1
208	Empire apt 409	LIVING ROOM	WALL	WHITE	DRYWALL	A	FAIR	Null	0.01	mg / cm ^2	0.05	1
209	Empire apt 409	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1
210	Empire apt 409	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0.03	mg / cm ^2	0.05	1
211	Empire apt 409	LIVING ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.02	mg / cm ^2	0.04	1
212	Empire apt 409	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.11	mg / cm ^2	0.72	2.26
213	Empire apt 409	LIVING ROOM	CLOSET DOOR	BROWN	WOOD	B	INTACT	Negative	0.04	mg / cm ^2	0.07	1.24
214	Empire apt 409	LIVING ROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.04	mg / cm ^2	0.09	3.44
215	Empire apt 409	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1

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Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
216	Empire apt 409	LIVING ROOM	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
217	Empire apt 409	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.05	mg / cm ^2	0.11	3.88
218	Empire apt 409	LIVING ROOM	BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
219	Empire apt 409	LIVING ROOM	FLOOR	BEIGE	CARPET	D	INTACT	Negative	0	mg / cm ^2	0.02	1
220	Empire apt 409	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
221	Empire apt 409	KITCHEN	WALL	WHITE	DRYWALL		INTACT	Negative	0.02	mg / cm ^2	0.02	1.25
222	Empire apt 409	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
223	Empire apt 409	KITCHEN	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.02	1.83
224	Empire apt 409	KITCHEN	CLOSET DOOR	BROWN	WOOD	C	INTACT	Negative	0.05	mg / cm ^2	0.06	1.22
225	Empire apt 409	KITCHEN	WALL	BEIGE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.04	1.17
226	Empire apt 409	KITCHEN	BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
227	Empire apt 409	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
228	Empire apt 409	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
229	Empire apt 409	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
230	Empire apt 409	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
231	Empire apt 409	BEDROOM 1	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.05	1.97
232	Empire apt 409	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
233	Empire apt 409	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.05	mg / cm ^2	0.06	1.29
234	Empire apt 409	BEDROOM 1	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1
235	Empire apt 409	BEDROOM 1	CLOSET DOOR	BROWN	WOOD	B	INTACT	Negative	0.03	mg / cm ^2	0.04	1

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Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
236	Empire apt 409	BEDROOM 1	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1.05
237	Empire apt 409	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
238	Empire apt 409	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
239	Empire apt 409	BEDROOM 1	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1.13
240	Empire apt 409	BEDROOM 1	BASEBOARD	BEIGE	VINYL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
241	Empire apt 409	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
242	Empire apt 409	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
243	Empire apt 409	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.05	2.11
244	Empire apt 409	BATHROOM	SHOWER	BEIGE	CERAMIC TILES	A	INTACT	Null	0.7	mg / cm ^2	0.1	2.25
245	Empire apt 409	BATHROOM	SHOWER	BEIGE	CERAMIC TILES	A	INTACT	Negative	0.6	mg / cm ^2	0.1	2.07
246	Empire apt 409	BATHROOM	SHOWER FLOOR	BEIGE	CERAMIC TILES		INTACT	Negative	0.01	mg / cm ^2	0.03	2.55
247	Empire apt 409	BATHROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1
248	Empire apt 409	BATHROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1
249	Empire apt 409	BATHROOM	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.04	mg / cm ^2	0.05	1
250	Empire apt 409	BATHROOM	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
251	Empire apt 409	BATHROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1
252	Empire apt 409	BATHROOM	BASEBOARD	BROWN	VINYL	B	INTACT	Negative	0	mg / cm ^2	0.02	1.13
253	Empire apt 409	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
254	Empire apt 501	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
255	Empire apt 501	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1

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Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
256	Empire apt 501	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
257	Empire apt 501	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Null	0.01	mg / cm ^2	0.09	1
258	Empire apt 501	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.02	1.97
259	Empire apt 501	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0.04	mg / cm ^2	0.02	1
260	Empire apt 501	LIVING ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.03	mg / cm ^2	0.05	1.07
261	Empire apt 501	LIVING ROOM	WALL	WHITE	VINYL	B	INTACT	Negative	0.03	mg / cm ^2	0.12	3.78
262	Empire apt 501	LIVING ROOM	WALL	WHITE	VINYL	C	INTACT	Negative	0.06	mg / cm ^2	0.19	6.66
263	Empire apt 501	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
264	Empire apt 501	LIVING ROOM	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	-0.48	mg / cm ^2	0.76	3.03
265	Empire apt 501	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Null	0.01	mg / cm ^2	0.06	1.36
266	Empire apt 501	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.04	mg / cm ^2	0.1	4.33
267	Empire apt 501	LIVING ROOM	BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
268	Empire apt 501	LIVING ROOM	CLOSET DOOR	BROWN	WOOD	D	INTACT	Negative	0.04	mg / cm ^2	0.05	1
269	Empire apt 501	LIVING ROOM	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
270	Empire apt 501	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
271	Empire apt 501	KITCHEN	WALL	BEIGE	VINYL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
272	Empire apt 501	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
273	Empire apt 501	KITCHEN	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.05	2.04
274	Empire apt 501	KITCHEN	WALL	WHITE	DRYWALL	C	INTACT	Null	0.02	mg / cm ^2	0.06	1.77
275	Empire apt 501	KITCHEN	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.02	1.8

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Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

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Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
276	Empire apt 501	KITCHEN	CLOSET DOOR	BROWN	WOOD	C	INTACT	Negative	0.06	mg / cm ^2	0.08	1.64
277	Empire apt 501	KITCHEN	BASEBOARD	BEIGE	VINYL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
278	Empire apt 501	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
279	Empire apt 501	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
280	Empire apt 501	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
281	Empire apt 501	BEDROOM 1	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1
282	Empire apt 501	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
283	Empire apt 501	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.05	mg / cm ^2	0.06	1.12
284	Empire apt 501	BEDROOM 1	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.07	2.23
285	Empire apt 501	BEDROOM 1	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.04	mg / cm ^2	0.07	6.87
286	Empire apt 501	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	-0.01	mg / cm ^2	0.82	4.54
287	Empire apt 501	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1.13
288	Empire apt 501	BEDROOM 1	WALL	GRAY	DRYWALL	D	FAIR	Negative	0.01	mg / cm ^2	0.02	1.48
289	Empire apt 501	BEDROOM 1	CLOSET DOOR	BROWN	WOOD	D	INTACT	Negative	0.05	mg / cm ^2	0.06	1.26
290	Empire apt 501	BEDROOM 1	BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
291	Empire apt 501	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
292	Empire apt 501	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
293	Empire apt 501	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1.38
294	Empire apt 501	BATHROOM	SHOWER	BEIGE	CERAMIC TILES	A	INTACT	Negative	0.7	mg / cm ^2	0.1	2.3
295	Empire apt 501	BATHROOM	SHOWER FLOOR	BEIGE	CERAMIC TILES		INTACT	Negative	0	mg / cm ^2	0.02	1

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Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
296	Empire apt 501	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.04	1.46
297	Empire apt 501	BATHROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.03	1
298	Empire apt 501	BATHROOM	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.04	mg / cm ^2	0.05	1
299	Empire apt 501	BATHROOM	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
300	Empire apt 501	BATHROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.03	1.33
301	Empire apt 501	BATHROOM	BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
302	Empire apt 501	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
303	Empire apt 502	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
304	Empire apt 502	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
305	Empire apt 502	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.04	mg / cm ^2	0.06	5.02
306	Empire apt 502	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0.03	mg / cm ^2	0.04	1
307	Empire apt 502	LIVING ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.06	mg / cm ^2	0.07	1.38
308	Empire apt 502	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1.57
309	Empire apt 502	LIVING ROOM	CLOSET DOOR	BROWN	WOOD	B	INTACT	Negative	0.04	mg / cm ^2	0.07	1.4
310	Empire apt 502	LIVING ROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1.01
311	Empire apt 502	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0.26	mg / cm ^2	0.59	2.75
312	Empire apt 502	LIVING ROOM	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
313	Empire apt 502	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
314	Empire apt 502	LIVING ROOM	BASEBOARD	WHITE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1.44
315	Empire apt 502	LIVING ROOM	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
316	Empire apt 502	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
317	Empire apt 502	KITCHEN	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.05	2.55
318	Empire apt 502	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
319	Empire apt 502	KITCHEN	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1.23
320	Empire apt 502	KITCHEN	CLOSET DOOR	BROWN	CARPET	C	INTACT	Negative	0.02	mg / cm ^2	0.04	1
321	Empire apt 502	KITCHEN	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.05	mg / cm ^2	0.09	3.62
322	Empire apt 502	KITCHEN	BASEBOARD	WHITE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
323	Empire apt 502	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
324	Empire apt 502	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
325	Empire apt 502	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
326	Empire apt 502	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1.14
327	Empire apt 502	BEDROOM 1	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.03	1.09
328	Empire apt 502	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
329	Empire apt 502	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.03	mg / cm ^2	0.04	1
330	Empire apt 502	BEDROOM 1	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1
331	Empire apt 502	BEDROOM 1	CLOSET DOOR	BROWN	WOOD	B	INTACT	Negative	0.05	mg / cm ^2	0.06	1.14
332	Empire apt 502	BEDROOM 1	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1
333	Empire apt 502	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1.01
334	Empire apt 502	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1.17
335	Empire apt 502	BEDROOM 1	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.08	mg / cm ^2	0.11	7.29

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
336	Empire apt 502	BEDROOM 1	BASEBOARD	WHITE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
337	Empire apt 502	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
338	Empire apt 502	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
339	Empire apt 502	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.03	1.56
340	Empire apt 502	BATHROOM	SHOWER	BEIGE	CERAMIC TILES	A	INTACT	Negative	0.8	mg / cm ^2	0.1	2.38
341	Empire apt 502	BATHROOM	SHOWER FLOOR	BEIGE	CERAMIC TILES		INTACT	Negative	0	mg / cm ^2	0.02	1
342	Empire apt 502	BATHROOM	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1
343	Empire apt 502	BATHROOM	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.04	1.48
344	Empire apt 502	BATHROOM	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.06	mg / cm ^2	0.03	1.19
345	Empire apt 502	BATHROOM	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
346	Empire apt 502	BATHROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.05	mg / cm ^2	0.13	5.38
347	Empire apt 502	BATHROOM	BASEBOARD	WHITE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
348	Empire apt 502	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
349			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.07
350			CALIBRATION CHECK					Negative	0.9	mg / cm ^2	0.1	1.04
351			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.07
352			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.1
353									3.68	cps	0	
354			CALIBRATION CHECK					Negative	0.9	mg / cm ^2	0.1	1.05
355			CALIBRATION CHECK					Negative	0.9	mg / cm ^2	0.1	1.07

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
356			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.09
357	Empire apt 506	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
358	Empire apt 506	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Null	0.07	mg / cm ^2	0.1	3.2
359	Empire apt 506	LIVING ROOM	WALL	WHITE	DRYWALL	A		Negative	0.02	mg / cm ^2	0.04	1.67
360	Empire apt 506	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0.06	mg / cm ^2	0.08	1.49
361	Empire apt 506	LIVING ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.01	mg / cm ^2	0.03	1
362	Empire apt 506	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.05	2
363	Empire apt 506	LIVING ROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1.13
364	Empire apt 506	LIVING ROOM	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
365	Empire apt 506	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1.09
366	Empire apt 506	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.03	mg / cm ^2	0.06	1.82
367	Empire apt 506	LIVING ROOM	BASEBOARD	WHITE	VINYL	D	INTACT	Negative	0.01	mg / cm ^2	0.03	1.13
368	Empire apt 506	LIVING ROOM	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
369	Empire apt 506	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
370	Empire apt 506	KITCHEN	WALL	BLUE	VINYL		INTACT	Negative	0.02	mg / cm ^2	0.07	2.85
371	Empire apt 506	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
372	Empire apt 506	KITCHEN	WALL	YELLOW	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1.07
373	Empire apt 506	KITCHEN	WALL	YELLOW	DRYWALL	C	INTACT	Negative	0.04	mg / cm ^2	0.03	1.91
374	Empire apt 506	KITCHEN	CLOSET DOOR	BROWN	WOOD	C	INTACT	Negative	0.03	mg / cm ^2	0.05	1
375	Empire apt 506	KITCHEN	BASEBOARD	WHITE	VINYL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
376	Empire apt 506	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
377	Empire apt 506	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
378	Empire apt 506	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
379	Empire apt 506	BEDROOM 1	CEILING	WHITE	POPCORN			Negative	0	mg / cm ^2	0.02	1
380	Empire apt 506	BEDROOM 1	WALL	BEIGE	DRYWALL	A	INTACT	Negative	0.24	mg / cm ^2	0.62	3.72
381	Empire apt 506	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.13	mg / cm ^2	0.14	2.22
382	Empire apt 506	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
383	Empire apt 506	BEDROOM 1	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1.49
384	Empire apt 506	BEDROOM 1	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1
385	Empire apt 506	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1.46
386	Empire apt 506	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
387	Empire apt 506	BEDROOM 1	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.4	mg / cm ^2	0.6	2.84
388	Empire apt 506	BEDROOM 1	CLOSET DOOR	BROWN	WOOD	D	INTACT	Negative	0.03	mg / cm ^2	0.05	1
389	Empire apt 506	BEDROOM 1	BASEBOARD	WHITE	VINYL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1
390	Empire apt 506	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
391	Empire apt 506	BATHROOM	CEILING	WHITE	PLASTER		INTACT	Negative	0	mg / cm ^2	0.02	1
392	Empire apt 506	BATHROOM	WALL	BEIGE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.04	1.37
393	Empire apt 506	BATHROOM	SHOWER	BEIGE	CERAMIC TILES	B	INTACT	Positive[3]	1.7	mg / cm ^2	0.6	2.32

[3] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
394	Empire apt 506	BATHROOM	SHOWER FLOOR	BEIGE	CERAMIC TILES	B		Negative	0	mg / cm ^2	0.02	1
395	Empire apt 506	BATHROOM	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0.07	mg / cm ^2	0.1	2.87
396	Empire apt 506	BATHROOM	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
397	Empire apt 506	BATHROOM	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.05	mg / cm ^2	0.06	1
398	Empire apt 506	BATHROOM	BASEBOARD	BLACK	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
399	Empire apt 506	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
400	Empire apt 601	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
401	Empire apt 601	LIVING ROOM	CEILING	WHITE	POPCORN			Null	0	mg / cm ^2	0.02	1
402	Empire apt 601	LIVING ROOM	CEILING	WHITE	POPCORN			Null	0	mg / cm ^2	0.02	1
403	Empire apt 601	LIVING ROOM	CEILING	WHITE	POPCORN			Null	0	mg / cm ^2	0.02	1
404	Empire apt 601	LIVING ROOM	CEILING	WHITE	POPCORN			Negative	0	mg / cm ^2	0.02	1
405	Empire apt 601	LIVING ROOM	WALL	BEIGE	DRYWALL	A	INTACT	Negative	0.19	mg / cm ^2	0.66	2.02
406	Empire apt 601	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0.03	mg / cm ^2	0.05	1
407	Empire apt 601	LIVING ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.03	mg / cm ^2	0.04	1
408	Empire apt 601	LIVING ROOM	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1
409	Empire apt 601	LIVING ROOM	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.03	1.33
410	Empire apt 601	LIVING ROOM	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
411	Empire apt 601	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
412	Empire apt 601	LIVING ROOM	WALL	BEIGE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.02	1.99
413	Empire apt 601	LIVING ROOM	CLOSET DOOR	BROWN	WOOD	D	INTACT	Negative	0.03	mg / cm ^2	0.05	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
414	Empire apt 601	LIVING ROOM	BASEBOARD	BROWN	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
415	Empire apt 601	LIVING ROOM	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
416	Empire apt 601	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Positive[4]	1.4	mg / cm ^2	0.3	1
417	Empire apt 601	KITCHEN	WALL	BEIGE	VINYL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1.05
418	Empire apt 601	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
419	Empire apt 601	KITCHEN	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1
420	Empire apt 601	KITCHEN	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0.05	mg / cm ^2	0.12	4.76
421	Empire apt 601	KITCHEN	CLOSET DOOR	BROWN	WOOD	C	INTACT	Negative	0.04	mg / cm ^2	0.05	1.12
422	Empire apt 601	KITCHEN	BASEBOARD	BROWN	VINYL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
423	Empire apt 601	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
424	Empire apt 601	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
425	Empire apt 601	BEDROOM 1	CEILING	WHITE	POPCORN			Null	0	mg / cm ^2	0.02	1
426	Empire apt 601	BEDROOM 1	CEILING	WHITE	POPCORN			Null	0	mg / cm ^2	0.02	1
427	Empire apt 601	BEDROOM 1	CEILING	WHITE	POPCORN			Null	0	mg / cm ^2	0.02	1
428	Empire apt 601	BEDROOM 1	CEILING	WHITE	POPCORN			Null	0	mg / cm ^2	0.02	1
429	Empire apt 601	BEDROOM 1	CEILING	WHITE	POPCORN			Positive	1.4	mg / cm ^2	0.4	1
430	Empire apt 601	BEDROOM 1	WALL	WHITE	DRYWALL	A	INTACT	Null	0.03	mg / cm ^2	0.1	3.39
431	Empire apt 601	BEDROOM 1	WALL	WHITE	DRYWALL	A		Negative	0.05	mg / cm ^2	0.12	5.24

[4] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
432	Empire apt 601	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
433	Empire apt 601	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.07	mg / cm ^2	0.07	1.35
434	Empire apt 601	BEDROOM 1	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1
435	Empire apt 601	BEDROOM 1	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.02	1.97
436	Empire apt 601	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
437	Empire apt 601	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1.24
438	Empire apt 601	BEDROOM 1	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1.29
439	Empire apt 601	BEDROOM 1	CLOSET DOOR	BROWN	WOOD	D	INTACT	Negative	0.03	mg / cm ^2	0.05	1.01
440	Empire apt 601	BEDROOM 1	BASEBOARD	BROWN	VINYL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
441	Empire apt 601	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
442	Empire apt 601	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
443	Empire apt 601	BATHROOM	CEILING	WHITE	POPCORN			Negative	0	mg / cm ^2	0.02	1
444	Empire apt 601	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1
445	Empire apt 601	BATHROOM	SHOWER	WHITE	CERAMIC TILES	A	INTACT	Positive[5]	1.4	mg / cm ^2	0.4	2.41
446	Empire apt 601	BATHROOM	SHOWER FLOOR	BEIGE	CERAMIC TILES		INTACT	Negative	0.01	mg / cm ^2	0.03	2.72
447	Empire apt 601	BATHROOM	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.03	2.21
448	Empire apt 601	BATHROOM	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0.07	mg / cm ^2	0.18	5.06
449	Empire apt 601	BATHROOM	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1

[5] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
450	Empire apt 601	BATHROOM	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.05	mg / cm ^2	0.05	1
451	Empire apt 601	BATHROOM	WALL	BEIGE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.02	1.5
452	Empire apt 601	BATHROOM	BASEBOARD	BROWN	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
453	Empire apt 601	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
454	Empire apt 607	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
455	Empire apt 607	LIVING ROOM	CEILING	WHITE	POPCORN			Negative	0	mg / cm ^2	0.02	1
456	Empire apt 607	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1.59
457	Empire apt 607	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0.04	mg / cm ^2	0.05	1
458	Empire apt 607	LIVING ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.04	mg / cm ^2	0.05	1
459	Empire apt 607	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1.52
460	Empire apt 607	LIVING ROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
461	Empire apt 607	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Null	0	mg / cm ^2	0.02	1
462	Empire apt 607	LIVING ROOM	WINDOW SASH	GRAY	METAL	C		Negative	0	mg / cm ^2	0.02	1
463	Empire apt 607	LIVING ROOM	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
464	Empire apt 607	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.04	mg / cm ^2	0.13	4.45
465	Empire apt 607	LIVING ROOM	CLOSET DOOR	BROWN	WOOD	D	INTACT	Negative	0.05	mg / cm ^2	0.07	1.35
466	Empire apt 607	LIVING ROOM	BASEBOARD	WHITE	VINYL	A	INTACT	Negative	0.02	mg / cm ^2	0.02	1.3
467	Empire apt 607	LIVING ROOM	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
468	Empire apt 607	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Positive[6]	1.4	mg / cm ^2	0.4	1
469	Empire apt 607	KITCHEN	WALL	WHITE	VINYL	A	INTACT	Negative	0.03	mg / cm ^2	0.07	2.24
470	Empire apt 607	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
471	Empire apt 607	KITCHEN	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.03	1.22
472	Empire apt 607	KITCHEN	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.03	1.55
473	Empire apt 607	KITCHEN	CLOSET DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
474	Empire apt 607	KITCHEN	BASEBOARD	BEIGE	VINYL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
475	Empire apt 607	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
476	Empire apt 607	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
477	Empire apt 607	BEDROOM 1	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1
478	Empire apt 607	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
479	Empire apt 607	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.05	mg / cm ^2	0.05	1
480	Empire apt 607	BEDROOM 1	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.05	mg / cm ^2	0.12	4.21
481	Empire apt 607	BEDROOM 1	WALL	WHITE	DRYWALL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
482	Empire apt 607	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1.08
483	Empire apt 607	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Null	0.01	mg / cm ^2	0.02	2.86
484	Empire apt 607	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Null	0	mg / cm ^2	0.02	1.92
485	Empire apt 607	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1

[6] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
486	Empire apt 607	BEDROOM 1	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.22	mg / cm ^2	0.63	2.24
487	Empire apt 607	BEDROOM 1	CLOSET DOOR	BROWN	WOOD	D	INTACT	Negative	0.03	mg / cm ^2	0.04	1
488	Empire apt 607	BEDROOM 1	BASEBOARD	WHITE	VINYL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1
489	Empire apt 607	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Null	0	mg / cm ^2	0.02	1
490	Empire apt 607	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Null	0	mg / cm ^2	0.02	1
491	Empire apt 607	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1.34
492	Empire apt 607	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
493	Empire apt 607	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
494	Empire apt 607	BATHROOM	SHOWER	WHITE	CERAMIC TILES	B	INTACT	Null	0.7	mg / cm ^2	0.2	2.2
495	Empire apt 607	BATHROOM	SHOWER	BEIGE	CERAMIC TILES	B	INTACT	Negative	0.7	mg / cm ^2	0.1	2.18
496	Empire apt 607	BATHROOM	SHOWER FLOOR	BEIGE	CERAMIC TILES		INTACT	Negative	0.02	mg / cm ^2	0.04	3.85
497	Empire apt 607	BATHROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.05	mg / cm ^2	0.08	3.19
498	Empire apt 607	BATHROOM	DOOR	BROWN	WOOD	D	INTACT	Negative	0	mg / cm ^2	0.02	1
499	Empire apt 607	BATHROOM	DOOR CASING	BROWN	METAL	D	INTACT	Negative	0.07	mg / cm ^2	0.07	1.25
500	Empire apt 607	BATHROOM	BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
501	Empire apt 607	BATHROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.05	2.5
502	Empire apt 607	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
503	Empire apt 610	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
504	Empire apt 610	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1.24
505	Empire apt 610	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0.09	mg / cm ^2	0.11	1.69

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
506	Empire apt 610	LIVING ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.02	mg / cm ^2	0.03	1
507	Empire apt 610	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1.06
508	Empire apt 610	LIVING ROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1
509	Empire apt 610	LIVING ROOM	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1.11
510	Empire apt 610	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0.4	mg / cm ^2	0.6	2.58
511	Empire apt 610	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1
512	Empire apt 610	LIVING ROOM	CLOSET DOOR	BROWN	WOOD	D	INTACT	Negative	0.03	mg / cm ^2	0.04	1
513	Empire apt 610	LIVING ROOM	BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
514	Empire apt 610	LIVING ROOM	FLOOR	BEIGE	CARPET		INTACT	Positive[7]	1.4	mg / cm ^2	0.4	1
515	Empire apt 610	LIVING ROOM	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
516	Empire apt 610	LIVING ROOM	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
517	Empire apt 610	LIVING ROOM	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
518	Empire apt 610	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
519	Empire apt 610	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
520	Empire apt 610	KITCHEN	CEILING	WHITE	POPCORN			Positive	1.4	mg / cm ^2	0.3	1
521	Empire apt 610	KITCHEN	WALL	BEIGE	POPCORN	A	INTACT	Negative	0.01	mg / cm ^2	0.03	1
522	Empire apt 610	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
523	Empire apt 610	KITCHEN	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.04	1.56

[7] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
524	Empire apt 610	KITCHEN	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.02	1.79
525	Empire apt 610	KITCHEN	CLOSET DOOR	BROWN	WOOD	C	INTACT	Negative	0.04	mg / cm ^2	0.05	1
526	Empire apt 610	KITCHEN	BASEBOARD	BEIGE	VINYL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
527	Empire apt 610	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
528	Empire apt 610	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
529	Empire apt 610	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Positive[8]	1.5	mg / cm ^2	0.4	1
530	Empire apt 610	BEDROOM 1	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.06	2.36
531	Empire apt 610	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
532	Empire apt 610	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.04	mg / cm ^2	0.05	1
533	Empire apt 610	BEDROOM 1	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.04	2.04
534	Empire apt 610	BEDROOM 1	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.03	1.14
535	Empire apt 610	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Null	0	mg / cm ^2	0.02	1
536	Empire apt 610	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
537	Empire apt 610	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
538	Empire apt 610	BEDROOM 1	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.2	mg / cm ^2	0.66	2.44
539	Empire apt 610	BEDROOM 1	CLOSET DOOR	BROWN	DRYWALL	D	INTACT	Negative	0.03	mg / cm ^2	0.05	1
540	Empire apt 610	BEDROOM 1	BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
541	Empire apt 610	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Positive	1.5	mg / cm ^2	0.4	1

[8] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
542	Empire apt 610	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
543	Empire apt 610	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
544	Empire apt 610	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Null	0	mg / cm ^2	0.02	1
545	Empire apt 610	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Null	0	mg / cm ^2	0.02	1
546	Empire apt 610	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
547	Empire apt 610	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Positive[9]	1.5	mg / cm ^2	0.5	1
548	Empire apt 610	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1.55
549	Empire apt 610	BATHROOM	WALL	BEIGE	CERAMIC TILES	A	INTACT	Negative	0.7	mg / cm ^2	0.1	2.23
550	Empire apt 610	BATHROOM	SHOWER FLOOR	BEIGE	CERAMIC TILES	A	INTACT	Negative	0	mg / cm ^2	0.02	1.26
551	Empire apt 610	BATHROOM	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.05	1.88
552	Empire apt 610	BATHROOM	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0.03	mg / cm ^2	0.08	2.69
553	Empire apt 610	BATHROOM	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
554	Empire apt 610	BATHROOM	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.03	mg / cm ^2	0.04	1
555	Empire apt 610	BATHROOM	WALL	BEIGE	DRYWALL	D	INTACT	Negative	0.03	mg / cm ^2	0.07	2.6
556	Empire apt 610	BATHROOM	BASEBOARD	BROWN	VINYL	D	INTACT	Negative	0.21	mg / cm ^2	0.07	1.82
557	Empire apt 610	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
558			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.09
559			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.05

[9] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
560			CALIBRATION CHECK					Positive	1.1	mg / cm ^2	0.1	1.12
561									3.85	cps	0	
562			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.12
563			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.06
564			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.05
565	Empire apt 606		CEILING	WHITE	PLASTER		INTACT	Null	0	mg / cm ^2	0.02	1
566	Empire apt 606		CEILING	WHITE	PLASTER		INTACT	Null	0	mg / cm ^2	0.02	1
567	Empire apt 606		CEILING	WHITE	PLASTER		INTACT	Negative	0	mg / cm ^2	0.02	1
568	Empire apt 606		WALL	WHITE	DRYWALL	A	INTACT	Negative	-0.33	mg / cm ^2	0.63	2.09
569	Empire apt 606		DOOR	BROWN	WOOD	A	INTACT	Negative	0.05	mg / cm ^2	0.03	1.17
570	Empire apt 606		DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.05	mg / cm ^2	0.05	1.09
571	Empire apt 606		WALL	WHITE	DRYWALL	B	INTACT	Negative	0.03	mg / cm ^2	0.05	4.04
572	Empire apt 606		WALL	WHITE	DRYWALL	C	INTACT	Null	0.01	mg / cm ^2	0.04	1.26
573	Empire apt 606		WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1
574	Empire apt 606		WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
575	Empire apt 606		WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0.03	mg / cm ^2	0.8	2.94
576	Empire apt 606		WALL	WHITE	DRYWALL	D	FAIR	Null	0.13	mg / cm ^2	0.32	10
577	Empire apt 606		WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1.3
578	Empire apt 606		CLOSET DOOR	BROWN	WOOD	D	INTACT	Negative	0.03	mg / cm ^2	0.04	1
579	Empire apt 606		BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
580	Empire apt 606		FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
581	Empire apt 606	KITCHEN	CEILING	WHITE	PLASTER		INTACT	Negative	0	mg / cm ^2	0.02	1
582	Empire apt 606	KITCHEN	WALL	BEIGE	VINYL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
583	Empire apt 606	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
584	Empire apt 606	KITCHEN	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.05	2.48
585	Empire apt 606	KITCHEN	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
586	Empire apt 606	KITCHEN	CLOSET DOOR	BROWN	WOOD	C	INTACT	Negative	0.03	mg / cm ^2	0.04	1
587	Empire apt 606	KITCHEN	BASEBOARD	BROWN	VINYL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
588	Empire apt 606	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
589	Empire apt 606	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
590	Empire apt 606	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
591	Empire apt 606	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
592	Empire apt 606	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
593	Empire apt 606	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
594	Empire apt 606	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
595	Empire apt 606	BEDROOM 1	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.06	2.31
596	Empire apt 606	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.07	mg / cm ^2	0.09	1.73
597	Empire apt 606	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
598	Empire apt 606	BEDROOM 1	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.04	1.74
599	Empire apt 606	BEDROOM 1	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1.6

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
600	Empire apt 606	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
601	Empire apt 606	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1.57
602	Empire apt 606	BEDROOM 1	WALL	WHITE	DRYWALL	D	INTACT	Negative	-0.18	mg / cm ^2	0.72	2.2
603	Empire apt 606	BEDROOM 1	CLOSET DOOR	BROWN	WOOD	D	INTACT	Negative	0.06	mg / cm ^2	0.08	1.65
604	Empire apt 606	BEDROOM 1	BASEBOARD	BEIGE	VINYL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
605	Empire apt 606	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Null	0	mg / cm ^2	0.02	1
606	Empire apt 606	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
607	Empire apt 606	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
608	Empire apt 606	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
609	Empire apt 606	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
610	Empire apt 606	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
611	Empire apt 606	BATHROOM	WALL	BEIGE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1
612	Empire apt 606	BATHROOM	SHOWER	WHITE	CERAMIC TILES	B	INTACT	Positive[10]	1.5	mg / cm ^2	0.4	2.15
613	Empire apt 606	BATHROOM	SHOWER FLOOR	BEIGE	CERAMIC TILES		INTACT	Negative	0	mg / cm ^2	0.02	1
614	Empire apt 606	BATHROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
615	Empire apt 606	BATHROOM	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.06	mg / cm ^2	0.07	1.4
616	Empire apt 606	BATHROOM	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
617	Empire apt 606	BATHROOM	FLOOR	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.03	1.52

[10] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
618	Empire apt 606	BATHROOM	BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
619	Empire apt 606	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
620	Empire apt 701	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
621	Empire apt 701	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	-0.08	mg / cm ^2	0.7	7.1
622	Empire apt 701	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0.03	mg / cm ^2	0.04	1
623	Empire apt 701	LIVING ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.1	mg / cm ^2	0.09	1.33
624	Empire apt 701	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.04	mg / cm ^2	0.13	5.81
625	Empire apt 701	LIVING ROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.04	1.63
626	Empire apt 701	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	-0.1	mg / cm ^2	0.62	2.28
627	Empire apt 701	LIVING ROOM	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
628	Empire apt 701	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.03	1.54
629	Empire apt 701	LIVING ROOM	CLOSET DOOR	BROWN	WOOD	D	INTACT	Negative	0.07	mg / cm ^2	0.09	1.66
630	Empire apt 701	LIVING ROOM	BASEBOARD	BROWN	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
631	Empire apt 701	LIVING ROOM	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
632	Empire apt 701	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
633	Empire apt 701	KITCHEN	WALL	BEIGE	VINYL	A	INTACT	Negative	0.02	mg / cm ^2	0.02	1.38
634	Empire apt 701	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
635	Empire apt 701	KITCHEN	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.03	2.6
636	Empire apt 701	KITCHEN	WALL	BEIGE	DRYWALL	C	INTACT	Null	0.02	mg / cm ^2	0.15	1.58
637	Empire apt 701	KITCHEN	WALL	BEIGE	DRYWALL	C	INTACT	Negative	-0.45	mg / cm ^2	1.31	2.53

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
638	Empire apt 701	KITCHEN	BASEBOARD	BROWN	WOOD	C	INTACT	Null	0.06	mg / cm ^2	0.15	1.43
639	Empire apt 701	KITCHEN	BASEBOARD	BROWN	WOOD	C	INTACT	Negative	0.08	mg / cm ^2	0.1	1.79
640	Empire apt 701	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0.01	mg / cm ^2	0.02	3.09
641	Empire apt 701	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
642	Empire apt 701	BEDROOM 1	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.03	mg / cm ^2	0.07	2.36
643	Empire apt 701	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.03	mg / cm ^2	0.05	1.12
644	Empire apt 701	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
645	Empire apt 701	BEDROOM 1	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.03	mg / cm ^2	0.05	3.76
646	Empire apt 701	BEDROOM 1	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.03	3.63
647	Empire apt 701	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1.21
648	Empire apt 701	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
649	Empire apt 701	BEDROOM 1	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1.34
650	Empire apt 701	BEDROOM 1	CLOSET DOOR	BROWN	WOOD	D	INTACT	Negative	0.03	mg / cm ^2	0.04	1
651	Empire apt 701	BEDROOM 1	BASEBOARD	BROWN	VINYL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
652	Empire apt 701	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
653	Empire apt 701	BATHROOM	CEILING	WHITE	PLASTER		INTACT	Null	0	mg / cm ^2	0.02	1
654	Empire apt 701	BATHROOM	CEILING	WHITE	PLASTER		INTACT	Null	0	mg / cm ^2	0.02	1
655	Empire apt 701	BATHROOM	CEILING	WHITE	PLASTER		INTACT	Negative	0	mg / cm ^2	0.02	1
656	Empire apt 701	BATHROOM	WALL	BEIGE	DRYWALL	A	INTACT	Null	0.13	mg / cm ^2	0.9	10
657	Empire apt 701	BATHROOM	WALL	BEIGE	DRYWALL	A	INTACT	Null	0	mg / cm ^2	0.02	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
658	Empire apt 701	BATHROOM	WALL	BEIGE	DRYWALL	A	INTACT	Negative	0	mg / cm ^2	0.02	1.66
659	Empire apt 701	BATHROOM	WALL	WHITE	CEILING TILES	A	INTACT	Negative	0.7	mg / cm ^2	0.2	2.23
660	Empire apt 701	BATHROOM	SHOWER FLOOR	BEIGE	CEILING TILES	A	INTACT	Negative	0	mg / cm ^2	0.02	1.49
661	Empire apt 701	BATHROOM	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.04	2.11
662	Empire apt 701	BATHROOM	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
663	Empire apt 701	BATHROOM	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
664	Empire apt 701	BATHROOM	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.03	mg / cm ^2	0.04	1
665	Empire apt 701	BATHROOM	FLOOR	BEIGE	DRYWALL	D	INTACT	Negative	0.03	mg / cm ^2	0.06	2.31
666	Empire apt 701	BATHROOM	BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
667	Empire apt 701	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
668	Empire apt 708	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
669	Empire apt 708	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Null	0.02	mg / cm ^2	0.07	2.61
670	Empire apt 708	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.03	1.61
671	Empire apt 708	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0.03	mg / cm ^2	0.04	1
672	Empire apt 708	LIVING ROOM	DOOR CASING	BROWN	WOOD	A	INTACT	Negative	0.05	mg / cm ^2	0.06	1.32
673	Empire apt 708	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1.1
674	Empire apt 708	LIVING ROOM	CLOSET DOOR	BROWN	WOOD	B	INTACT	Negative	0.04	mg / cm ^2	0.06	1.14
675	Empire apt 708	LIVING ROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
676	Empire apt 708	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
677	Empire apt 708	LIVING ROOM	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
678	Empire apt 708	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.03	mg / cm ^2	0.1	5.11
679	Empire apt 708	LIVING ROOM	BASEBOARD	BEIGE	VINYL	B	INTACT	Negative	0.12	mg / cm ^2	0.76	2.07
680	Empire apt 708	LIVING ROOM	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
681	Empire apt 708	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
682	Empire apt 708	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
683	Empire apt 708	KITCHEN	WALL	BEIGE	VINYL	A	INTACT	Negative	0.01	mg / cm ^2	0.03	1
684	Empire apt 708	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
685	Empire apt 708	KITCHEN	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1.84
686	Empire apt 708	KITCHEN	CLOSET DOOR	BROWN	WOOD	C	INTACT	Negative	0.03	mg / cm ^2	0.04	1
687	Empire apt 708	KITCHEN	WALL	BEIGE	DRYWALL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
688	Empire apt 708	KITCHEN	BASEBOARD	BROWN	VINYL	D	INTACT	Positive[11]	1.3	mg / cm ^2	0.2	2.59
689	Empire apt 708	KITCHEN	BASEBOARD	BROWN	VINYL	D	INTACT	Null	1.2	mg / cm ^2	0.2	2.5
690	Empire apt 708	KITCHEN	BASEBOARD	BROWN	VINYL	D	INTACT	Positive	1.2	mg / cm ^2	0.1	2.33
691	Empire apt 708	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
692	Empire apt 708	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
693	Empire apt 708	BEDROOM 1	WALL	WHITE	DRYWALL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
694	Empire apt 708	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
695	Empire apt 708	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.03	mg / cm ^2	0.05	1.2

[11] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
696	Empire apt 708	BEDROOM 1	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.04	mg / cm ^2	0.07	5.69
697	Empire apt 708	BEDROOM 1	CLOSET DOOR	BROWN	WOOD	B	INTACT	Negative	0.07	mg / cm ^2	0.09	1.69
698	Empire apt 708	BEDROOM 1	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1
699	Empire apt 708	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1.21
700	Empire apt 708	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
701	Empire apt 708	BEDROOM 1	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.04	mg / cm ^2	0.13	4.9
702	Empire apt 708	BEDROOM 1	BASEBOARD	BEIGE	VINYL	A	INTACT	Null	0.03	mg / cm ^2	0.22	2.46
703	Empire apt 708	BEDROOM 1	BASEBOARD	BEIGE	VINYL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	2.09
704	Empire apt 708	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
705	Empire apt 708	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
706	Empire apt 708	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.26	mg / cm ^2	0.57	7.74
707	Empire apt 708	BATHROOM	SHOWER	WHITE	CEILING TILES	A	INTACT	Negative	0.7	mg / cm ^2	0.1	2.13
708	Empire apt 708	BATHROOM	SHOWER FLOOR	BEIGE	CEILING TILES		INTACT	Negative	0	mg / cm ^2	0.02	1
709	Empire apt 708	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.04	mg / cm ^2	0.13	5.46
710	Empire apt 708	BATHROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.05	2.74
711	Empire apt 708	BATHROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.05	mg / cm ^2	0.17	7.35
712	Empire apt 708	BATHROOM	BASEBOARD	BROWN	WOOD	C	INTACT	Null	0.01	mg / cm ^2	0.05	1
713	Empire apt 708	BATHROOM	BASEBOARD	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
714	Empire apt 708	BATHROOM	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.04	mg / cm ^2	0.05	1.27
715	Empire apt 708	BATHROOM	WALL	BEIGE	DRYWALL	D	INTACT	Negative	0	mg / cm ^2	0.02	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
716	Empire apt 708	BATHROOM	BASEBOARD	BROWN	VINYL	B	INTACT	Null	1.1	mg / cm ^2	0.1	2.32
717	Empire apt 708	BATHROOM	BASEBOARD	BROWN	VINYL	B	INTACT	Positive[12]	1.7	mg / cm ^2	0.5	2.09
718	Empire apt 708	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
719			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.08
720			CALIBRATION CHECK					Positive	1.1	mg / cm ^2	0.1	1.1
721			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.06
1									3.81	cps	0	
2			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.09
3			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.08
4			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.07
5	Empire Common	EXTERIOR	SIDING	BEIGE	STUCCO	A	INTACT	Negative	0	mg / cm ^2	0.02	1
6	Empire Common	EXTERIOR	WINDOW SASH	GRAY	VINYL	A	INTACT	Null	0	mg / cm ^2	0.02	1
7	Empire Common	EXTERIOR	WINDOW SASH	GRAY	VINYL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
8	Empire Common	EXTERIOR	WINDOW SILL	GRAY	VINYL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
9	Empire Common	EXTERIOR	DOOR	GRAY	METAL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
10	Empire Common	EXTERIOR	DOOR CASING	GRAY	METAL	A	INTACT	Negative	-0.31	mg / cm ^2	0.79	3.22
11	Empire Common	EXTERIOR	SIDING	BEIGE	STUCCO	B	INTACT	Negative	0	mg / cm ^2	0.02	1
12	Empire Common	EXTERIOR	WINDOW SASH	GRAY	METAL	B	INTACT	Negative	0.7	mg / cm ^2	0.3	4.29

[12] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
13	Empire Common	EXTERIOR	WINDOW CASING	GRAY	METAL	B	INTACT	Negative	0.01	mg / cm ^2	0.03	1.89
14	Empire Common	EXTERIOR	SIDING	BEIGE	STUCCO	C	INTACT	Negative	0	mg / cm ^2	0.02	1
15	Empire Common	EXTERIOR	DOOR	BEIGE	METAL	C	INTACT	Negative	0.27	mg / cm ^2	0.17	1.61
16	Empire Common	EXTERIOR	DOOR CASING	BEIGE	METAL	C	INTACT	Negative	0.04	mg / cm ^2	0.04	1
17	Empire Common	EXTERIOR	DOOR CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1.92
18	Empire Common	EXTERIOR	DOOR	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
19	Empire Common	EXTERIOR	SIDING	BEIGE	STUCCO	D	INTACT	Negative	0	mg / cm ^2	0.02	1
20	Empire Common	EXTERIOR	WINDOW SASH	GRAY	METAL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
21	Empire Common	EXTERIOR	WINDOW CASING	GRAY	METAL	D	INTACT	Null	0	mg / cm ^2	0.02	1
22	Empire Common	EXTERIOR	WINDOW CASING	GRAY	METAL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
23	Empire Common	STAIRWAY	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
24	Empire Common	STAIRWAY	DOOR	GRAY	METAL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
25	Empire Common	STAIRWAY	DOOR CASING	GRAY	METAL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
26	Empire Common	STAIRWAY	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
27	Empire Common	STAIRWAY	DOOR	BROWN	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1.21
28	Empire Common	STAIRWAY	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
29	Empire Common	STAIRWAY	WALL	BEIGE	DRYWALL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
30	Empire Common	STAIRWAY	BASEBOARD	BROWN	VINYL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
31	Empire Common	STAIRWAY	FLOOR	GREEN	CARPET		INTACT	Null	0	mg / cm ^2	0.02	1
32	Empire Common	STAIRWAY	FLOOR	GREEN	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1.22

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
33	Empire Common	community	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
34	Empire Common	community	WALL	BEIGE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.03	1.98
35	Empire Common	community	WINDOW SASH	GRAY	METAL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
36	Empire Common	community	WINDOW CASING	GRAY	METAL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
37	Empire Common	community	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.04	1.9
38	Empire Common	community	DOOR	BROWN	WOOD	B	INTACT	Negative	0	mg / cm ^2	0.02	1
39	Empire Common	community	DOOR CASING	BROWN	METAL	B	INTACT	Negative	0.08	mg / cm ^2	0.07	1.11
40	Empire Common	community	CLOSET DOOR	BROWN	WOOD	B	INTACT	Negative	0.03	mg / cm ^2	0.05	1
41	Empire Common	community	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.03	1.84
42	Empire Common	community	DOOR	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
43	Empire Common	community	DOOR CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
44	Empire Common	community	WALL	BEIGE	DRYWALL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
45	Empire Common	community	CLOSET DOOR	BROWN	WOOD	D	INTACT	Negative	0	mg / cm ^2	0.02	1
46	Empire Common	community	DOOR CASING	BROWN	METAL	D	INTACT	Negative	0.07	mg / cm ^2	0.07	1.12
47	Empire Common	community	BASEBOARD	BEIGE	CARPET	D	INTACT	Negative	0	mg / cm ^2	0.02	1
48	Empire Common	community	FLOOR	BEIGE	CARPET		INTACT	Null	0	mg / cm ^2	0.02	1
49	Empire Common	community	FLOOR	BEIGE	CARPET		INTACT	Positive[13]	1.4	mg / cm ^2	0.4	1
50	Empire Common	community	FLOOR	BEIGE	VINYL TILES		INTACT	Negative	0.03	mg / cm ^2	0.03	2.48

[13] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
51	Empire Common	community kitchen	CEILING	WHITE	DRYWALL		INTACT	Negative	0	mg / cm ^2	0.02	1
52	Empire Common	community kitchen	WALL	BEIGE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.02	1.18
53	Empire Common	community kitchen	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
54	Empire Common	community kitchen	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.05	mg / cm ^2	0.06	1.26
55	Empire Common	community kitchen	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
56	Empire Common	community kitchen	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
57	Empire Common	community kitchen	CABINET	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
58	Empire Common	community kitchen	WALL	BEIGE	DRYWALL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
59	Empire Common	community kitchen	BASEBOARD	BROWN	VINYL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
60	Empire Common	community kitchen	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
61	Empire Common	mens restroom	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
62	Empire Common	mens restroom	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
63	Empire Common	mens restroom	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.03	mg / cm ^2	0.04	1.02
64	Empire Common	mens restroom	WALL	BEIGE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1
65	Empire Common	mens restroom	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.02	1.52
66	Empire Common	mens restroom	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0.05	mg / cm ^2	0.09	2.5
67	Empire Common	mens restroom	WALL	BEIGE	DRYWALL	D	INTACT	Negative	0.03	mg / cm ^2	0.04	1.5
68	Empire Common	mens restroom	BASEBOARD	BLUE	LINOLEUM	D	INTACT	Negative	0	mg / cm ^2	0.02	1
69	Empire Common	mens restroom	FLOOR	BLUE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
70	Empire Common	mens restroom	DOOR	BLUE	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
71	Empire Common	mens restroom	DOOR CASING	BLUE	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
72	Empire Common	womens restroom	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
73	Empire Common	womens restroom	WALL	BEIGE	DRYWALL	A	INTACT	Negative	0	mg / cm ^2	0.02	1.32
74	Empire Common	womens restroom	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
75	Empire Common	womens restroom	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.03	mg / cm ^2	0.05	1
76	Empire Common	womens restroom	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1
77	Empire Common	womens restroom	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.03	1
78	Empire Common	womens restroom	DOOR	BLUE	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
79	Empire Common	womens restroom	DOOR CASING	BLUE	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
80	Empire Common	womens restroom	WALL	BEIGE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1.09
81	Empire Common	womens restroom	BASEBOARD	BLUE	LINOLEUM	D	INTACT	Negative	0	mg / cm ^2	0.02	1
82	Empire Common	womens restroom	FLOOR	BLUE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
83	Empire Common	community meeting room	CEILING	WHITE	CEILING TILES		INTACT	Negative	0	mg / cm ^2	0.02	1
84	Empire Common	community meeting room	WALL	BEIGE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.08	3.6
85	Empire Common	community meeting room	WINDOW CASING	GRAY	METAL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
86	Empire Common	community meeting room	WINDOW SASH	GRAY	METAL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
87	Empire Common	community meeting room	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.09	3.5
88	Empire Common	community meeting room	DOOR	BROWN	WOOD	B	INTACT	Negative	0	mg / cm ^2	0.02	1
89	Empire Common	community meeting room	DOOR CASING	BROWN	METAL	B	INTACT	Negative	0.04	mg / cm ^2	0.05	1
90	Empire Common	community meeting room	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	2.62

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
91	Empire Common	community meeting room	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
92	Empire Common	community meeting room	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.04	mg / cm ^2	0.05	1
93	Empire Common	community meeting room	WALL	BEIGE	DRYWALL	D	INTACT	Negative	0.08	mg / cm ^2	0.13	3.17
94	Empire Common	community meeting room	BASEBOARD	GREEN	CARPET	D	INTACT	Negative	0	mg / cm ^2	0.02	1
95	Empire Common	community meeting room	FLOOR	GREEN	CARPET		INTACT[14]	Positive	1.4	mg / cm ^2	0.4	1
96	Empire Common	community meeting room	FLOOR	GREEN	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
97	Empire Common	community meeting room	FLOOR	GREEN	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
98	Empire Common	community meeting room	FLOOR	GREEN	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
99	Empire Common	community lobby	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
100	Empire Common	community lobby	CEILING	WHITE	POPCORN		INTACT	Negative	0.5	mg / cm ^2	0.4	1
101	Empire Common	community lobby	WALL	BEIGE	DRYWALL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
102	Empire Common	community lobby	DOOR	BROWN	METAL	A	INTACT	Null	0	mg / cm ^2	0.02	1
103	Empire Common	community lobby	DOOR	BROWN	METAL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
104	Empire Common	community lobby	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
105	Empire Common	community lobby	WINDOW SASH	GRAY	METAL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
106	Empire Common	community lobby	WINDOW SILL	GRAY	METAL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
107	Empire Common	community lobby	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.03	mg / cm ^2	0.07	2.72
108	Empire Common	community lobby	DOOR	BROWN	WOOD	B	INTACT	Negative	0	mg / cm ^2	0.02	1

[14] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
109	Empire Common	community lobby	DOOR CASING	BROWN	METAL	B	INTACT	Negative	0.1	mg / cm ^2	0.09	1.28
110	Empire Common	community lobby	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
111	Empire Common	community lobby	DOOR elevator	BROWN	CONCRETE	C	INTACT	Negative	0.08	mg / cm ^2	0.11	2.1
112	Empire Common	community lobby	DOOR CASING	BROWN	CONCRETE	C	INTACT	Negative	0.07	mg / cm ^2	0.04	1.71
113	Empire Common	community lobby	WALL	BEIGE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.03	1.33
114	Empire Common	community lobby	BASEBOARD	BROWN	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
115	Empire Common	community lobby	FLOOR	GREEN	VINYL TILES		INTACT	Negative	0	mg / cm ^2	0.02	1
116	Empire Common	community office	CEILING	WHITE	POPCORN		INTACT	Negative	0.5	mg / cm ^2	0.4	1
117	Empire Common	community office	WALL	GREEN	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.03	1.47
118	Empire Common	community office	WINDOW SASH	GRAY	METAL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
119	Empire Common	community office	WINDOW CASING	GRAY	METAL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
120	Empire Common	community office	WALL	GREEN	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.05	1.59
121	Empire Common	community office	WALL	GREEN	DRYWALL	C	INTACT	Negative	0.03	mg / cm ^2	0.06	2
122	Empire Common	community office	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
123	Empire Common	community office	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.03	mg / cm ^2	0.04	1
124	Empire Common	community office	WALL	GREEN	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1.06
125	Empire Common	community office	BASEBOARD	BEIGE	CARPET	C	INTACT	Negative	0	mg / cm ^2	0.02	1
126	Empire Common	community office	FLOOR	BEIGE	CARPET		INTACT[15]	Positive	1.5	mg / cm ^2	0.5	1

[15] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
127	Empire Common	community office	FLOOR	BEIGE	CARPET		INTACT[16]	Positive	1.5	mg / cm ^2	0.4	1
128	Empire Common	MAILROOM	CEILING	BEIGE	DRYWALL		INTACT	Negative	0.02	mg / cm ^2	0.02	1
129	Empire Common	MAILROOM	WALL	BEIGE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1
130	Empire Common	MAILROOM	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1
131	Empire Common	MAILROOM	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0.03	mg / cm ^2	0.02	1.12
132	Empire Common	MAILROOM	WALL	BEIGE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.03	1
133	Empire Common	MAILROOM	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
134	Empire Common	MAILROOM	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.05	mg / cm ^2	0.06	1.26
135	Empire Common	MAILROOM	BASEBOARD	GRAY	LINOLEUM	D	INTACT	Negative	0	mg / cm ^2	0.02	1
136	Empire Common	MAILROOM	FLOOR	GRAY	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1.56
137	Empire Common	RISER ROOM	DOOR	BROWN	WOOD	A	INTACT	Null	0	mg / cm ^2	0.02	1
138	Empire Common	RISER ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
139	Empire Common	RISER ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.03	mg / cm ^2	0.07	2.18
140	Empire Common	RISER ROOM	WALL	BEIGE	VINYL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
141	Empire Common	RISER ROOM	DOOR	BEIGE	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
142	Empire Common	RISER ROOM	DOOR CASING	BEIGE	METAL	C	INTACT	Negative	0.03	mg / cm ^2	0.05	1.06
143	Empire Common	RISER ROOM	BASEBOARD	BROWN	VINYL	B	INTACT	Positive	1.4	mg / cm ^2	0.4	2.12
144	Empire Common	RISER ROOM	BASEBOARD	BROWN	VINYL	B	INTACT	Negative	0.29	mg / cm ^2	0.05	2.22

[16] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
145	Empire Common	RISER ROOM	BASEBOARD	BROWN	VINYL	B	INTACT	Positive[17]	1.8	mg / cm ^2	0.5	1.95
146	Empire Common	MECHANICAL ROOM	BASEBOARD	BROWN	VINYL	D	INTACT	Negative	0.08	mg / cm ^2	0.04	2.55
147	Empire Common	MECHANICAL ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
148	Empire Common	MECHANICAL ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.03	mg / cm ^2	0.04	1
149	Empire Common	MECHANICAL ROOM	DOOR CASING	BEIGE	METAL	C	INTACT	Negative	0.02	mg / cm ^2	0.04	1
150	Empire Common	MECHANICAL ROOM	DOOR	BEIGE	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
151	Empire APT 603	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
152	Empire APT 603	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Positive	1.5	mg / cm ^2	0.4	1
153	Empire APT 603	LIVING ROOM	WALL	WHITE	POPCORN	A	INTACT	Null	0.01	mg / cm ^2	0.03	1
154	Empire APT 603	LIVING ROOM	WALL	WHITE	POPCORN	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1.37
155	Empire APT 603	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0.03	mg / cm ^2	0.05	1
156	Empire APT 603	LIVING ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.1	mg / cm ^2	0.1	1.68
157	Empire APT 603	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.02	1.81
158	Empire APT 603	LIVING ROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1
159	Empire APT 603	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1.22
160	Empire APT 603	LIVING ROOM	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0.5	mg / cm ^2	0.5	1
161	Empire APT 603	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1
162	Empire APT 603	LIVING ROOM	BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1

[17] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
163	Empire APT 603	LIVING ROOM	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
164	Empire APT 603	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Positive[18]	1.7	mg / cm ^2	0.6	1
165	Empire APT 603	KITCHEN	WALL	BEIGE	VINYL	A	INTACT	Negative	0.05	mg / cm ^2	0.15	4.58
166	Empire APT 603	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
167	Empire APT 603	KITCHEN	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.06	mg / cm ^2	0.15	5.98
168	Empire APT 603	KITCHEN	CLOSET DOOR	BROWN	WOOD	C	INTACT	Negative	0.03	mg / cm ^2	0.05	1
169	Empire APT 603	KITCHEN	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1
170	Empire APT 603	KITCHEN	BASEBOARD	BEIGE	VINYL	D	INTACT	Null	0	mg / cm ^2	0.02	1
171	Empire APT 603	KITCHEN	BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	2
172	Empire APT 603	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
173	Empire APT 603	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Positive	1.5	mg / cm ^2	0.4	1
174	Empire APT 603	BEDROOM 1	WALL	BEIGE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.04	2.88
175	Empire APT 603	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
176	Empire APT 603	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.07	mg / cm ^2	0.08	1.19
177	Empire APT 603	BEDROOM 1	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.05	mg / cm ^2	0.16	4.52
178	Empire APT 603	BEDROOM 1	CLOSET DOOR	BROWN	WOOD	B	INTACT	Negative	0.04	mg / cm ^2	0.05	1.04
179	Empire APT 603	BEDROOM 1	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1
180	Empire APT 603	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Null	0.01	mg / cm ^2	0.02	2.4

[18] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
181	Empire APT 603	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
182	Empire APT 603	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0.6	mg / cm ^2	0.4	1
183	Empire APT 603	BEDROOM 1	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1.28
184	Empire APT 603	BEDROOM 1	BASEBOARD	BEIGE	VINYL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
185	Empire APT 603	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Positive[19]	1.5	mg / cm ^2	0.4	1
186	Empire APT 603	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Positive	1.5	mg / cm ^2	0.4	1.23
187	Empire APT 603	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Positive	1.8	mg / cm ^2	0.6	1
188	Empire APT 603	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1.02
189	Empire APT 603	BATHROOM	SHOWER	BEIGE	CERAMIC TILES	A	INTACT	Negative	0.01	mg / cm ^2	0.05	1.54
190	Empire APT 603	BATHROOM	SHOWER FLOOR	WHITE	CERAMIC TILES		INTACT	Negative	0.04	mg / cm ^2	0.02	1.35
191	Empire APT 603	BATHROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1
192	Empire APT 603	BATHROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.05	2.01
193	Empire APT 603	BATHROOM	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
194	Empire APT 603	BATHROOM	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.07	mg / cm ^2	0.06	1.16
195	Empire APT 603	BATHROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.6	mg / cm ^2	0.4	1.51
196	Empire APT 603	BATHROOM	BASEBOARD	BROWN	VINYL	C	INTACT	Positive	1.3	mg / cm ^2	0.2	2.51
197	Empire APT 603	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
198	Empire APT 608	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Positive	1.5	mg / cm ^2	0.5	1

[19] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
199	Empire APT 608	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1.32
200	Empire APT 608	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0.05	mg / cm ^2	0.06	1
201	Empire APT 608	LIVING ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.03	mg / cm ^2	0.04	1
202	Empire APT 608	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1.31
203	Empire APT 608	LIVING ROOM	CLOSET DOOR	BROWN	WOOD	B	INTACT	Negative	0.06	mg / cm ^2	0.09	1.67
204	Empire APT 608	LIVING ROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
205	Empire APT 608	LIVING ROOM	WINDOW CASING	GRAY	METAL	C	INTACT	Null	0.01	mg / cm ^2	0.02	3.61
206	Empire APT 608	LIVING ROOM	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
207	Empire APT 608	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Null	0	mg / cm ^2	0.02	1
208	Empire APT 608	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1.58
209	Empire APT 608	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.03	mg / cm ^2	0.07	2.38
210	Empire APT 608	LIVING ROOM	BASEBOARD	GRAY	VINYL	D	INTACT	Null	0.06	mg / cm ^2	0.12	10
211	Empire APT 608	LIVING ROOM	BASEBOARD	GRAY	VINYL	D	INTACT	Negative	0.4	mg / cm ^2	0.4	10
212	Empire APT 608	LIVING ROOM	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1.22
213	Empire APT 608	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Positive[20]	1.5	mg / cm ^2	0.4	1
214	Empire APT 608	KITCHEN	WALL	WHITE	DRYWALL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
215	Empire APT 608	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
216	Empire APT 608	KITCHEN	WALL	WHITE	DRYWALL	C	INTACT	Null	0.01	mg / cm ^2	0.02	1

[20] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
217	Empire APT 608	KITCHEN	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	2.09
218	Empire APT 608	KITCHEN	CLOSET DOOR	BROWN	WOOD	C	INTACT	Negative	0.03	mg / cm ^2	0.05	1
219	Empire APT 608	KITCHEN	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1.44
220	Empire APT 608	KITCHEN	BASEBOARD	BROWN	VINYL	D	INTACT	Positive[21]	1.3	mg / cm ^2	0.2	1
221	Empire APT 608	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Positive	1.5	mg / cm ^2	0.4	1
222	Empire APT 608	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Positive	1.5	mg / cm ^2	0.4	1
223	Empire APT 608	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Positive	1.6	mg / cm ^2	0.4	1
224	Empire APT 608	BEDROOM 1	WALL	YELLOW	DRYWALL	A	INTACT	Negative	0.08	mg / cm ^2	0.12	2.83
225	Empire APT 608	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
226	Empire APT 608	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.05	mg / cm ^2	0.06	1.16
227	Empire APT 608	BEDROOM 1	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1.23
228	Empire APT 608	BEDROOM 1	CLOSET DOOR	BROWN	WOOD	B	INTACT	Negative	0.05	mg / cm ^2	0.06	1.28
229	Empire APT 608	BEDROOM 1	WALL	YELLOW	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.05	1.85
230	Empire APT 608	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0.5	mg / cm ^2	0.5	1
231	Empire APT 608	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
232	Empire APT 608	BEDROOM 1	WALL	BEIGE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.08	3.52
233	Empire APT 608	BEDROOM 1	BASEBOARD	GRAY	VINYL	A	INTACT	Negative	0.14	mg / cm ^2	0.53	10
234	Empire APT 608	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Positive	1.6	mg / cm ^2	0.5	1

[21] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
235	Empire APT 608	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Positive[22]	1.4	mg / cm ^2	0.4	1
236	Empire APT 608	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.02	1.55
237	Empire APT 608	BATHROOM	SHOWER	WHITE	CERAMIC TILES	A	INTACT	Negative	0.18	mg / cm ^2	0.22	4.55
238	Empire APT 608	BATHROOM	SHOWER FLOOR	BEIGE	CERAMIC TILES		INTACT	Negative	0.02	mg / cm ^2	0.02	2.39
239	Empire APT 608	BATHROOM	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1
240	Empire APT 608	BATHROOM	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1
241	Empire APT 608	BATHROOM	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.03	1.48
242	Empire APT 608	BATHROOM	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.05	mg / cm ^2	0.06	1.27
243	Empire APT 608	BATHROOM	WALL	YELLOW	METAL	D	INTACT	Negative	0.03	mg / cm ^2	0.08	3.18
244	Empire APT 608	BATHROOM	BASEBOARD	BLUE	VINYL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
245	Empire APT 608	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
246			CALIBRATION CHECK					Positive	1.7	mg / cm ^2	0.4	1.09
247			CALIBRATION CHECK					Positive	1.4	mg / cm ^2	0.4	1.04
248			CALIBRATION CHECK					Positive	1.4	mg / cm ^2	0.4	1
249			CALIBRATION CHECK					Positive	1.4	mg / cm ^2	0.3	1
250	Empire APT 705	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Positive	1.6	mg / cm ^2	0.6	1
251	Empire APT 705	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1.52
252	Empire APT 705	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0.04	mg / cm ^2	0.06	1.19

[22] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
253	Empire APT 705	LIVING ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.03	mg / cm ^2	0.05	1.17
254	Empire APT 705	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.5	mg / cm ^2	0.5	2.86
255	Empire APT 705	LIVING ROOM	CLOSET DOOR	BROWN	WOOD	B	INTACT	Negative	0.03	mg / cm ^2	0.05	1.11
256	Empire APT 705	LIVING ROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
257	Empire APT 705	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Null	0	mg / cm ^2	0.02	1
258	Empire APT 705	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0.5	mg / cm ^2	0.4	1.83
259	Empire APT 705	LIVING ROOM	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
260	Empire APT 705	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
261	Empire APT 705	LIVING ROOM	BASEBOARD	BROWN	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
262	Empire APT 705	LIVING ROOM	FLOOR	BROWN	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
263	Empire APT 705	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Positive[23]	1.6	mg / cm ^2	0.5	1
264	Empire APT 705	KITCHEN	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.08	mg / cm ^2	0.25	6.64
265	Empire APT 705	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
266	Empire APT 705	KITCHEN	WALL	WHITE	DRYWALL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
267	Empire APT 705	KITCHEN	CLOSET DOOR	BROWN	WOOD	C	INTACT	Negative	0.03	mg / cm ^2	0.04	1
268	Empire APT 705	KITCHEN	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.05	mg / cm ^2	0.06	4.08
269	Empire APT 705	KITCHEN	BASEBOARD	BROWN	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
270	Empire APT 705	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1

[23] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
271	Empire APT 705	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
272	Empire APT 705	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Positive	1.7[24]	mg / cm ^2	0.6	1
273	Empire APT 705	BEDROOM 1	WALL	WHITE	DRYWALL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
274	Empire APT 705	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
275	Empire APT 705	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.09	mg / cm ^2	0.1	1.75
276	Empire APT 705	BEDROOM 1	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.09	mg / cm ^2	0.66	4.94
277	Empire APT 705	BEDROOM 1	CLOSET DOOR	BROWN	WOOD	B	INTACT	Negative	0.07	mg / cm ^2	0.08	1.66
278	Empire APT 705	BEDROOM 1	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.07	3.25
279	Empire APT 705	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
280	Empire APT 705	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Null	0	mg / cm ^2	0.02	1
281	Empire APT 705	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Null	0	mg / cm ^2	0.02	1
282	Empire APT 705	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0.5	mg / cm ^2	0.5	3.33
283	Empire APT 705	BEDROOM 1	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.04	2.06
284	Empire APT 705	BEDROOM 1	BASEBOARD	BROWN	VINYL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
285	Empire APT 705	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
286	Empire APT 705	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
287	Empire APT 705	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Positive	1.5	mg / cm ^2	0.5	1
288	Empire APT 705	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0	mg / cm ^2	0.02	1

[24] Any XRF readings may be confirmed by laboratory analysis.

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
289	Empire APT 705	BATHROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.03	mg / cm ^2	0.04	3.92
290	Empire APT 705	BATHROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.05	2.55
291	Empire APT 705	BATHROOM	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
292	Empire APT 705	BATHROOM	DOOR CASING	BROWN	WOOD	C	INTACT	Negative	0.04	mg / cm ^2	0.06	1.46
293	Empire APT 705	BATHROOM	SHOWER	WHITE	CERAMIC TILES	D	INTACT	Positive	1.5[25]	mg / cm ^2	0.4	2.19
294	Empire APT 705	BATHROOM	SHOWER FLOOR	BEIGE	CERAMIC TILES		INTACT	Negative	0	mg / cm ^2	0.02	1.18
295	Empire APT 705	BATHROOM	BASEBOARD	BROWN	VINYL	B	INTACT	Negative	0.22	mg / cm ^2	0.07	2.19
296	Empire APT 705	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Null	0.9	mg / cm ^2	0.3	1
297	Empire APT 705	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Null	1.1	mg / cm ^2	0.2	1
298	Empire APT 705	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Positive	1.4	mg / cm ^2	0.3	1
299	Empire APT 705	BATHROOM	CALIBRATION CHECK	BEIGE	LINOLEUM		INTACT	Positive	1.3	mg / cm ^2	0.3	1.11
300	Empire APT 705	BATHROOM	CALIBRATION CHECK	BEIGE	LINOLEUM		INTACT	Negative	0.9	mg / cm ^2	0.1	1.03
301	Empire APT 705	BATHROOM	CALIBRATION CHECK	BEIGE	LINOLEUM		INTACT	Positive	1	mg / cm ^2	0.1	1.11
302									3.45	cps	0	
303			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.06
304			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.09
305			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.06
306	Empire APT 706	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1

[25] Any XRF readings may be confirmed by laboratory analysis.

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Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
307	Empire APT 706	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.05	mg / cm ^2	0.04	1.92
308	Empire APT 706	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0.04	mg / cm ^2	0.05	1
309	Empire APT 706	LIVING ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.08	mg / cm ^2	0.09	1.56
310	Empire APT 706	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.1	mg / cm ^2	0.08	3.36
311	Empire APT 706	LIVING ROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.04	mg / cm ^2	0.06	1.79
312	Empire APT 706	LIVING ROOM	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
313	Empire APT 706	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0.26	mg / cm ^2	0.67	2.3
314	Empire APT 706	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.05	mg / cm ^2	0.11	3.27
315	Empire APT 706	LIVING ROOM	CLOSET DOOR	BROWN	WOOD	D	INTACT	Negative	0.03	mg / cm ^2	0.05	1.03
316	Empire APT 706	LIVING ROOM	BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
317	Empire APT 706	LIVING ROOM	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
318	Empire APT 706	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
319	Empire APT 706	KITCHEN	WALL	WHITE	DRYWALL	A	INTACT	Negative	0	mg / cm ^2	0.02	1.15
320	Empire APT 706	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
321	Empire APT 706	KITCHEN	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.5	mg / cm ^2	0.5	1.41
322	Empire APT 706	KITCHEN	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.03	mg / cm ^2	0.02	1.49
323	Empire APT 706	KITCHEN	CLOSET DOOR	BROWN	WOOD	C	INTACT	Negative	0.04	mg / cm ^2	0.05	1.04
324	Empire APT 706	KITCHEN	BASEBOARD	BEIGE	VINYL	C	INTACT	Negative	0	mg / cm ^2	0.02	1

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Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
325	Empire APT 706	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Positive[26]	1.5	mg / cm ^2	0.5	1
326	Empire APT 706	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
327	Empire APT 706	BEDROOM 1	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.07	mg / cm ^2	0.12	3.35
328	Empire APT 706	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1.16
329	Empire APT 706	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.02	mg / cm ^2	0.04	1
330	Empire APT 706	BEDROOM 1	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.03	1
331	Empire APT 706	BEDROOM 1	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.03	1.21
332	Empire APT 706	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
333	Empire APT 706	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
334	Empire APT 706	BEDROOM 1	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.3	mg / cm ^2	0.63	2.36
335	Empire APT 706	BEDROOM 1	CLOSET DOOR	BROWN	WOOD	D	INTACT	Negative	0.02	mg / cm ^2	0.04	1
336	Empire APT 706	BEDROOM 1	BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
337	Empire APT 706	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
338	Empire APT 706	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Positive	1.3	mg / cm ^2	0.3	1
339	Empire APT 706	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1
340	Empire APT 706	BATHROOM	SHOWER	BEIGE	CERAMIC TILES	B	INTACT	Negative	0.01	mg / cm ^2	0.03	1
341	Empire APT 706	BATHROOM	SHOWER FLOOR	BEIGE	CERAMIC TILES		INTACT	Negative	0.04	mg / cm ^2	0.05	1.19
342	Empire APT 706	BATHROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.05	mg / cm ^2	0.07	2.45

[26] Any XRF readings may be confirmed by laboratory analysis.

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Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
343	Empire APT 706	BATHROOM	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
344	Empire APT 706	BATHROOM	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.02	mg / cm ^2	0.04	1
345	Empire APT 706	BATHROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.04	mg / cm ^2	0.06	1.6
346	Empire APT 706	BATHROOM	BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
347	Empire APT 706	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Null	0	mg / cm ^2	0.02	1
348	Empire APT 706	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Null	0.8	mg / cm ^2	0.3	1
349	Empire APT 706	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0.6	mg / cm ^2	0.4	1
350	Empire APT 803	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
351	Empire APT 803	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Positive[27]	1.5	mg / cm ^2	0.5	1
352	Empire APT 803	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
353	Empire APT 803	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0.3	mg / cm ^2	0.15	1.17
354	Empire APT 803	LIVING ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.06	mg / cm ^2	0.07	1.22
355	Empire APT 803	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Null	0.01	mg / cm ^2	0.02	1.74
356	Empire APT 803	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1.39
357	Empire APT 803	LIVING ROOM	CLOSET DOOR	BROWN	WOOD	B	INTACT	Negative	0	mg / cm ^2	0.02	1
358	Empire APT 803	LIVING ROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.05	mg / cm ^2	0.07	5.73
359	Empire APT 803	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1.64
360	Empire APT 803	LIVING ROOM	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0.5	mg / cm ^2	0.5	1

[27] Any XRF readings may be confirmed by laboratory analysis.

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Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
361	Empire APT 803	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.04	mg / cm ^2	0.1	3.63
362	Empire APT 803	LIVING ROOM	BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
363	Empire APT 803	LIVING ROOM	FLOOR	BEIGE	CARPET		INTACT	Null	0	mg / cm ^2	0.02	1
364	Empire APT 803	LIVING ROOM	FLOOR	BEIGE	CARPET		INTACT	Positive[28]	1.4	mg / cm ^2	0.4	1
365	Empire APT 803	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Positive	1.7	mg / cm ^2	0.6	2.84
366	Empire APT 803	KITCHEN	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.05	mg / cm ^2	0.18	5.65
367	Empire APT 803	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
368	Empire APT 803	KITCHEN	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.04	2.45
369	Empire APT 803	KITCHEN	CLOSET DOOR	BROWN	WOOD	C	INTACT	Negative	0.04	mg / cm ^2	0.05	1
370	Empire APT 803	KITCHEN	WALL	WHITE	DRYWALL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
371	Empire APT 803	KITCHEN	BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
372	Empire APT 803	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
373	Empire APT 803	BEDROOM 1	CEILING	WHITE	PLASTER		INTACT	Positive	1.6	mg / cm ^2	0.5	1
374	Empire APT 803	BEDROOM 1	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.04	1.51
375	Empire APT 803	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
376	Empire APT 803	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.06	mg / cm ^2	0.05	1
377	Empire APT 803	BEDROOM 1	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.4	mg / cm ^2	0.5	2.35
378	Empire APT 803	BEDROOM 1	CLOSET DOOR	BROWN	WOOD	B	INTACT	Negative	0.08	mg / cm ^2	0.11	1.87

[28] Any XRF readings may be confirmed by laboratory analysis.

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Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
379	Empire APT 803	BEDROOM 1	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.03	mg / cm ^2	0.06	6.53
380	Empire APT 803	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
381	Empire APT 803	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
382	Empire APT 803	BEDROOM 1	WALL	WHITE	VINYL	D	INTACT	Negative	0.01	mg / cm ^2	0.04	2.04
383	Empire APT 803	BEDROOM 1	BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
384	Empire APT 803	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Null	0	mg / cm ^2	0.02	1
385	Empire APT 803	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Positive	1.4	mg / cm ^2	0.4	1
386	Empire APT 803	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Positive	1.5	mg / cm ^2	0.4	1
387	Empire APT 803	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
388	Empire APT 803	BATHROOM	SHOWER	BEIGE	CEILING TILES	A	INTACT	Positive	1.9	mg / cm ^2	0.9	2.63
389	Empire APT 803	BATHROOM	SHOWER FLOOR	BEIGE	CEILING TILES		INTACT	Negative	0	mg / cm ^2	0.02	1
390	Empire APT 803	BATHROOM	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0	mg / cm ^2	0.02	1.76
391	Empire APT 803	BATHROOM	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0	mg / cm ^2	0.02	1.03
392	Empire APT 803	BATHROOM	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
393	Empire APT 803	BATHROOM	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.05	mg / cm ^2	0.06	1
394	Empire APT 803	BATHROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.08	4.76
395	Empire APT 803	BATHROOM	BASEBOARD	BLUE	VINYL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
396	Empire APT 803	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
397	Empire APT 804	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
398	Empire APT 804	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1.38

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Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
399	Empire APT 804	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
400	Empire APT 804	LIVING ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.06	mg / cm ^2	0.06	1.23
401	Empire APT 804	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.03	2.41
402	Empire APT 804	LIVING ROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.04	mg / cm ^2	0.08	2.34
403	Empire APT 804	LIVING ROOM	WINDOW CASING	GRAY	METAL	C	INTACT	Null	0	mg / cm ^2	0.02	1.36
404	Empire APT 804	LIVING ROOM	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0.5	mg / cm ^2	0.5	4.22
405	Empire APT 804	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
406	Empire APT 804	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Null	0.02	mg / cm ^2	0.02	1.77
407	Empire APT 804	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.02	1.91
408	Empire APT 804	LIVING ROOM	CLOSET DOOR	BROWN	WOOD	D	INTACT	Negative	0.05	mg / cm ^2	0.07	1.33
409	Empire APT 804	LIVING ROOM	BASEBOARD	BROWN	VINYL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
410	Empire APT 804	LIVING ROOM	FLOOR	BEIGE	CARPET		INTACT	Positive	1.5	mg / cm ^2	0.4	1
411	Empire APT 804	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
412	Empire APT 804	KITCHEN	WALL	WHITE	VINYL	A	INTACT	Negative	0.03	mg / cm ^2	0.09	2.53
413	Empire APT 804	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Null	0	mg / cm ^2	0.03	1
414	Empire APT 804	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
415	Empire APT 804	KITCHEN	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.03	1.38
416	Empire APT 804	KITCHEN	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.3	mg / cm ^2	0.66	4.75
417	Empire APT 804	KITCHEN	CLOSET DOOR	BROWN	WOOD	C	INTACT	Negative	0.02	mg / cm ^2	0.04	1
418	Empire APT 804	KITCHEN	BASEBOARD	BROWN	VINYL	B	INTACT	Negative	0	mg / cm ^2	0.02	1

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Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
419	Empire APT 804	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Null	0	mg / cm ^2	0.02	1
420	Empire APT 804	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
421	Empire APT 804	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Positive	1.6	mg / cm ^2	0.5	1
422	Empire APT 804	BEDROOM 1	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.03	mg / cm ^2	0.04	2.66
423	Empire APT 804	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
424	Empire APT 804	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.05	mg / cm ^2	0.03	1
425	Empire APT 804	BEDROOM 1	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.05	mg / cm ^2	0.12	4.46
426	Empire APT 804	BEDROOM 1	WALL	WHITE	DRYWALL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
427	Empire APT 804	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
428	Empire APT 804	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Null	0	mg / cm ^2	0.02	1
429	Empire APT 804	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1.66
430	Empire APT 804	BEDROOM 1	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.4	mg / cm ^2	0.5	2.13
431	Empire APT 804	BEDROOM 1	CLOSET DOOR	BROWN	WOOD	D	INTACT	Negative	0.05	mg / cm ^2	0.07	1.39
432	Empire APT 804	BEDROOM 1	BASEBOARD	BROWN	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
433	Empire APT 804	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
434	Empire APT 804	BATHROOM	CEILING	WHITE	CEILING TILES		INTACT	Positive	1.9	mg / cm ^2	0.7	1
435	Empire APT 804	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.04	1.47
436	Empire APT 804	BATHROOM	SHOWER	WHITE	CERAMIC TILES	A	INTACT	Negative	0.02	mg / cm ^2	0.03	1
437	Empire APT 804	BATHROOM	SHOWER FLOOR	BROWN	CERAMIC TILES		INTACT	Negative	0.02	mg / cm ^2	0.02	1.46
438	Empire APT 804	BATHROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1.27

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
439	Empire APT 804	BATHROOM	DOOR	BROWN	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
440	Empire APT 804	BATHROOM	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.1	mg / cm ^2	0.12	1.76
441	Empire APT 804	BATHROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.05	2.41
442	Empire APT 804	BATHROOM	BASEBOARD	BROWN	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
443	Empire APT 804	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
444	Empire APT 810	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Positive	1.4	mg / cm ^2	0.4	1
445	Empire APT 810	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.03	1.24
446	Empire APT 810	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
447	Empire APT 810	LIVING ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.07	mg / cm ^2	0.09	1.85
448	Empire APT 810	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Null	0.01	mg / cm ^2	0.04	1
449	Empire APT 810	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.04	mg / cm ^2	0.09	2.87
450	Empire APT 810	LIVING ROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.05	2.35
451	Empire APT 810	LIVING ROOM	WINDOW CASING	GRAY	VINYL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
452	Empire APT 810	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Null	0	mg / cm ^2	0.02	1
453	Empire APT 810	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0.4	mg / cm ^2	0.6	3.47
454	Empire APT 810	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.13	mg / cm ^2	0.25	7.11
455	Empire APT 810	LIVING ROOM	CLOSET DOOR	BROWN	METAL	D	INTACT	Negative	0.06	mg / cm ^2	0.08	1.42
456	Empire APT 810	LIVING ROOM	BASEBOARD	BROWN	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
457	Empire APT 810	LIVING ROOM	FLOOR	BROWN	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
458	Empire APT 810	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.03	1

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Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
459	Empire APT 810	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Positive	1.5	mg / cm ^2	0.4	1
460	Empire APT 810	KITCHEN	WALL	BEIGE	VINYL	A	INTACT	Negative	0.01	mg / cm ^2	0.04	1.4
461	Empire APT 810	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
462	Empire APT 810	KITCHEN	WALL	WHITE	DRYWALL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
463	Empire APT 810	KITCHEN	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1.88
464	Empire APT 810	KITCHEN	CLOSET DOOR	BROWN	WOOD	C	INTACT	Negative	0.04	mg / cm ^2	0.06	1.27
465	Empire APT 810	KITCHEN	BASEBOARD	BROWN	VINYL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
466	Empire APT 810	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Null	0	mg / cm ^2	0.02	1
467	Empire APT 810	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
468	Empire APT 810	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Positive	1.4	mg / cm ^2	0.4	1
469	Empire APT 810	BEDROOM 1	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.03	mg / cm ^2	0.07	2.33
470	Empire APT 810	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
471	Empire APT 810	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.03	mg / cm ^2	0.04	1
472	Empire APT 810	BEDROOM 1	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1
473	Empire APT 810	BEDROOM 1	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.04	3.32
474	Empire APT 810	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
475	Empire APT 810	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
476	Empire APT 810	BEDROOM 1	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.5	mg / cm ^2	0.4	1.33
477	Empire APT 810	BEDROOM 1	CLOSET DOOR	BROWN	WOOD	D	INTACT	Negative	0.05	mg / cm ^2	0.07	1.38
478	Empire APT 810	BEDROOM 1	BASEBOARD	BROWN	VINYL	A	INTACT	Negative	0	mg / cm ^2	0.02	1

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Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
479	Empire APT 810	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
480	Empire APT 810	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Positive	1.4	mg / cm ^2	0.3	1
481	Empire APT 810	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.02	1
482	Empire APT 810	BATHROOM	SHOWER	BEIGE	CERAMIC TILES	A	INTACT	Positive	2	mg / cm ^2	0.9	2.29
483	Empire APT 810	BATHROOM	SHOWER FLOOR	BEIGE	CERAMIC TILES		INTACT	Negative	0.01	mg / cm ^2	0.02	2.7
484	Empire APT 810	BATHROOM	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1
485	Empire APT 810	BATHROOM	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0.03	mg / cm ^2	0.05	2
486	Empire APT 810	BATHROOM	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
487	Empire APT 810	BATHROOM	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.06	mg / cm ^2	0.08	1.55
488	Empire APT 810	BATHROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1
489	Empire APT 810	BATHROOM	BASEBOARD	BROWN	VINYL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
490	Empire APT 810	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
491	Empire APT 907	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Positive	1.5	mg / cm ^2	0.5	1
492	Empire APT 907	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.15	mg / cm ^2	0.63	2.49
493	Empire APT 907	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
494	Empire APT 907	LIVING ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.04	mg / cm ^2	0.05	1
495	Empire APT 907	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.02	1.65
496	Empire APT 907	LIVING ROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
497	Empire APT 907	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0.5	mg / cm ^2	0.5	1.3
498	Empire APT 907	LIVING ROOM	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1

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Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
499	Empire APT 907	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.05	1.98
500	Empire APT 907	LIVING ROOM	CLOSET DOOR	BROWN	WOOD	D	INTACT	Negative	0.04	mg / cm ^2	0.06	1.15
501	Empire APT 907	LIVING ROOM	BASEBOARD	WHITE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
502	Empire APT 907	LIVING ROOM	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1.01
503	Empire APT 907	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Positive	1.8	mg / cm ^2	0.7	1
504	Empire APT 907	KITCHEN	WALL	BEIGE	VINYL	A	INTACT	Negative	0.08	mg / cm ^2	0.17	4.86
505	Empire APT 907	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
506	Empire APT 907	KITCHEN	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.05	1.65
507	Empire APT 907	KITCHEN	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.5	mg / cm ^2	0.5	1.39
508	Empire APT 907	KITCHEN	CLOSET DOOR	BROWN	WOOD	C	INTACT	Negative	0.03	mg / cm ^2	0.04	1
509	Empire APT 907	KITCHEN	BASEBOARD	BROWN	VINYL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
510	Empire APT 907	KITCHEN	FLOOR	BEIGE	VINYL TILES		INTACT	Positive	1.4	mg / cm ^2	0.4	1
511	Empire APT 907	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
512	Empire APT 907	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Positive	1.4	mg / cm ^2	0.4	1
513	Empire APT 907	BEDROOM 1	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.07	mg / cm ^2	0.09	2.7
514	Empire APT 907	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
515	Empire APT 907	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.06	mg / cm ^2	0.08	1.42
516	Empire APT 907	BEDROOM 1	WALL	WHITE	DRYWALL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
517	Empire APT 907	BEDROOM 1	WALL	WHITE	DRYWALL	C	INTACT	Null	0.7	mg / cm ^2	0.5	9.15
518	Empire APT 907	BEDROOM 1	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1.33

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Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
519	Empire APT 907	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0.4	mg / cm ^2	0.5	2.81
520	Empire APT 907	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Null	0	mg / cm ^2	0.02	1.17
521	Empire APT 907	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0.19	mg / cm ^2	0.59	2.01
522	Empire APT 907	BEDROOM 1	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1
523	Empire APT 907	BEDROOM 1	CLOSET DOOR	BROWN	WOOD	D	INTACT	Negative	0.07	mg / cm ^2	0.1	1.79
524	Empire APT 907	BEDROOM 1	BASEBOARD	WHITE	VINYL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
525	Empire APT 907	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Positive	1.4	mg / cm ^2	0.4	1
526	Empire APT 907	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
527	Empire APT 907	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Positive	1.5	mg / cm ^2	0.4	1
528	Empire APT 907	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.05	2.54
529	Empire APT 907	BATHROOM	SHOWER	WHITE	CEILING TILES	B	INTACT	Negative	0.1	mg / cm ^2	0.11	1.66
530	Empire APT 907	BATHROOM	SHOWER FLOOR	BROWN	CEILING TILES		INTACT	Negative	0.01	mg / cm ^2	0.02	1
531	Empire APT 907	BATHROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.02	1.49
532	Empire APT 907	BATHROOM	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
533	Empire APT 907	BATHROOM	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.07	mg / cm ^2	0.08	1.46
534	Empire APT 907	BATHROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.05	1.67
535	Empire APT 907	BATHROOM	BASEBOARD	BROWN	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
536	Empire APT 907	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
537			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.09
538			CALIBRATION CHECK					Positive	1.4	mg / cm ^2	0.3	1.09

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No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
539			CALIBRATION CHECK					Negative	0.9	mg / cm ^2	0.1	1.03
540			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.06
541	Empire APT 909	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
542	Empire APT 909	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Positive	1.8	mg / cm ^2	0.7	1
543	Empire APT 909	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.3	mg / cm ^2	0.55	2.58
544	Empire APT 909	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0.05	mg / cm ^2	0.07	1.33
545	Empire APT 909	LIVING ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.05	mg / cm ^2	0.06	1.21
546	Empire APT 909	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.03	1.94
547	Empire APT 909	LIVING ROOM	CLOSET DOOR	BROWN	WOOD	B	INTACT	Negative	0.03	mg / cm ^2	0.05	1
548	Empire APT 909	LIVING ROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1
549	Empire APT 909	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
550	Empire APT 909	LIVING ROOM	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0.6	mg / cm ^2	0.4	1.23
551	Empire APT 909	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1.82
552	Empire APT 909	LIVING ROOM	BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
553	Empire APT 909	LIVING ROOM	FLOOR	BEIGE	CARPET		INTACT	Positive	1.5	mg / cm ^2	0.4	1
554	Empire APT 909	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Positive	1.5	mg / cm ^2	0.4	1
555	Empire APT 909	KITCHEN	WALL	BLUE	VINYL	A	INTACT	Negative	0.23	mg / cm ^2	0.13	4.08
556	Empire APT 909	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
557	Empire APT 909	KITCHEN	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.03	mg / cm ^2	0.02	1.64
558	Empire APT 909	KITCHEN	CLOSET DOOR	BROWN	WOOD	C	INTACT	Negative	0.04	mg / cm ^2	0.04	1.01

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No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
559	Empire APT 909	KITCHEN	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.03	mg / cm ^2	0.04	1.58
560	Empire APT 909	KITCHEN	BASEBOARD	BEIGE	VINYL	D	INTACT	Null	0	mg / cm ^2	0.05	1
561	Empire APT 909	KITCHEN	BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
562	Empire APT 909	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
563	Empire APT 909	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
564	Empire APT 909	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
565	Empire APT 909	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Positive	1.5	mg / cm ^2	0.5	1
566	Empire APT 909	BEDROOM 1	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.04	1.11
567	Empire APT 909	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
568	Empire APT 909	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.13	mg / cm ^2	0.14	2.33
569	Empire APT 909	BEDROOM 1	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1.02
570	Empire APT 909	BEDROOM 1	CLOSET DOOR	BROWN	WOOD	B	INTACT	Negative	0.05	mg / cm ^2	0.03	1.24
571	Empire APT 909	BEDROOM 1	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.03	1.62
572	Empire APT 909	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
573	Empire APT 909	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
574	Empire APT 909	BEDROOM 1	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.03	2.16
575	Empire APT 909	BEDROOM 1	BASEBOARD	BEIGE	VINYL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
576	Empire APT 909	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
577	Empire APT 909	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.03	1
578	Empire APT 909	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
579	Empire APT 909	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
580	Empire APT 909	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Positive	1.5	mg / cm ^2	0.5	1
581	Empire APT 909	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.03	1.74
582	Empire APT 909	BATHROOM	SHOWER	WHITE	CERAMIC TILES	A	INTACT	Negative	0.12	mg / cm ^2	0.14	2.22
583	Empire APT 909	BATHROOM	SHOWER FLOOR	BEIGE	CERAMIC TILES		INTACT	Negative	0.01	mg / cm ^2	0.02	1
584	Empire APT 909	BATHROOM	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.04	mg / cm ^2	0.11	4.23
585	Empire APT 909	BATHROOM	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0.03	mg / cm ^2	0.03	1.87
586	Empire APT 909	BATHROOM	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.09	mg / cm ^2	0.11	1.88
587	Empire APT 909	BATHROOM	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
588	Empire APT 909	BATHROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.03	1.47
589	Empire APT 909	BATHROOM	BASEBOARD	BLUE	VINYL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
590	Empire APT 909	BATHROOM	FLOOR	WHITE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
591	Empire APT 1005	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
592	Empire APT 1005	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Positive	1.4	mg / cm ^2	0.4	1
593	Empire APT 1005	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.02	1.51
594	Empire APT 1005	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0.04	mg / cm ^2	0.05	1
595	Empire APT 1005	LIVING ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.04	mg / cm ^2	0.05	1.01
596	Empire APT 1005	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.02	1.58
597	Empire APT 1005	LIVING ROOM	CLOSET DOOR	BROWN	WOOD	B	INTACT	Negative	0.03	mg / cm ^2	0.05	1.01
598	Empire APT 1005	LIVING ROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.03	1.25

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Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
599	Empire APT 1005	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0.5	mg / cm ^2	0.5	1
600	Empire APT 1005	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
601	Empire APT 1005	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.5	mg / cm ^2	0.4	1.84
602	Empire APT 1005	LIVING ROOM	BASEBOARD	WHITE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	1
603	Empire APT 1005	LIVING ROOM	FLOOR	BEIGE	CARPET	Dj	INTACT	Null	0	mg / cm ^2	0.02	1
604	Empire APT 1005	LIVING ROOM	FLOOR	BEIGE	CARPET	Dj	INTACT	Positive	1.6	mg / cm ^2	0.4	1
605	Empire APT 1005	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Positive	1.6	mg / cm ^2	0.5	1
606	Empire APT 1005	KITCHEN	WALL	BEIGE	VINYL	A	INTACT	Negative	0.25	mg / cm ^2	0.2	2.2
607	Empire APT 1005	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
608	Empire APT 1005	KITCHEN	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1
609	Empire APT 1005	KITCHEN	CLOSET DOOR	BROWN	WOOD	C	INTACT	Negative	0.03	mg / cm ^2	0.04	1
610	Empire APT 1005	KITCHEN	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.03	mg / cm ^2	0.06	2.39
611	Empire APT 1005	KITCHEN	BASEBOARD	BROWN	VINYL	D	INTACT	Positive	2.2	mg / cm ^2	0.6	2.07
612	Empire APT 1005	KITCHEN	FLOOR	WHITE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
613	Empire APT 1005	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Positive	1.5	mg / cm ^2	0.5	1
614	Empire APT 1005	BEDROOM 1	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.02	1.42
615	Empire APT 1005	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
616	Empire APT 1005	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.04	mg / cm ^2	0.05	1
617	Empire APT 1005	BEDROOM 1	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.02	1.66
618	Empire APT 1005	BEDROOM 1	CLOSET DOOR	BROWN	WOOD	B	INTACT	Negative	0.03	mg / cm ^2	0.05	1

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Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
619	Empire APT 1005	BEDROOM 1	FLOOR	WHITE	DRYWALL	C	INTACT	Negative	0.04	mg / cm ^2	0.09	2.89
620	Empire APT 1005	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0.6	mg / cm ^2	0.4	2.95
621	Empire APT 1005	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
622	Empire APT 1005	BEDROOM 1	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.03	1.77
623	Empire APT 1005	BEDROOM 1	BASEBOARD	WHITE	VINYL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
624	Empire APT 1005	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
625	Empire APT 1005	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
626	Empire APT 1005	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Positive	1.5	mg / cm ^2	0.4	1
627	Empire APT 1005	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
628	Empire APT 1005	BATHROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.03	1.03
629	Empire APT 1005	BATHROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.04	mg / cm ^2	0.03	2.18
630	Empire APT 1005	BATHROOM	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
631	Empire APT 1005	BATHROOM	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.06	mg / cm ^2	0.07	1.35
632	Empire APT 1005	BATHROOM	SHOWER	WHITE	CERAMIC TILES	D	INTACT	Positive	2	mg / cm ^2	0.9	1.81
633	Empire APT 1005	BATHROOM	SHOWER FLOOR	BEIGE	CERAMIC TILES		INTACT	Null	0	mg / cm ^2	0.02	1
634	Empire APT 1005	BATHROOM	SHOWER FLOOR	BEIGE	CERAMIC TILES		INTACT	Negative	0.01	mg / cm ^2	0.02	1.75
635	Empire APT 1005	BATHROOM	BASEBOARD	BROWN	VINYL	C	INTACT	Positive	1.4	mg / cm ^2	0.2	2.64
636	Empire APT 1005	BATHROOM	FLOOR	WHITE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
637	Common floor 10	HALL	CEILING	WHITE	POPCORN		INTACT	Positive	1.5	mg / cm ^2	0.4	1
638	Common floor 10	HALL	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1.28

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
639	Common floor 10	HALL	DOOR	BROWN	WOOD	A	INTACT	Negative	0.06	mg / cm ^2	0.08	1.56
640	Common floor 10	HALL	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.1	mg / cm ^2	0.14	2.32
641	Common floor 10	HALL	WALL	WHITE	DRYWALL	B	INTACT	Null	0.5	mg / cm ^2	0.1	2.71
642	Common floor 10	HALL	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.5	mg / cm ^2	0.1	2.45
643	Common floor 10	HALL	WINDOW SASH	GRAY	METAL	B	INTACT	Negative	0	mg / cm ^2	0.02	1.24
644	Common floor 10	HALL	WINDOW CASING	GRAY	METAL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
645	Common floor 10	HALL	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.06	2.96
646	Common floor 10	HALL	WALL	WHITE	DRYWALL	D	INTACT	Positive	1.2	mg / cm ^2	0.2	1.71
647	Common floor 10	HALL	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.6	mg / cm ^2	0.1	1.8
648	Common floor 10	HALL	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.7	mg / cm ^2	0.1	2.15
649	Common floor 10	HALL	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.5	mg / cm ^2	0.1	1.67
650	Common floor 10	HALL	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.5	mg / cm ^2	0.1	1.63
651	Common floor 10	HALL	BASEBOARD	GRAY	CARPET	A	INTACT	Negative	0	mg / cm ^2	0.02	1
652	Common floor 10	HALL	FLOOR	GRAY	CARPET		INTACT	Positive	1.6	mg / cm ^2	0.4	1
653	Common floor 10	rubbish	CEILING	WHITE	DRYWALL		INTACT	Negative	0.01	mg / cm ^2	0.02	1.12
654	Common floor 10	rubbish	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1
655	Common floor 10	rubbish	DOOR	BROWN	WOOD	B	INTACT	Negative	0	mg / cm ^2	0.02	1
656	Common floor 10	rubbish	DOOR CASING	BROWN	METAL	B	INTACT	Negative	0.01	mg / cm ^2	0.04	2.38
657	Common floor 10	rubbish	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.03	1.3
658	Common floor 10	rubbish	WALL	WHITE	DRYWALL	D	INTACT	Null	0.03	mg / cm ^2	0.05	1.85

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
659	Common floor 10	rubbish	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1.01
660	Common floor 10	rubbish	BASEBOARD	BROWN	VINYL	A	INTACT	Negative	0.04	mg / cm ^2	0.02	1.61
661	Common floor 10	rubbish	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0.01	mg / cm ^2	0.02	2.72
662	Common floor 10	storage	CEILING	WHITE	CONCRETE		INTACT	Null	0.01	mg / cm ^2	0.09	1
663	Common floor 10	storage	CEILING	WHITE	CONCRETE		INTACT	Negative	0.02	mg / cm ^2	0.02	1
664	Common floor 10	storage	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.02	1
665	Common floor 10	storage	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.02	1
666	Common floor 10	storage	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.03	1
667	Common floor 10	storage	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.05	1.33
668	Common floor 10	storage	DOOR	BROWN	WOOD	D	INTACT	Negative	0	mg / cm ^2	0.02	1
669	Common floor 10	storage	DOOR CASING	BROWN	METAL	D	INTACT	Negative	0.07	mg / cm ^2	0.08	1.51
670	Common floor 10	storage	BASEBOARD	BROWN	VINYL	A	INTACT	Negative	0.09	mg / cm ^2	0.05	3.01
671	Common floor 10	storage	FLOOR	WHITE	VINYL TILES		INTACT	Positive	1.4	mg / cm ^2	0.3	1.05
672	Common floor 10	storage	FLOOR	WHITE	VINYL TILES			Negative	0.01	mg / cm ^2	0.02	2.72
673			CALIBRATION CHECK					Null	1	mg / cm ^2	0.1	1.09
674			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.07
675			CALIBRATION CHECK					Negative	0.9	mg / cm ^2	0.1	1.03
676			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.07
1									4.07	cps	0	
2			CALIBRATION CHECK					Null	0.9	mg / cm ^2	0.5	1.02

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
3			CALIBRATION CHECK					Null	0.9	mg / cm ^2	0.8	1
4			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.09
5			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.09
6			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.09
7	Empire Common	north stairs	WALL	WHITE	DRYWALL	A	INTACT	Null	0.04	mg / cm ^2	0.19	2.25
8	Empire Common	north stairs	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.03	mg / cm ^2	0.06	2.19
9	Empire Common	north stairs	WALL	WHITE	DRYWALL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
10	Empire Common	north stairs	WALL	WHITE	DRYWALL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
11	Empire Common	north stairs	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1
12	Empire Common	north stairs	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
13	Empire Common	north stairs	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.04	mg / cm ^2	0.06	1.39
14	Empire Common	north stairs	railing	BROWN	METAL		INTACT	Negative	0.06	mg / cm ^2	0.07	1.14
15	Empire Common	north stairs	RISER STAIRS	BROWN	METAL		INTACT	Negative	0.06	mg / cm ^2	0.03	1.04
16	Empire Common	north stairs	STRINGER STAIR	BROWN	METAL		INTACT	Negative	0.08	mg / cm ^2	0.09	1.51
17	Empire Common	north stairs	BASEBOARD	BROWN	VINYL	B	INTACT	Negative	0.05	mg / cm ^2	0.04	1.82
18	Empire Common	north stairs	DOOR	BROWN	METAL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
19	Empire Common	north stairs	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
20	Empire Common	north stairs	pipe	BLACK	METAL	D	INTACT	Null	0.04	mg / cm ^2	0.16	8.24
21	Empire Common	north stairs	WALL	WHITE	CONCRETE		INTACT	Negative	0.04	mg / cm ^2	0.03	1.5
22	Common floor 9	HALL	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1

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Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
23	Common floor 9	HALL	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
24	Common floor 9	HALL	WALL	WHITE	DRYWALL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
25	Common floor 9	HALL	WALL	WHITE	DRYWALL	B	INTACT	Null	1.2	mg / cm ^2	0.2	2.13
26	Common floor 9	HALL	WALL	WHITE	DRYWALL	B	INTACT	Positive	1.1	mg / cm ^2	0.1	2
27	Common floor 9	HALL	WALL	WHITE	DRYWALL	B	INTACT	Positive	1.1	mg / cm ^2	0.1	2.14
28	Common floor 9	HALL	WINDOW CASING	GRAY	METAL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
29	Common floor 9	HALL	WINDOW SASH	GRAY	METAL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
30	Common floor 9	HALL	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.03	1.05
31	Common floor 9	HALL	DOOR	BROWN	WOOD	C	INTACT	Negative	0.04	mg / cm ^2	0.05	1
32	Common floor 9	HALL	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.07	mg / cm ^2	0.07	1.41
33	Common floor 9	HALL	BASEBOARD	GRAY	CARPET	C	INTACT	Negative	0	mg / cm ^2	0.02	1
34	Common floor 9	HALL	WALL	WHITE	DRYWALL	D	INTACT	Positive	1.4	mg / cm ^2	0.3	1.86
35	Common floor 9	HALL	FLOOR	BROWN	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
36	Common floor 9	storage	CEILING	WHITE	WOOD		INTACT	Negative	0.01	mg / cm ^2	0.02	1.09
37	Common floor 9	storage	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.03	1
38	Common floor 9	storage	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1
39	Common floor 9	storage	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1
40	Common floor 9	storage	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.04	1
41	Common floor 9	storage	DOOR	BROWN	WOOD	D	INTACT	Negative	0	mg / cm ^2	0.02	1
42	Common floor 9	storage	DOOR CASING	BROWN	METAL	D	INTACT	Negative	0.07	mg / cm ^2	0.08	1.44

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
43	Common floor 9	storage	BASEBOARD	BROWN	VINYL	A	INTACT	Negative	0.1	mg / cm ^2	0.07	3.44
44	Common floor 9	storage	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0	mg / cm ^2	0.02	1
45	Common floor 9	storage	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0.02	mg / cm ^2	0.03	4.26
46	Common floor 9	garbage	CEILING	WHITE	WOOD		INTACT	Negative	0.01	mg / cm ^2	0.02	1
47	Common floor 9	garbage	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.03	mg / cm ^2	0.03	1.74
48	Common floor 9	garbage	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.06	mg / cm ^2	0.04	2.14
49	Common floor 9	garbage	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.03	1.23
50	Common floor 9	garbage	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.03	mg / cm ^2	0.06	2.03
51	Common floor 9	garbage	DOOR	BROWN	WOOD	B	INTACT	Negative	0	mg / cm ^2	0.02	1
52	Common floor 9	garbage	DOOR CASING	BROWN	METAL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
53	Common floor 9	garbage	BASEBOARD	BROWN	VINYL	A	INTACT	Positive	1.5	mg / cm ^2	0.4	2.19
54	Common floor 9	garbage	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0.01	mg / cm ^2	0.02	1.76
55	Common floor 8	HALL	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
56	Common floor 8	HALL	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
57	Empire apt 901	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
58	Empire apt 901	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Null	0.03	mg / cm ^2	0.26	10
59	Empire apt 901	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
60	Empire apt 901	LIVING ROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
61	Empire apt 901	LIVING ROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1
62	Empire apt 901	LIVING ROOM	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
63	Empire apt 901	LIVING ROOM	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.06	mg / cm ^2	0.08	1.52
64	Empire apt 901	LIVING ROOM	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.04	1.85
65	Empire apt 901	LIVING ROOM	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1
66	Empire apt 901	LIVING ROOM	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1.55
67	Empire apt 901	LIVING ROOM	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
68	Empire apt 901	LIVING ROOM	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.03	mg / cm ^2	0.04	3.67
69	Empire apt 901	LIVING ROOM	CLOSET DOOR	BROWN	DRYWALL	D	INTACT	Negative	0.04	mg / cm ^2	0.05	1
70	Empire apt 901	LIVING ROOM	BASEBOARD	BROWN	VINYL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
71	Empire apt 901	LIVING ROOM	FLOOR	BEIGE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
72	Empire apt 901	BATHROOM	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
73	Empire apt 901	BATHROOM	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1.16
74	Empire apt 901	BATHROOM	SHOWER	BEIGE	CERAMIC TILES	A	INTACT	Negative	0.7	mg / cm ^2	0.1	2.21
75	Empire apt 901	BATHROOM	SHOWER FLOOR	BEIGE	CERAMIC TILES	A	INTACT	Negative	0	mg / cm ^2	0.02	1
76	Empire apt 901	BATHROOM	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1
77	Empire apt 901	BATHROOM	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.04	2.05
78	Empire apt 901	BATHROOM	WALL	BEIGE	DRYWALL	D	INTACT	Negative	0.04	mg / cm ^2	0.11	3.13
79	Empire apt 901	BATHROOM	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
80	Empire apt 901	BATHROOM	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.06	mg / cm ^2	0.07	1.22
81	Empire apt 901	BATHROOM	BASEBOARD	BEIGE	VINYL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
82	Empire apt 901	BATHROOM	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1

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Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
83	Empire apt 901	BEDROOM 1	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
84	Empire apt 901	BEDROOM 1	WALL	WHITE	DRYWALL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
85	Empire apt 901	BEDROOM 1	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.04	mg / cm ^2	0.05	1.09
86	Empire apt 901	BEDROOM 1	DOOR	BROWN	WOOD	A	INTACT	Negative	0.01	mg / cm ^2	0.04	2.43
87	Empire apt 901	BEDROOM 1	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.05	1.71
88	Empire apt 901	BEDROOM 1	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.04	1.87
89	Empire apt 901	BEDROOM 1	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.04	1.62
90	Empire apt 901	BEDROOM 1	WINDOW SASH	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
91	Empire apt 901	BEDROOM 1	WINDOW CASING	GRAY	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
92	Empire apt 901	BEDROOM 1	CLOSET DOOR	BROWN	WOOD	D	INTACT	Negative	0.03	mg / cm ^2	0.04	1
93	Empire apt 901	BEDROOM 1	FLOOR	BEIGE	CARPET		INTACT	Positive	1.4	mg / cm ^2	0.3	1
94	Empire apt 901	KITCHEN	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
95	Empire apt 901	KITCHEN	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1.08
96	Empire apt 901	KITCHEN	CABINET	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
97	Empire apt 901	KITCHEN	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.3	mg / cm ^2	0.53	8.05
98	Empire apt 901	KITCHEN	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1.02
99	Empire apt 901	KITCHEN	CLOSET DOOR	BROWN	WOOD	C	INTACT	Negative	0.03	mg / cm ^2	0.02	1
100	Empire apt 901	KITCHEN	BASEBOARD	BEIGE	VINYL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
101	Empire apt 901	KITCHEN	FLOOR	BEIGE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
102	Common floor 8	HALL	CEILING	WHITE	POPCORN		INTACT	Positive	1.4	mg / cm ^2	0.3	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
103	Common floor 8	HALL	WALL	BEIGE	PLASTER	A	INTACT	Negative	0.7	mg / cm ^2	0.1	1.95
104	Common floor 8	HALL	DOOR	BROWN	WOOD	A	INTACT	Negative	0.04	mg / cm ^2	0.06	1.22
105	Common floor 8	HALL	DOOR CASING	BROWN	WOOD	A	INTACT	Negative	0.2	mg / cm ^2	0.19	2.65
106	Common floor 8	HALL	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.02	1.19
107	Common floor 8	HALL	WINDOW CASING	GRAY	METAL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
108	Common floor 8	HALL	WINDOW SASH	GRAY	METAL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
109	Common floor 8	HALL	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0.03	mg / cm ^2	0.07	1.92
110	Common floor 8	HALL	WALL	BEIGE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1
111	Common floor 8	HALL	BASEBOARD	BROWN	CARPET	A	POOR	Negative	0	mg / cm ^2	0.02	1
112	Common floor 8	HALL	FLOOR	BROWN	CARPET		INTACT	Positive	1.5	mg / cm ^2	0.5	1
113	Common floor 8	STORAGE	CEILING	WHITE	CONCRETE		INTACT	Negative	0.03	mg / cm ^2	0.02	1.29
114	Common floor 8	STORAGE	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.03	1.03
115	Common floor 8	STORAGE	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.03	mg / cm ^2	0.04	1.42
116	Common floor 8	STORAGE	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1
117	Common floor 8	STORAGE	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.03	mg / cm ^2	0.02	1.16
118	Common floor 8	STORAGE	DOOR	BROWN	WOOD	D	INTACT	Negative	0	mg / cm ^2	0.02	1
119	Common floor 8	STORAGE	DOOR CASING	BROWN	METAL	D	INTACT	Negative	0.06	mg / cm ^2	0.07	1.18
120	Common floor 8	STORAGE	BASEBOARD	BROWN	VINYL	A	INTACT	Null	0.06	mg / cm ^2	0.02	2.4
121	Common floor 8	STORAGE	BASEBOARD	BROWN	VINYL	A	INTACT	Negative	0.04	mg / cm ^2	0.03	1.48
122	Common floor 8	STORAGE	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0.01	mg / cm ^2	0.02	3.44

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
123	Common floor 8	garbage	CEILING	WHITE	CONCRETE		INTACT	Negative	0.02	mg / cm ^2	0.02	1.35
124	Common floor 8	garbage	WALL	WHITE	CONCRETE	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1
125	Common floor 8	garbage	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.05	mg / cm ^2	0.06	1.59
126	Common floor 8	garbage	WALL	WHITE	DRYWALL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
127	Common floor 8	garbage	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.03	mg / cm ^2	0.03	2.15
128	Common floor 8	garbage	DOOR	BROWN	WOOD	B	INTACT	Negative	0	mg / cm ^2	0.02	1
129	Common floor 8	garbage	DOOR CASING	BROWN	METAL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
130	Common floor 8	garbage	BASEBOARD	BROWN	VINYL	A	INTACT	Negative	0.05	mg / cm ^2	0.02	2.07
131	Common floor 8	garbage	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0.01	mg / cm ^2	0.02	2.16
132	Common floor 7	HALL	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
133	Common floor 7	HALL	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
134	Common floor 7	HALL	WALL	WHITE	STUCCO	A	INTACT	Negative	0.02	mg / cm ^2	0.03	1
135	Common floor 7	HALL	DOOR	BROWN	WOOD	A	INTACT	Negative	0.03	mg / cm ^2	0.04	1
136	Common floor 7	HALL	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.12	mg / cm ^2	0.13	2.3
137	Common floor 7	HALL	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.5	mg / cm ^2	0.1	1.73
138	Common floor 7	HALL	WINDOW CASING	GRAY	METAL	B	INTACT	Negative	0	mg / cm ^2	0.02	1.75
139	Common floor 7	HALL	WINDOW SASH	GRAY	METAL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
140	Common floor 7	HALL	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.03	1
141	Common floor 7	HALL	BASEBOARD	BROWN	CARPET	C	INTACT	Negative	0	mg / cm ^2	0.02	1
142	Common floor 7	HALL	FLOOR	BROWN	CARPET		INTACT	Positive	1.5	mg / cm ^2	0.5	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
143	Common floor 7	HALL	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.4	mg / cm ^2	0.1	1.59
144	Common floor 7	STORAGE	CEILING	WHITE	CONCRETE		INTACT	Negative	0.02	mg / cm ^2	0.02	1.68
145	Common floor 7	STORAGE	WALL	WHITE	VINYL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1
146	Common floor 7	STORAGE	WALL	WHITE	VINYL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1
147	Common floor 7	STORAGE	WALL	WHITE	VINYL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1
148	Common floor 7	STORAGE	WALL	WHITE	VINYL	D	INTACT	Negative	0.06	mg / cm ^2	0.12	3.35
149	Common floor 7	STORAGE	DOOR	BROWN	WOOD	D	INTACT	Negative	0	mg / cm ^2	0.02	1
150	Common floor 7	STORAGE	DOOR CASING	BROWN	METAL	D	INTACT	Negative	0.05	mg / cm ^2	0.05	1.07
151	Common floor 7	STORAGE	BASEBOARD	BROWN	VINYL	A	INTACT	Negative	0.11	mg / cm ^2	0.06	3.42
152	Common floor 7	STORAGE	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0	mg / cm ^2	0.02	1
153	Common floor 7	garbage	CEILING	WHITE	CONCRETE		INTACT	Negative	0.01	mg / cm ^2	0.02	1
154	Common floor 7	garbage	WALL	WHITE	CONCRETE	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1.34
155	Common floor 7	garbage	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.03	mg / cm ^2	0.04	1.13
156	Common floor 7	garbage	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1
157	Common floor 7	garbage	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1
158	Common floor 7	garbage	BASEBOARD	BROWN	VINYL	A	INTACT	Positive	1.5	mg / cm ^2	0.4	2.38
159	Common floor 7	garbage	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0.02	mg / cm ^2	0.04	4.35
160	Common floor 6	HALL	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
161	Common floor 6	HALL	WALL	WHITE	STUCCO	A	INTACT	Negative	0.02	mg / cm ^2	0.07	2.46
162	Common floor 6	HALL	DOOR	BROWN	WOOD	A	INTACT	Null	0.03	mg / cm ^2	0.09	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
163	Common floor 6	HALL	DOOR	BROWN	WOOD	A	INTACT	Negative	0.04	mg / cm ^2	0.05	1.08
164	Common floor 6	HALL	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.08	mg / cm ^2	0.08	1.26
165	Common floor 6	HALL	WALL	WHITE	DRYWALL	B	INTACT	Null	1.1	mg / cm ^2	0.1	4.55
166	Common floor 6	HALL	WALL	WHITE	DRYWALL	B	INTACT	Positive	1.4	mg / cm ^2	0.3	10
167	Common floor 6	HALL	WINDOW CASING	GRAY	METAL	B	INTACT	Negative	0.5	mg / cm ^2	0.5	1
168	Common floor 6	HALL	WINDOW SASH	GRAY	METAL	B	INTACT	Negative	0	mg / cm ^2	0.02	1.32
169	Common floor 6	HALL	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1
170	Common floor 6	HALL	BASEBOARD	BROWN	CARPET	C	INTACT	Negative	0	mg / cm ^2	0.02	1
171	Common floor 6	HALL	FLOOR	BROWN	CARPET		INTACT	Positive	1.5	mg / cm ^2	0.5	1
172	Common floor 6	HALL	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.7	mg / cm ^2	0.1	1.48
173	Common floor 6	STORAGE	CEILING	WHITE	CONCRETE		INTACT	Negative	0.01	mg / cm ^2	0.02	1
174	Common floor 6	STORAGE	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.04	1.46
175	Common floor 6	STORAGE	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.03	1
176	Common floor 6	STORAGE	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.03	1
177	Common floor 6	STORAGE	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.04	mg / cm ^2	0.04	1.11
178	Common floor 6	STORAGE	DOOR	BROWN	WOOD	D	INTACT	Negative	0	mg / cm ^2	0.02	1
179	Common floor 6	STORAGE	DOOR CASING	BROWN	METAL	D	INTACT	Negative	0.06	mg / cm ^2	0.06	1
180	Common floor 6	STORAGE	BASEBOARD	BROWN	VINYL	A	INTACT	Negative	0.08	mg / cm ^2	0.05	2.55
181	Common floor 6	STORAGE	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0	mg / cm ^2	0.02	1
182	Common floor 6	garbage	CEILING	WHITE	CONCRETE		INTACT	Negative	0.02	mg / cm ^2	0.02	1.1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
183	Common floor 6	garbage	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.03	mg / cm ^2	0.02	1.22
184	Common floor 6	garbage	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.03	mg / cm ^2	0.02	1.15
185	Common floor 6	garbage	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.04	mg / cm ^2	0.07	1.77
186	Common floor 6	garbage	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.02	1
187	Common floor 6	garbage	DOOR	BROWN	WOOD	B	INTACT	Negative	0	mg / cm ^2	0.02	1
188	Common floor 6	garbage	DOOR CASING	BROWN	METAL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
189	Common floor 6	garbage	BASEBOARD	BROWN	VINYL	A	INTACT	Positive	1.4	mg / cm ^2	0.4	2.27
190	Common floor 6	garbage	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0.01	mg / cm ^2	0.02	2.44
191			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.08
192			CALIBRATION CHECK					Negative	0.9	mg / cm ^2	0.1	1.02
193			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.1
194	Common floor 5	HALL	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1.01
195	Common floor 5	HALL	WALL	WHITE	STUCCO	A	INTACT	Negative	0.6	mg / cm ^2	0.1	1.98
196	Common floor 5	HALL	DOOR	BROWN	WOOD	A	INTACT	Negative	0.04	mg / cm ^2	0.05	1.05
197	Common floor 5	HALL	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.03	mg / cm ^2	0.04	1
198	Common floor 5	HALL	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.03	1
199	Common floor 5	HALL	WINDOW CASING	GRAY	METAL	B	INTACT	Negative	0	mg / cm ^2	0.02	1.21
200	Common floor 5	HALL	WINDOW SASH	GRAY	METAL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
201	Common floor 5	HALL	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.05	1.48
202	Common floor 5	HALL	BASEBOARD	BROWN	CARPET	C	INTACT	Negative	0	mg / cm ^2	0.02	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
203	Common floor 5	HALL	FLOOR	BROWN	CARPET		INTACT	Null	0	mg / cm ^2	0.02	1
204	Common floor 5	HALL	FLOOR	BROWN	CARPET		INTACT	Null	0	mg / cm ^2	0.02	1
205	Common floor 5	HALL	FLOOR	BROWN	CARPET		INTACT	Positive	1.4	mg / cm ^2	0.3	1
206	Common floor 5	HALL	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.02	1.26
207	Common floor 5	STORAGE	CEILING	WHITE	CONCRETE		INTACT	Negative	0.01	mg / cm ^2	0.02	1
208	Common floor 5	STORAGE	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.02	1
209	Common floor 5	STORAGE	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.03	mg / cm ^2	0.03	1.96
210	Common floor 5	STORAGE	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.03	1
211	Common floor 5	STORAGE	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.03	mg / cm ^2	0.04	1.03
212	Common floor 5	STORAGE	DOOR	BROWN	WOOD	D	INTACT	Negative	0	mg / cm ^2	0.02	1
213	Common floor 5	STORAGE	DOOR CASING	BROWN	METAL	D	INTACT	Negative	0.06	mg / cm ^2	0.06	1.23
214	Common floor 5	STORAGE	BASEBOARD	BROWN	VINYL	A	INTACT	Negative	0.07	mg / cm ^2	0.04	2.3
215	Common floor 5	STORAGE	FLOOR	WHITE	VINYL TILES		INTACT	Null	0	mg / cm ^2	0.02	1
216	Common floor 5	STORAGE	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0	mg / cm ^2	0.02	1
217	Common floor 5	garbage	CEILING	WHITE	CONCRETE		INTACT	Negative	0.04	mg / cm ^2	0.02	1.85
218	Common floor 5	garbage	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.04	1.41
219	Common floor 5	garbage	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.02	1.04
220	Common floor 5	garbage	WALL	WHITE	DRYWALL	C	INTACT	Null	0.07	mg / cm ^2	0.29	1.74
221	Common floor 5	garbage	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.04	mg / cm ^2	0.05	1.57
222	Common floor 5	garbage	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.02	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
223	Common floor 5	garbage	DOOR	BROWN	WOOD	B	INTACT	Negative	0	mg / cm ^2	0.02	1
224	Common floor 5	garbage	DOOR CASING	BROWN	METAL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
225	Common floor 5	garbage	BASEBOARD	BROWN	VINYL	A	INTACT	Positive	1.5	mg / cm ^2	0.5	1.93
226	Common floor 5	garbage	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0.03	mg / cm ^2	0.06	7.2
227	Common floor 4	HALL	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
228	Common floor 4	HALL	WALL	BEIGE	PLASTER	A	INTACT	Negative	0.02	mg / cm ^2	0.05	1.74
229	Common floor 4	HALL	DOOR	BROWN	WOOD	A	INTACT	Negative	0.07	mg / cm ^2	0.09	1.64
230	Common floor 4	HALL	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.06	mg / cm ^2	0.07	1.45
231	Common floor 4	HALL	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.5	mg / cm ^2	0.1	2.06
232	Common floor 4	HALL	WINDOW SASH	GRAY	METAL	B	INTACT	Null	0	mg / cm ^2	0.02	1
233	Common floor 4	HALL	WINDOW SASH	GRAY	METAL	B	INTACT	Negative	0.5	mg / cm ^2	0.5	1
234	Common floor 4	HALL	WINDOW CASING	GRAY	METAL	B	INTACT	Negative	0.5	mg / cm ^2	0.4	1.32
235	Common floor 4	HALL	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.05	2.02
236	Common floor 4	HALL	BASEBOARD	BROWN	CARPET	C	INTACT	Negative	0	mg / cm ^2	0.02	1
237	Common floor 4	HALL	FLOOR	BROWN	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
238	Common floor 4	HALL	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.6	mg / cm ^2	0.1	1.81
239	Common floor 4	STORAGE	CEILING	WHITE	CONCRETE		INTACT	Negative	0.01	mg / cm ^2	0.02	1
240	Common floor 4	STORAGE	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.03	1
241	Common floor 4	STORAGE	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1
242	Common floor 4	STORAGE	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.03	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
243	Common floor 4	STORAGE	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.05	mg / cm ^2	0.09	2.14
244	Common floor 4	STORAGE	DOOR	BROWN	WOOD	D	INTACT	Negative	0	mg / cm ^2	0.02	1
245	Common floor 4	STORAGE	DOOR CASING	BROWN	METAL	D	INTACT	Negative	0.03	mg / cm ^2	0.04	1
246	Common floor 4	STORAGE	BASEBOARD	BROWN	VINYL	A	INTACT	Negative	0.06	mg / cm ^2	0.04	1.93
247	Common floor 4	STORAGE	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0.01	mg / cm ^2	0.02	3.46
248	Common floor 4	garbage	CEILING	WHITE	CONCRETE		INTACT	Negative	0.02	mg / cm ^2	0.02	1.06
249	Common floor 4	garbage	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1
250	Common floor 4	garbage	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.02	1
251	Common floor 4	garbage	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.03	1
252	Common floor 4	garbage	WALL	WHITE	DRYWALL	D	INTACT	Null	0.03	mg / cm ^2	0.04	1.79
253	Common floor 4	garbage	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1
254	Common floor 4	garbage	BASEBOARD	BROWN	VINYL	A	INTACT	Positive	1.4	mg / cm ^2	0.4	2.37
255	Common floor 4	garbage	FLOOR	WHITE	VINYL TILES		INTACT	Null	0	mg / cm ^2	0.02	1.17
256	Common floor 4	garbage	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0.01	mg / cm ^2	0.02	3.84
257	Common floor 3	HALL	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
258	Common floor 3	HALL	CEILING	WHITE	POPCORN		INTACT	Positive	1.5	mg / cm ^2	0.5	1.75
259	Common floor 3	HALL	WALL	BEIGE	STUCCO	A	INTACT	Negative	0.5	mg / cm ^2	0.1	2.28
260	Common floor 3	HALL	DOOR	BROWN	WOOD	A	INTACT	Negative	0.05	mg / cm ^2	0.07	1.37
261	Common floor 3	HALL	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.04	mg / cm ^2	0.05	1.19
262	Common floor 3	HALL	WALL	WHITE	DRYWALL	B	INTACT	Positive	1	mg / cm ^2	0.1	2.04

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
263	Common floor 3	HALL	WINDOW SASH	GRAY	METAL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
264	Common floor 3	HALL	WINDOW CASING	GRAY	METAL	B	INTACT	Negative	0	mg / cm ^2	0.02	2.78
265	Common floor 3	HALL	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1
266	Common floor 3	HALL	BASEBOARD	BROWN	CARPET	C	INTACT	Negative	0	mg / cm ^2	0.02	1
267	Common floor 3	HALL	FLOOR	BROWN	CARPET		INTACT	Null	0	mg / cm ^2	0.02	1
268	Common floor 3	HALL	FLOOR	BROWN	CARPET		INTACT	Positive	1.4	mg / cm ^2	0.4	1.15
269	Common floor 3	HALL	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.8	mg / cm ^2	0.1	1.71
270	Common floor 3	STORAGE	CEILING	WHITE	CONCRETE		INTACT	Negative	0.02	mg / cm ^2	0.02	1.16
271	Common floor 3	STORAGE	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.02	1
272	Common floor 3	STORAGE	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.03	1.16
273	Common floor 3	STORAGE	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.03	mg / cm ^2	0.03	1.68
274	Common floor 3	STORAGE	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.03	mg / cm ^2	0.03	1.68
275	Common floor 3	STORAGE	DOOR	BROWN	WOOD	D	INTACT	Negative	0	mg / cm ^2	0.02	1
276	Common floor 3	STORAGE	DOOR CASING	BROWN	METAL	D	INTACT	Negative	0.04	mg / cm ^2	0.05	1
277	Common floor 3	STORAGE	BASEBOARD	BROWN	VINYL	A	INTACT	Negative	0.04	mg / cm ^2	0.02	1.65
278	Common floor 3	STORAGE	FLOOR	WHITE	VINYL TILES		INTACT	Null	0	mg / cm ^2	0.02	1
279	Common floor 3	STORAGE	FLOOR	WHITE	VINYL TILES		INTACT	Null	0	mg / cm ^2	0.04	1
280	Common floor 3	STORAGE	FLOOR	WHITE	VINYL TILES		INTACT	Null	0.01	mg / cm ^2	0.02	3.77
281	Common floor 3	STORAGE	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0.01	mg / cm ^2	0.02	1.87
282	Common floor 3	garbage rubbish	CEILING	WHITE	CONCRETE		INTACT	Negative	0.02	mg / cm ^2	0.02	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
283	Common floor 3	garbage rubbish	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.04	1.45
284	Common floor 3	garbage rubbish	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.02	1.41
285	Common floor 3	garbage rubbish	DOOR	BROWN	WOOD	B	INTACT	Negative	0	mg / cm ^2	0.02	1
286	Common floor 3	garbage rubbish	DOOR CASING	BROWN	METAL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
287	Common floor 3	garbage rubbish	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.02	1.34
288	Common floor 3	garbage rubbish	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.03	1
289	Common floor 3	garbage rubbish	BASEBOARD	BROWN	VINYL	A	INTACT	Negative	0.06	mg / cm ^2	0.03	2.05
290	Common floor 3	garbage rubbish	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0	mg / cm ^2	0.02	1.68
291	Common floor 3	garbage rubbish	DOOR	BROWN	WOOD	B	INTACT	Negative	0	mg / cm ^2	0.02	1
292	Common floor 3	garbage rubbish	DOOR CASING	BROWN	METAL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
293	Common floor 2	HALL	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
294	Common floor 2	HALL	WALL	BEIGE	PLASTER	A	INTACT	Null	0.9	mg / cm ^2	0.2	1.91
295	Common floor 2	HALL	WALL	BEIGE	PLASTER	A	INTACT	Negative	0.8	mg / cm ^2	0.1	2.07
296	Common floor 2	HALL	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
297	Common floor 2	HALL	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0.04	mg / cm ^2	0.05	1
298	Common floor 2	HALL	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.06	mg / cm ^2	0.04	2.4
299	Common floor 2	HALL	WINDOW CASING	GRAY	METAL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
300	Common floor 2	HALL	WINDOW SASH	GRAY	METAL	B	INTACT	Negative	0.28	mg / cm ^2	0.65	2.04
301	Common floor 2	HALL	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1
302	Common floor 2	HALL	BASEBOARD	BROWN	CARPET	C	INTACT	Negative	0	mg / cm ^2	0.02	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
303	Common floor 2	HALL	FLOOR	BROWN	CARPET		INTACT	Positive	1.4	mg / cm ^2	0.4	1
304	Common floor 2	HALL	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.05	mg / cm ^2	0.06	3.3
305	Common floor 2	STORAGE	CEILING	WHITE	CONCRETE		INTACT	Negative	0.02	mg / cm ^2	0.02	1.02
306	Common floor 2	STORAGE	WALL	WHITE	DRYWALL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
307	Common floor 2	STORAGE	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.03	1
308	Common floor 2	STORAGE	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.05	1.45
309	Common floor 2	STORAGE	WALL	WHITE	DRYWALL	D	INTACT	Null	0.02	mg / cm ^2	0.05	1.46
310	Common floor 2	STORAGE	WALL	WHITE	DRYWALL	D	INTACT	Null	0.07	mg / cm ^2	0.39	3.26
311	Common floor 2	STORAGE	WALL	WHITE	DRYWALL	D	INTACT	Null	0.01	mg / cm ^2	0.07	1
312	Common floor 2	STORAGE	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.03	mg / cm ^2	0.05	1.81
313	Common floor 2	STORAGE	DOOR	BROWN	WOOD	B	INTACT	Negative	0	mg / cm ^2	0.02	1
314	Common floor 2	STORAGE	DOOR CASING	BROWN	METAL	B	INTACT	Negative	0.08	mg / cm ^2	0.08	1.47
315	Common floor 2	STORAGE	BASEBOARD	BROWN	VINYL	C	INTACT	Negative	0.06	mg / cm ^2	0.02	2.34
316	Common floor 2	STORAGE	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0	mg / cm ^2	0.02	1.44
317	Common floor 2	game meeting room	CEILING	WHITE	POPCORN		INTACT	Negative	0	mg / cm ^2	0.02	1
318	Common floor 2	game meeting room	WALL	BEIGE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.04	1.42
319	Common floor 2	game meeting room	WINDOW CASING	GRAY	VINYL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
320	Common floor 2	game meeting room	WINDOW SASH	GRAY	VINYL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
321	Common floor 2	game meeting room	WALL	GREEN	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.02	1
322	Common floor 2	game meeting room	CLOSET DOOR	BROWN	WOOD	B	INTACT	Negative	0.04	mg / cm ^2	0.06	1.18

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
323	Common floor 2	game meeting room	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
324	Common floor 2	game meeting room	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
325	Common floor 2	game meeting room	DOOR CASING	BROWN	WOOD	C	INTACT	Negative	0.04	mg / cm ^2	0.05	1
326	Common floor 2	game meeting room	CABINET	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
327	Common floor 2	game meeting room	WALL	BEIGE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.03	1.07
328	Common floor 2	game meeting room	BASEBOARD	BLUE	CARPET	D	INTACT	Negative	0	mg / cm ^2	0.02	1
329	Common floor 2	game meeting room	FLOOR	BLUE	CARPET		INTACT	Negative	0	mg / cm ^2	0.02	1
330	Common floor 2	game bathroom	CEILING	WHITE	STUCCO		INTACT	Negative	0	mg / cm ^2	0.02	1
331	Common floor 2	game bathroom	CEILING	WHITE	STUCCO		INTACT	Null	0	mg / cm ^2	0.04	3.33
332	Common floor 2	game bathroom	CEILING	WHITE	STUCCO		INTACT	Null	0	mg / cm ^2	0.02	1
333	Common floor 2	game bathroom	CEILING	WHITE	STUCCO		INTACT	Negative	0	mg / cm ^2	0.02	1
334	Common floor 2	game bathroom	WALL	GREEN	DRYWALL	A	INTACT	Negative	0.04	mg / cm ^2	0.1	2.87
335	Common floor 2	game bathroom	DOOR	BROWN	WOOD	A	INTACT	Negative	0	mg / cm ^2	0.02	1
336	Common floor 2	game bathroom	DOOR CASING	BROWN	METAL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
337	Common floor 2	game bathroom	WALL	WHITE	DRYWALL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
338	Common floor 2	game bathroom	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.04	1.38
339	Common floor 2	game bathroom	WALL	GREEN	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.05	1.52
340	Common floor 2	game bathroom	BASEBOARD	BEIGE	VINYL	A	INTACT	Null	0.03	mg / cm ^2	0.18	1.67
341	Common floor 2	game bathroom	BASEBOARD	BEIGE	VINYL	A	INTACT	Negative	0.14	mg / cm ^2	0.08	4.94
342	Common floor 2	game bathroom	FLOOR	WHITE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
343	Common floor 2	laundry	CEILING	WHITE	POPCORN		INTACT	Null	0	mg / cm ^2	0.02	1
344	Common floor 2	laundry	CEILING	WHITE	POPCORN		INTACT	Positive	1.5	mg / cm ^2	0.4	1
345	Common floor 2	laundry	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.03	mg / cm ^2	0.07	2.37
346	Common floor 2	laundry	WINDOW CASING	GRAY	METAL	A	INTACT	Negative	0	mg / cm ^2	0.02	1
347	Common floor 2	laundry	WINDOW SASH	GRAY	METAL	A	INTACT	Negative	0	mg / cm ^2	0.02	1.31
348	Common floor 2	laundry	WALL	BEIGE	DRYWALL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
349	Common floor 2	laundry	WALL	BEIGE	DRYWALL	C	INTACT	Negative	0.05	mg / cm ^2	0.08	2.79
350	Common floor 2	laundry	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
351	Common floor 2	laundry	DOOR CASING	BEIGE	METAL	C	INTACT	Negative	0	mg / cm ^2	0.02	1
352	Common floor 2	laundry	WALL	BEIGE	DRYWALL	D	INTACT	Null	0.06	mg / cm ^2	0.11	3.77
353	Common floor 2	laundry	WALL	BEIGE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1.22
354	Common floor 2	laundry	BASEBOARD	BEIGE	VINYL	D	INTACT	Negative	0	mg / cm ^2	0.02	2.56
355	Common floor 2	laundry	FLOOR	BROWN	WOOD		INTACT	Negative	0	mg / cm ^2	0.02	1
356	Common floor 2	rubbish	CEILING	WHITE	CONCRETE		INTACT	Negative	0.02	mg / cm ^2	0.02	1
357	Common floor 2	rubbish	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1
358	Common floor 2	rubbish	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.06	4.04
359	Common floor 2	rubbish	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.05	mg / cm ^2	0.06	1.94
360	Common floor 2	rubbish	WALL	WHITE	DRYWALL	D	INTACT	Null	0.01	mg / cm ^2	0.02	1
361	Common floor 2	rubbish	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.03	1.17
362	Common floor 2	rubbish	DOOR	BROWN	WOOD	B	INTACT	Negative	0	mg / cm ^2	0.02	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
363	Common floor 2	rubbish	DOOR CASING	BROWN	METAL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
364	Common floor 2	rubbish	BASEBOARD	BROWN	VINYL	A	INTACT	Null	0.07	mg / cm ^2	0.04	2.38
365	Common floor 2	rubbish	BASEBOARD	BROWN	VINYL	A	INTACT	Negative	0.08	mg / cm ^2	0.04	2.39
366	Common floor 2	rubbish	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0	mg / cm ^2	0.02	1.18
367			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.1
368			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.08
369			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.06
370	Empire Common	south stairs	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.04	mg / cm ^2	0.08	2.83
371	Empire Common	south stairs	WALL	WHITE	DRYWALL	B	INTACT	Negative	0	mg / cm ^2	0.02	1
372	Empire Common	south stairs	WALL	WHITE	CONCRETE	C	INTACT	Negative	0.02	mg / cm ^2	0.02	1.29
373	Empire Common	south stairs	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.02	1.21
374	Empire Common	south stairs	DOOR	BROWN	WOOD	C	INTACT	Negative	0	mg / cm ^2	0.02	1
375	Empire Common	south stairs	DOOR CASING	BROWN	METAL	C	INTACT	Negative	0.07	mg / cm ^2	0.07	1.19
376	Empire Common	south stairs	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.03	mg / cm ^2	0.03	1.84
377	Empire Common	south stairs	BASEBOARD	BROWN	VINYL	D	INTACT	Negative	0.05	mg / cm ^2	0.04	1.87
378	Empire Common	south stairs	railing	BROWN	METAL		INTACT	Negative	0.15	mg / cm ^2	0.12	1.38
379	Empire Common	south stairs	RISER STAIRS	BROWN	METAL		INTACT	Negative	0.07	mg / cm ^2	0.07	1.2
380	Empire Common	south stairs	STRINGER STAIR	BROWN	METAL		INTACT	Null	0.05	mg / cm ^2	0.19	1
381	Empire Common	south stairs	STRINGER STAIR	BROWN	METAL		INTACT	Negative	0.08	mg / cm ^2	0.09	1.47
382	Empire Common	south stairs	FLOOR	WHITE	VINYL TILES		INTACT	Null	0	mg / cm ^2	0.02	1

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
383	Empire Common	south stairs	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0.02	mg / cm ^2	0.03	4.84
384	Common floor 10	STORAGE south tub	CEILING	WHITE	CONCRETE		INTACT	Negative	0.01	mg / cm ^2	0.02	1
385	Common floor 10	STORAGE south tub	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.02	1.48
386	Common floor 10	STORAGE south tub	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.03	mg / cm ^2	0.05	1.38
387	Common floor 10	STORAGE south tub	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.05	mg / cm ^2	0.08	2.12
388	Common floor 10	STORAGE south tub	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.03	1.21
389	Common floor 10	STORAGE south tub	DOOR	BROWN	WOOD	B	INTACT	Negative	0	mg / cm ^2	0.02	1
390	Common floor 10	STORAGE south tub	DOOR CASING	BROWN	METAL	B	INTACT	Negative	0.07	mg / cm ^2	0.08	1.53
391	Common floor 10	STORAGE south tub	BASEBOARD	BROWN	VINYL	C	INTACT	Negative	0.03	mg / cm ^2	0.04	1.11
392	Common floor 10	STORAGE south tub	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0	mg / cm ^2	0.02	1
393	Common floor 9	STORAGE south tub	CEILING	WHITE	CONCRETE		INTACT	Negative	0.01	mg / cm ^2	0.02	1
394	Common floor 9	STORAGE south tub	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.04	mg / cm ^2	0.09	2.64
395	Common floor 9	STORAGE south tub	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.04	1.21
396	Common floor 9	STORAGE south tub	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1
397	Common floor 9	STORAGE south tub	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1
398	Common floor 9	STORAGE south tub	DOOR	BROWN	WOOD	B	INTACT	Negative	0	mg / cm ^2	0.02	1
399	Common floor 9	STORAGE south tub	DOOR CASING	BROWN	METAL	B	FAIR	Negative	0.05	mg / cm ^2	0.06	1.3
400	Common floor 9	STORAGE south tub	BASEBOARD	BROWN	VINYL	A	INTACT	Null	0.05	mg / cm ^2	0.07	1.65
401	Common floor 9	STORAGE south tub	BASEBOARD	BROWN	VINYL	A		Negative	0.07	mg / cm ^2	0.04	2.26
402	Common floor 9	STORAGE south tub	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0.01	mg / cm ^2	0.02	2.49

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
403	Common floor 8	STORAGE south tub	CEILING	WHITE	CONCRETE		INTACT	Negative	0.02	mg / cm ^2	0.02	1
404	Common floor 8	STORAGE south tub	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1.01
405	Common floor 8	STORAGE south tub	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.03	1
406	Common floor 8	STORAGE south tub	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.03	1.11
407	Common floor 8	STORAGE south tub	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.03	1
408	Common floor 8	STORAGE south tub	DOOR	BROWN	WOOD	B	INTACT	Negative	0	mg / cm ^2	0.02	1
409	Common floor 8	STORAGE south tub	DOOR CASING	BROWN	METAL	B	INTACT	Negative	0.05	mg / cm ^2	0.07	1.28
410	Common floor 8	STORAGE south tub	BASEBOARD	BROWN	LINOLEUM	C	INTACT	Negative	0.08	mg / cm ^2	0.03	2.23
411	Common floor 8	STORAGE south tub	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0.01	mg / cm ^2	0.02	2.23
412	Common floor 7	STORAGE south tub	CEILING	WHITE	CONCRETE		INTACT	Negative	0.02	mg / cm ^2	0.02	1.86
413	Common floor 7	STORAGE south tub	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.04	1.34
414	Common floor 7	STORAGE south tub	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.03	1
415	Common floor 7	STORAGE south tub	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1
416	Common floor 7	STORAGE south tub	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.03	1
417	Common floor 7	STORAGE south tub	DOOR	BROWN	WOOD	B	INTACT	Negative	0	mg / cm ^2	0.02	1
418	Common floor 7	STORAGE south tub	DOOR CASING	BROWN	METAL	B	INTACT	Negative	0.04	mg / cm ^2	0.05	1
419	Common floor 7	STORAGE south tub	BASEBOARD	BROWN	VINYL	C	INTACT	Negative	0.02	mg / cm ^2	0.02	1.05
420	Common floor 7	STORAGE south tub	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0.03	mg / cm ^2	0.06	7.44
421	Common floor 6	STORAGE south tub	CEILING	WHITE	CONCRETE		INTACT	Negative	0.02	mg / cm ^2	0.02	1
422	Common floor 6	STORAGE south tub	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.03	mg / cm ^2	0.05	1.76

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
423	Common floor 6	STORAGE south tub	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.04	mg / cm ^2	0.08	2.21
424	Common floor 6	STORAGE south tub	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.02	1.52
425	Common floor 6	STORAGE south tub	WALL	WHITE	DRYWALL	D	INTACT	Null	0.05	mg / cm ^2	0.27	1.96
426	Common floor 6	STORAGE south tub	WALL	WHITE	DRYWALL	D		Negative	0.03	mg / cm ^2	0.04	1.52
427	Common floor 6	STORAGE south tub	DOOR	BROWN	WOOD	B	INTACT	Negative	0	mg / cm ^2	0.02	1
428	Common floor 6	STORAGE south tub	DOOR CASING	BROWN	METAL	B	INTACT	Negative	0.06	mg / cm ^2	0.06	1.14
429	Common floor 6	STORAGE south tub	BASEBOARD	BROWN	VINYL	B	INTACT	Negative	0.07	mg / cm ^2	0.09	2.39
430	Common floor 6	STORAGE south tub	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0	mg / cm ^2	0.02	1
431	Common floor 6	STORAGE south tub	CEILING	WHITE	CONCRETE		INTACT	Negative	0.01	mg / cm ^2	0.02	1
432	Common floor 6	STORAGE south tub	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.02	1.6
433	Common floor 6	STORAGE south tub	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.01	mg / cm ^2	0.03	1
434	Common floor 6	STORAGE south tub	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.03	1
435	Common floor 6	STORAGE south tub	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.03	1
436	Common floor 6	STORAGE south tub	DOOR	BROWN	WOOD	B	INTACT	Negative	0	mg / cm ^2	0.02	1
437	Common floor 6	STORAGE south tub	DOOR CASING	BROWN	METAL	B	INTACT	Negative	0.07	mg / cm ^2	0.08	1.53
438	Common floor 6	STORAGE south tub	BASEBOARD	BROWN	VINYL	B	INTACT	Negative	0.08	mg / cm ^2	0.09	2.4
439	Common floor 6	STORAGE south tub	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0	mg / cm ^2	0.02	1.34
440	Common floor 4	STORAGE south tub	CEILING	WHITE	CONCRETE		INTACT	Negative	0.02	mg / cm ^2	0.02	1.22
441	Common floor 4	STORAGE south tub	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.03	1
442	Common floor 4	STORAGE south tub	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.03	1.03

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
443	Common floor 4	STORAGE south tub	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.02	mg / cm ^2	0.02	1
444	Common floor 4	STORAGE south tub	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1
445	Common floor 4	STORAGE south tub	DOOR CASING	BROWN	METAL	B	INTACT	Negative	0.07	mg / cm ^2	0.09	1.61
446	Common floor 4	STORAGE south tub	DOOR	BROWN	WOOD	B	INTACT	Negative	0	mg / cm ^2	0.02	1
447	Common floor 4	STORAGE south tub	BASEBOARD	BROWN	VINYL	D	INTACT	Negative	0.05	mg / cm ^2	0.03	1.64
448	Common floor 4	STORAGE south tub	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0	mg / cm ^2	0.02	1
449	Common floor 3	STORAGE south tub	CEILING	WHITE	CONCRETE		INTACT	Negative	0.02	mg / cm ^2	0.02	1
450	Common floor 3	STORAGE south tub	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.01	mg / cm ^2	0.02	1
451	Common floor 3	STORAGE south tub	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.02	mg / cm ^2	0.03	1
452	Common floor 3	STORAGE south tub	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1.16
453	Common floor 3	STORAGE south tub	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.02	mg / cm ^2	0.02	1.55
454	Common floor 3	STORAGE south tub	DOOR	BROWN	WOOD	B	INTACT	Negative	0	mg / cm ^2	0.02	1
455	Common floor 3	STORAGE south tub	DOOR CASING	BROWN	METAL	B	INTACT	Negative	0.07	mg / cm ^2	0.09	1.56
456	Common floor 3	STORAGE south tub	BASEBOARD	BROWN	VINYL	B	INTACT	Negative	0.07	mg / cm ^2	0.08	2.08
457	Common floor 3	STORAGE south tub	FLOOR	WHITE	VINYL TILES		INTACT	Negative	0	mg / cm ^2	0.02	1.45
458	Common floor 2	tub bathroom	CEILING	WHITE	DRYWALL		INTACT	Negative	0.02	mg / cm ^2	0.03	1.04
459	Common floor 2	tub bathroom	WALL	WHITE	DRYWALL	A	INTACT	Negative	0.02	mg / cm ^2	0.04	1
460	Common floor 2	tub bathroom	WALL	WHITE	DRYWALL	B	INTACT	Negative	0.03	mg / cm ^2	0.05	1.55
461	Common floor 2	tub bathroom	WALL	WHITE	DRYWALL	C	INTACT	Null	0.01	mg / cm ^2	0.02	1.03
462	Common floor 2	tub bathroom	WALL	WHITE	DRYWALL	C	INTACT	Negative	0.01	mg / cm ^2	0.02	1.06

TABLE 1

Downloaded XRF Readings

Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

Date and Time of XRF Readings: March 1, 2018, 09:48-19:10; March 8, 2018, 08:05-17:34; March 12, 2018, 10:16-16:41

Niton, Serial # 25591, Source Model: XLp 300A

Source and Age of XRF Device: Cd 109-40mCi, 11/15/16 , NIST SRM Number: 2573.

No.	SITE	ROOM	COMPONENT	COLOR	SUBSTRATE	SIDE	CONDITION	Results	PbC	Units	PbC Error	Depth Index
463	Common floor 2	tub bathroom	WALL	WHITE	DRYWALL	D	INTACT	Negative	0.01	mg / cm ^2	0.02	1
464	Common floor 2	tub bathroom	DOOR	BROWN	WOOD	D	INTACT	Negative	0	mg / cm ^2	0.02	1
465	Common floor 2	tub bathroom	DOOR CASING	BROWN	METAL	D	INTACT	Negative	0.1	mg / cm ^2	0.11	1.86
466	Common floor 2	tub bathroom	TUB	WHITE	METAL	C	INTACT	Positive	34.3	mg / cm ^2	16.7	2.01
467	Common floor 2	tub bathroom	WALL	WHITE	CEILING TILES	C	INTACT	Negative	0	mg / cm ^2	0.03	1
468	Common floor 2	tub bathroom	WALL	BLUE	CERAMIC TILES	C	INTACT	Negative	0	mg / cm ^2	0.02	1
469	Common floor 2	tub bathroom	WALL	BLUE	CERAMIC TILES	C	INTACT	Negative	0.03	mg / cm ^2	0.09	2.54
470	Common floor 2	tub bathroom	BASEBOARD	BLUE	LINOLEUM	A	INTACT	Negative	0	mg / cm ^2	0.02	1
471	Common floor 2	tub bathroom	FLOOR	BLUE	LINOLEUM		INTACT	Negative	0	mg / cm ^2	0.02	1
472			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.09
473			CALIBRATION CHECK					Negative	0.9	mg / cm ^2	0.1	1.03
474			CALIBRATION CHECK					Positive	1	mg / cm ^2	0.1	1.07

Table Definitions

Components - Each room equivalent is made up of components. Components in a room include the ceiling, floor, walls, a door and its casing, the window sash, and window casings, etc. In general, the first occurrence of a component moving from corner to corner on each wall is tested, and represents all components of that type in the room. If multiples of a component type are observed, the first occurrence moving from corner to corner on each wall is labeled component 1, the second component is labeled component 2, etc. (e.g. door 1, then door 2 or window 1, then window 2).

Substrate - The substrate is the material underneath the paint. Many substrates exist, however, the HUD Final Guidelines recommend classifying substrates into one of six substrate types: brick, concrete, drywall, metal, plaster, and wood. These substrate types are intended to include a broad range of materials. If the true substrate is not one of the six types, the substrate that most closely matches the true substrate is selected.

Side - Walls are listed in each room by letter with wall "A" being closest to the street of address, proceeding clockwise to "B, C, D" etc. For interior apartment units and common areas, wall "A" is recorded as closest wall to the common hallway entry and proceeding clockwise to "B, C, D".

Condition – The condition of paint is evaluated as poor, fair, or intact.

Room - A room equivalent is identified as a room, a house exterior, a foyer, staircase, hallway, or an exterior area. Closets or other similar areas adjoining rooms are not considered as separate room equivalents unless they are obviously dissimilar from the adjoining room equivalent. Room equivalents are generally listed by number, starting with the 1st room on the main entrance and proceeding clockwise on each floor. Refer to drawings to confirm room number assignments.

Results - HUD and the United States Environmental Protection Agency (EPA) guidelines specify a positive determination of lead in paint when the lead content is equal to or greater than 1.0 milligrams of lead per square centimeter of painted surface (mg/cm^2) when measured by X-ray Fluorescence (XRF). A null reading indicates a longer measuring time is needed for determining a negative or positive result.

Depth Index – The depth index is a numerical value indicating the amount of non-leaded paint covering the lead (if any) detected by the analyzer.

- A depth index of less than 1.5 indicates a reading very near the surface.
- A depth index between 1.6 and 4.0 indicates a moderate depth.
- A depth index of greater than 4.0 indicates a deeply buried reading.

PbC – Pb is the chemical symbol for lead. The C stands for Combined K+L shell readings. X-ray fluorescence (XRF) technology works at the atomic level by releasing photons that dislodge electrons from an atom. Electrons within an atom exist in electron shells, which are labeled K, L, M, N, O, P, and Q. The analyzer provides K shell, L shell and combined (K+L shell) readings.

TABLE 2

Calculated Percentages for Lead-Based Building Components
Empire Apartments• 54 4th Street North, St. Cloud, MN 56303

building component	total # of positive readings	total # of negative readings	total # of readings	approximate %
white popcorn ceiling	48	67	115	47%
carpet flooring	24	50	74	32%
white/beige vinyl floor tiles	2	30	32	6%
brown/beige linoleum flooring	4	52	56	7%
brown vinyl baseboards	15	61	76	20%
hallway walls by windows	6	28	34	21%

Lead Safe Work Practices

Federal law (*Lead Renovation, Repair and Painting Rule; 40 CFR §745, Subpart E*) requires contractors that disturb painted surfaces in homes, child care facilities and schools built before 1978 to be certified and follow specific work practices to prevent lead contamination. Always ask to see your contractor's certification. Firms must be certified by EPA and use certified renovators who are trained by EPA-approved training providers to follow lead-safe work practices.

Federal law requires that individuals receive certain information before renovating more than six square feet of painted surfaces in a room for interior projects or more than twenty square feet of painted surfaces for exterior projects or window replacement or demolition in housing, child care facilities and schools built before 1978.

- Homeowners and tenants: renovators must give you this pamphlet before starting work.
- Child care facilities, including preschools and kindergarten classrooms, and the families of children under six years of age that attend those facilities: renovators must provide a copy of this pamphlet to child care facilities and general renovation information to families whose children attend those facilities.

Lead safe work practices shall be followed when any lead-based paints are disturbed during renovation or repair work. Before lead hazard reduction, all work areas should be prepped with drop cloths and dust containment barriers. The work area shall be cleaned on a daily basis to remove paint chips and dust. At the conclusion of work, all walls, trim and floors not freshly painted shall be wet washed and vacuumed or vacuumed with a high efficiency particle accumulator vacuum (HEPA) to remove remaining dirt. For exterior paint scraping, tarps or plastic sheeting must be used to collect paint chips. Paint chips and dust must be double-bagged and disposed of properly. Occupants should not be present during lead hazard reduction. The dwelling unit should not be reoccupied until clearance has been achieved.

Minnesota Statutes 144.9501-9509 require any contractor who abates lead-based paint as regulated lead work to have a Minnesota Lead Abatement License. Each member of the work crew must be a licensed lead worker. Lead abatement licenses are issued by the Minnesota Department of Health (651-215-0890).

Minnesota Rules, Chapters 4671, require that a licensed lead supervisor must notify the Minnesota Department of Health (MDH) by mail or fax at least five working days before starting any regulated lead work. A property owner who intends to perform lead hazard reduction must notify MDH by mail or fax at least ten working days before starting regulated lead work.

Disclosure

The Federal Residential Lead-Based Paint Hazard Reduction Act, 42 U.S.C. 4852d, requires sellers and landlords of most residential housing built before 1978 to disclose all available records and reports concerning lead-based paint and/or lead-based paint hazards, including the test results contained in this notice, to purchasers and tenants at the time of sale or lease or upon lease renewal. This disclosure must occur even if hazard reduction or abatement has been completed. Sellers and Landlords are also required to provide the pamphlet "Protect Your Family from Lead in Your Home" or another similar document approved by the EPA. Sample forms and pamphlets can be obtained from the EPA or HUD website and duplicated as necessary. To find out more information about your obligations under federal lead-based paint requirements call 1-800-424-LEAD.

Asbestos Operations & Maintenance (O&M) Plan

Empire Apartments

54 4th Avenue North, St. Cloud, MN 56303



Submitted to:

St. Cloud HRA

Submitted by:

Environmental Health Testing Services

Certified Asbestos Firm License No.: AC791

EHTS Project Number: 014-18-F

Submittal Date: November 10, 2022

EHTS Environmental Health Testing Services

November 10, 2022

Mr. Paul Soenneker
St. Cloud Housing and Redevelopment Authority
1225 West St. Germain Street
St. Cloud, Minnesota 56301

Telephone: 320-252-0880 (Office), 320-202-3147 (Direct)
E-mail: psoenneker@stcloudhra.com

RE: Asbestos O&M Plan
54 4th Avenue North, St. Cloud, MN 56303
EHTS Project No.: 014-18-F

Dear Mr. Soenneker:

Per your authorization, an Asbestos Operations & Maintenance (O&M) has been prepared for the above referenced property. This plan includes specific work practices, management of ACM impacted during emergency or natural disaster events, waste management, training, ongoing monitoring and record keeping.

We appreciate the opportunity to provide our professional services to you for this project. If you have any questions regarding this plan, I may be contacted at 952.297-5169.

Sincerely,

Environmental Health Testing Services

Kristine Stahl

Asbestos Inspector, MDH No. AI8690
Asbestos Site Supervisor, MDH No. AS8690
Asbestos Management Planner, MDH No. AM8690

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Appendix A: Figure: Site Location Map

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Appendix D: Table 2: Inventory of Suspect Asbestos-Containing Materials with Laboratory Analytical Results & Laboratory Analytical Report

Appendix E: Photographs - Apartment Unit Kitchen & Bathroom Flooring

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Form FWS 3-2430 Asbestos Inspection Form
Form FWS 3-2431 Awareness Training
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1.0 Summary

This Operations & Management (O&M) Plan has been prepared to control exposure of asbestos fibers for building occupants, employees and contractors at Empire Apartments located at 54 4th Street North, St. Cloud, Minnesota (subject site.) In order to properly manage ACM and PACM identified at the subject site, this plan includes specific work practices, management of ACM impacted during emergency or natural disaster events, waste management, training, ongoing monitoring and record keeping.

Empire Apartments is a 1971-constructed ten-story apartment building with an asphalt parking lot. The structure includes a total of eighty-nine apartment units; one two-bedroom unit and eighty-eight one-bedroom units. Common areas within the building includes an office, a community room, a community kitchen, two stairways, two restrooms, a lobby, a meeting room, a mechanical room, a riser room, two elevators and a shop/mechanical room.

Asbestos-containing material (ACM) and presumed asbestos-containing material (PACM), an asbestos content of more than one percent (1%), identified at the subject site includes the following:

Asbestos Containing Materials (ACM)	**Location/s**
Popcorn ceiling texture & leveling/seam compound present on the concrete deck underlying the ceiling	Throughout the building with the exception of the 2021 fire abated units and common areas. A list of areas with materials previously abated are shown on Table 1.
Wall texture	ACM wall texture is present on a portion of the walls located across from the elevators on floors 2 thru 10.
9x9 vinyl floor tile & black mastic	Storage rooms, rubbish rooms and possibly under carpeted areas within apartment units **Note: Observation of underlying flooring throughout the apartment units was limited due to the carpeting strongly adhered with a thick layer of mastic. It is possible 9x9-inch floor tile and black mastic identified as ACM exists under carpeted areas.**
Tan & black floor mastic	2nd floor laundry room
Drywall joint compound & white material underlying drywall tape	Throughout the building. Joint compound at Empire Apartments contains an asbestos content of 3% and less than 1% as a composite sample with the wallboard. Since MDH and EPA considers joint compound applied to wallboard as one material forming a wall system, a composite result of less than 1% indicates the wall system is not an asbestos-containing material in accordance with MDH ad MPCA regulations.
White elbow wrap insulation (presumed)	Throughout the building **Note: White pipe wrap with underlying fiberglass insulation is non-ACM.**

2.0 PROJECT INFORMATION

2.1 **Property Information**

Empire Apartments, located at 54 4th Avenue North, St. Cloud, Minnesota, is a 1971-constructed ten-story apartment building with an asphalt parking lot. The structure includes a total of eighty-nine apartment units; one two-bedroom unit and eighty-eight one-bedroom units. Common areas within the building includes an office, a community room, a community kitchen, two stairways, two restrooms, a lobby, a meeting room, a mechanical room, a riser room, two elevators and a shop/mechanical room.

In August of 2021, a fire occurred in unit 901 activating the fire system, which subsequentially caused water damage to the units and common areas below.

IS ASBESTOS BANNED IN THE UNITED STATES?

No. The U.S. continues to import and use asbestos. There are no asbestos exemptions for building based on the year of construction. Asbestos surveys must include all suspect ACM (asbestos containing materials) regardless of age.

2.2 **Asbestos Surveys & Sampling**

The following asbestos surveys/sampling reports for Empire Apartments were reviewed for this project:

- Asbestos Survey, Wilson Building and Empire Building, St. Cloud, MN; prepared by Braun Intertec; dated December 13, 1990. The survey identified boiler breeching insulation, hot water tank insulation, spray-on ceiling texture and 9”x9” floor tile as ACM. Pipe fitting insulation on fiberglass pipe, boiler water box insulation, sheetrock and 2’x4’ ceiling panels were identified as non-ACM. No boiler or hot water tank insulation was noted during a recent inspection of the building. It is possible the insulation has been abated, although no records or reports of the abatement have been attained.
- The following surveys and reports were conducted in response to the fire in apartment 901 in August of 2021:
    - Limited Asbestos Study, 54 Fourth Avenue N., Saint Cloud, MN; prepared by Techtron; Techtron No. 17850; dated September 14, 2021.
    - Limited Asbestos Sampling Report, Empire Apartments, 54 4th Avenue North, St. Cloud, MN 56303. Prepared by EHTS; EHTS No.:014-18-E-1; dated October 20, 2021.
    - Asbestos Abatement Oversight & Air Monitoring Report, Empire Apartments, 54 4th Avenue North, St. Cloud, MN 56303; Prepared by EHTS; EHTS No. 014-18-E-2; dated April 6, 2022.

      Damaged building materials varied throughout the impacted areas and included ceiling texture, drywall walls, baseboards, and flooring. A limited asbestos survey of the building materials within the fire and/or water-damaged units determined ACM (building materials with an asbestos content of greater than 1% asbestos) consisted of the ceiling texture throughout the structure, select flooring, the drywall joint compound and the pipe elbow

wrap. Abatement of the ACM was conducted by Bieniek's Abatement Services with oversight and air monitoring conducted by Environmental Health Testing Services (EHTS) in 2021 and 2022. A list of the abated materials and locations at Empire Apartments is shown on Table 1, Abatement Summary - List of Abated Materials and Locations, Appendix B.

- Limited Asbestos Survey, Empire Apartments, 54 4th Avenue North, St. Cloud, MN 56303; Prepared by EHTS; October of 2022. The subject site was surveyed for additional asbestos-containing materials (ACM) in October of 2022 by Kristine Stahl, Certified Asbestos Inspector #AI8690 (MDH Inspector Certifications and Laboratory Certificate, Appendix C), in accordance with the Minnesota Department of Health Asbestos Abatement Rules (MR Chapter 4620), and the Pre-Renovation and Demolition Rule (Minn. R. 7035.0805.)

  The survey involved an inspection of each apartment unit, the common areas and the utility rooms within the structure for an inventory of the building materials and their conditions throughout the structure. Wall and ceiling building materials were generally homogeneous throughout consisting of drywall with popcorn ceiling texture. The exception was an approximate 100 square foot area of textured wall material present in the hallways (floors 2 thru 10) across from the elevator doors.

  Living room and bedroom flooring throughout the units were carpeted. At the time of the survey, the carpeted areas within the apartment living rooms and bedrooms, were securely adhered to the floor with a thick layer of carpet mastic, which limited observation of underlying flooring. Therefore, effort or care should be taken during repair or restoration of flooring within the carpeted areas to determine if underlying flooring materials are present. It is possible 9x9 floor tile and/or black mastic previously identified as ACM exists within the carpeted areas.

  DISCRETE SAMPLING

  Discrete asbestos sampling involves collecting small quantity of building materials behind or along other building materials or appliances in order to maintain the integrity of the building components. Effort or care should be taken during repair or restoration of flooring within the carpeted areas to determine if underlying flooring materials are present, since it is possible 9x9 floor tile and/or black mastic previously identified as ACM exists within these areas.

  Kitchen and bathroom flooring throughout the units varied some with a majority consisting of vinyl sheeting. Due to the variation of kitchen and bathroom flooring materials, photographs were taken to maintain an accurate inventory of flooring within the units. Photographs of the kitchen and the bathroom flooring within each unit and are provided in Appendix E (Photographs – Apartment Unit Kitchen & Bathroom Flooring.)

The limited survey included discrete bulk sampling. Bulk sampling was performed in general accordance with the sampling protocols established in the Code of Federal Regulations (CFRJ) 40, Section 763, Subpart E. Ninety-eight (98) bulk samples were collected and submitted to Crisp Analytical, an accredited NVLAP laboratory for analysis using polarized light microscopy (EPA 600/R-93/116 Method.) Laboratory analysis results indicate the presence of asbestos in flooring, wall and ceiling materials. Sampling information, including materials and sample locations, is summarized on Table 2, *Inventory of Suspect Asbestos-Containing Materials with Laboratory Analytical Results* & Laboratory Analytical Report, Appendix D.

3.0 ACM LOCATIONS

Identified ACM and PACM at Empire Apartments includes the following:

Asbestos Containing Materials (ACM)	**Location/s**
Popcorn ceiling texture & leveling/seam compound present on the concrete deck underlying the ceiling	Throughout the building with the exception of the 2021 fire abated units and common areas. A list of areas with materials previously abated are shown on Table 1.
Wall texture	ACM wall texture is present on a portion of the walls located across from the elevators on floors 2 thru 10.
9x9 vinyl floor tile & black mastic	Storage rooms, rubbish rooms and possibly under carpeted areas within apartment units **Note: Observation of underlying flooring throughout the apartment units was limited due to the carpeting strongly adhered with a thick layer of mastic. It is possible 9x9-inch floor tile and black mastic identified as ACM exists under carpeted areas.**
Tan & black floor mastic	2nd floor laundry room
Drywall joint compound & white material underlying drywall tape	Throughout the building. Joint compound at Empire Apartments contains an asbestos content of 3% and less than 1% as a composite sample with the wallboard. Since MDH and EPA considers joint compound applied to wallboard as one material forming a wall system, a composite result of less than 1% indicates the wall system is not an asbestos-containing material in accordance with MDH ad MPCA regulations.
White elbow wrap insulation (presumed)	Throughout the building **Note: White pipe wrap with underlying fiberglass insulation is non-ACM.**

The asbestos in these materials does not constitute a health hazard if left undisturbed.

4.0 O&M Project Leader/Facility Manager

This plan requires a designated O&M Project Leader/Facility Manager to perform the following:

- Notify building employees, tenants who will occupy the area, and contractors bidding work in the building of the presence, location, and physical condition of the ACM, and stress the need to avoid disturbing the material.
- Distribute written notices, post signs or labels on ACM where employees can see them, and make the O&M Plan available to anyone who might work on or disturb the ACM. All warning signs and labels posted on areas containing asbestos must comply with OSHA regulations in 29 CFR 1910.1001(j) (3) and (4).
- Make sure contractors who may come in contact with ACM or PACM are aware of this material by having them review the O&M plan and sign the Contractor Notification Form for Asbestos (see FWS Form 3-2432, Appendix G).

5.0 EMPLOYEE TRAINING & NOTIFICATION

All maintenance, custodial, and other employees who may disturb asbestos during their normal job duties must complete a minimum of 2 hours of asbestos awareness training BEFORE they begin duties where there is a potential for contact. This training is taken annually.

Awareness training should include such topics as:

- Background information on asbestos,
- Health effects of asbestos,
- Worker protection programs,
- Locations of ACM and PACM at the facility,
- Recognition of ACM and PACM damage and deterioration,
- The O&M plan for the facility, and
- Proper response to fiber release episodes.

Online asbestos awareness training courses are available to provide certificates of completion and meet the requirements of OSHA 29 CFR 1910.1001(j)(7)(iv).

6.0 SAFE WORK PRACTICES

It is important to minimize the disturbance of ACM and the subsequent release of asbestos fibers. You can accomplish this by staying out of physical contact with materials that contain, or are presumed to contain, asbestos. Whenever maintenance, custodial, or other employees perform work in areas where ACM or PACM is present, they must use appropriate work practices and protective measures to minimize the potential to disturb the ACM/PACM. This includes using wet methods (such as applying

water to ACM with a low-pressure sprayer); isolating area/s; and avoiding certain activities such as sawing, sanding, or drilling around ACM/PACM.

All personnel at Empire Apartments must observe the following work practices to avoid or minimize fiber release during activities that may affect ACM/PACM:

- **Do not** drill holes into material containing asbestos;
- **Do not** hang pictures, signs (except asbestos warning signs), clothing, plants, or any other articles on structures covered with materials containing asbestos;
- **Do not** sand, saw, or grind floor tiles, hard board panels, or other materials that may contain asbestos;
- **Do not** damage materials containing asbestos while moving furniture or other objects;
- **Do not** install curtains, drapes, or dividers in a way that will damage materials containing asbestos;
- **Do not** dust floors, ceilings, moldings, or other surfaces with a dry brush or sweep with a broom in an environment containing asbestos;
- **Do not** use an ordinary vacuum to clean up debris containing asbestos;
- **Do not** remove ceiling tiles below materials containing asbestos without wearing proper respiratory protection, clearing the area of other people, and observing asbestos waste disposal procedures;
- **Do not** remove ventilation system filters in a dry state; and
- **Do not** shake ventilation system filters.

The following are specific work practices based on activity and ACM type. The Work Practice Worksheets are provided in Appendix F. **For tasks not listed and involving the disturbance of ACM or PACM, please check with the O&M Project Leader/Facility Manager.** A licensed abatement contractor may be required to abate the material prior to the activity.

6.1 General Cleaning

Activity	Attachment (Appendix F)
Cleaning room that has asbestos-containing dust	WP-01
Cleaning up debris	WP-02

6.2 Drywall Joint Compound

Activity	Attachment (Appendix F)
Cutting or drilling ACM drywall with drywall compound	WP-03
Removing a section of asbestos-containing drywall	WP-04

6.3 Hallway Wall Texture, Ceiling Texture & Underlying Joint/Leveling Deck Compound

Work practices for ACM ceiling texture and underlying joint/leveling compound include the following:

Activity	Attachment (Appendix F)
Repairing damaged wall or ceiling texture	WP-05
Attaching an item to textured wall or ceiling	WP-06
Repairing or replacing an item on textured wall or ceiling with NO DISTURBANCE	WP-07
Repair or replace an item on textured wall or ceiling with LITTLE DISTURBANCE	WP-08
Repair or replace item MAY DISTURB ceiling or wall	WP-09
Installing cables in plemum space with NO DEBRIS PRESENT	WP-10
Installing cables in plemum space with LITTLE DEBRIS PRESENT	WP-11
Clean room with wall or ceiling texture with NO DEBRIS PRESENT	WP-12
Painting wall or ceiling texture PREVIOSUL PAINTED	WP-13
Painting wall or ceiling texture NOT PREVIOUSLY PAINTED	WP-14

6.4 Floor Tile & Black Mastic

Work practices for ACM floor tile and/or black floor tile mastic include the following:

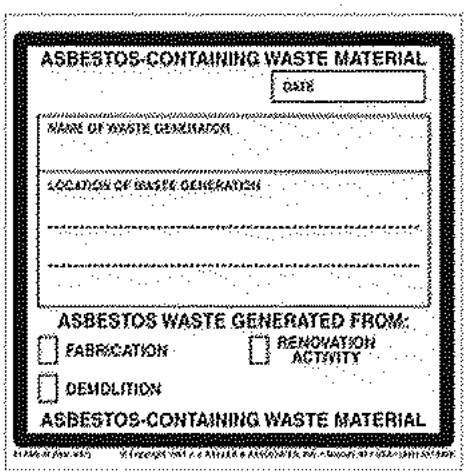
Activity	Attachment (Appendix F)
Installing flooring or carpet over asbestos flooring	WP-15
Wet strip wax from asbestos floor tiles	WP-16
Buffering asbestos floor tiles	WP-17
Cleaning asbestos floor tiles	WP-18
Removing carpet over asbestos floor tiles STRONGLY ADHERED	WP-19
Removing carpet over asbestos floor tiles WEAKLY ADHERED	WP-20

6.5 Elbow Pipe Wrap

The disturbance of elbow pipe wrap at Empire Apartments will require laboratory asbestos analysis and/or abatement by a licensed abatement contractor prior to any activity.

7.0 WASTES

Wastes with asbestos debris must meet NESHAP wetting and labeling requirements. In general, waste collection, processing, packaging and transporting asbestos-containing waste must yield no visible emissions of asbestos to the outside air. This may be accomplished by adequately wetting asbestos-containing waste and sealing it in double-lined leak-tight bag with OSHA asbestos warning labels. The labels shall include the names of the waste generator and the location of waste generation and placed within a designated area at Empire Apartments until transported and disposed of at a permitted landfill by a certified asbestos abatement contractor.



8.0 EMERGENCIES & NATURAL DISASTERS

Areas with damaged ACM due to emergency or natural disaster events will require containment as soon as the area has been controlled. This can be accomplished by contracting a licensed abatement contractor to build containment in the affected area/s. The construction of containment typically involves covering the walls, the ceiling and the flooring with poly and setting up negative air machines to assure asbestos fibers are not dispersed throughout the structure. It is not necessary for abatement to be performed consecutively with containment, since the negative air machines can be rented and run allowing abatement to be scheduled at a later date.

9.0 MONITORING & RECORD KEEPING

The ACM identified in the inventory is subject to deterioration with age, the effects of building occupancy, and accidental damage. To monitor the condition of the ACM, the O&M Project Leader/Facility Manager ensures that staff visually inspect the material at regular intervals (at least two times per year), and immediately report any ACM damage or deterioration.

The Project Leader/Facility Manager keeps a written record of these periodic inspections. The record must include:

- Date of inspection;
- Inspector;
- Locations inspected, such as floor level, room names, or numbers, etc.;
- Nature of ACM (pipe wrap, ceiling texture, etc.) and friability;
- Whether adequate labeling is still intact;
- Changes of status since last inspection (e.g., new damage, water damage, etc.); and
- Any recommended action(s).

The most recent inspection/risk assessment should be used as the basis for this survey. You may use the Asbestos Inspection Form (FWS Form 3-2430, Appendix G) for this inspection. Project Leaders/Facility Managers must ensure that the staff retains all facility asbestos management documents, including:

- Copies of Asbestos Hazard Emergency Response Act (AHERA) inspection and assessment reports;
- Written O&M plan;
- Semiannual ACM/PACM visual inspection records (see FWS Form 3-2430, Appendix G);
- Awareness training records (see FWS Form 3-2431, Appendix G); and
- Changes to location, condition, or quantity of the ACM/PACM.

10.0 CLOSURE

We appreciate the opportunity in providing this O&M Plan for Empire Apartments. If additional information or assistance is needed, I may be reached at 952-297-5169.

Prepared by:



_____

Kristine F. Stahl

Asbestos Inspector, MDH No. AI8690
Asbestos Site Supervisor, MDH No. AS8690
Asbestos Management Planner, MDH No. AM869

DEFINITIONS

Asbestos. Includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophylite asbestos, actinolite asbestos, and any of these minerals that have been chemically treated or altered.

Asbestos Containing Material (ACM). Any material or product that contains more than 1% asbestos.

Category I Non-friable ACM. Material such as packing, gaskets, resilient floor covering, and asphalt roofing products containing more than 1% asbestos.

Category II Non-friable ACM. Any material containing more than 1% asbestos that is not category I non-friable ACM, and that, when dry, cannot be crumbled, pulverized or reduced to powder by hand pressure. Category II ACM includes, but is not limited to: (1) Asbestos cement siding and shingles, (2) Transite panel boards, and (3) Asbestos cement pipe (asbestos cement pipe may not be limited to buildings).

Friable ACM. Any material containing more than 1% asbestos that, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure.

High-Efficiency Particulate Air (HEPA) Filter. A filter capable of trapping and retaining at least 99.97% of monodispersed particles of 0.3 micrometers or larger in diameter.

Presumed Asbestos Containing Material (PACM). Thermal System Insulation (TSI) and surfacing material found in buildings constructed before 1981 and floor tile installed in buildings through 1981 may contain asbestos. Although it is unlikely, some flooring installed after 1981 may contain asbestos. Until sampling demonstrates that the material has 1% or less asbestos, we consider these materials PACM.

Regulated Asbestos Containing Material (RACM). RACM includes:

(1) Friable asbestos material;

(2) Category I non-friable ACM that has become friable, or has been subjected to sanding, grinding, cutting, or abrading; and

(3) Category II non-friable ACM that has a high probability of becoming crumbled, pulverized, or reduced to powder during the course of demolition or renovation operations.

Vinyl Asbestos Floor Tile. When vinyl floor tile, and in some cases its mastic, contains more than 1% asbestos, it must be handled as ACM.

Three Levels of Work Practices

The three work practice levels are defined as follows:

Work Practice Level A: is work that may contact ACM, but which will not disturb it. Level A is defined in terms of Class IV work in the construction standard (29 CFR 1926.1101). It is Class IV work (except for cleanup work) with a negative exposure assessment which involves maintenance and custodial activities during which employees contact ACM and PACM, but do not disturb it. **Note that cleanup of asbestos-containing debris and waste is not Level A work (Refer to Level B for this type of cleanup work).** It is also Class II work (involving nonfriable materials such as gaskets, roofing, and cement asbestos board) with a negative exposure assessment. Work on resilient flooring is treated differently by OSHA and is described in Figure 2 "OSHA Requirements for Work Practices for Resilient Floor Covering Materials."

Work practices: required for Level A are those set forth in paragraph (g) (10) of the OSHA asbestos construction standard for Class IV work and (g)(8) and (g)(11) for Class II work. See Figure 1 for checklist of requirements

Work Practice Level B: is work that may disturb ACM, but where the OSHA PEL is not exceeded and release of ACM, dust and debris is confined to the immediate location of the disturbance. In the construction standard, it is Class III work on TSI or Surfacing ACM with a negative exposure assessment, Class IV work activities to cleanup waste and debris containing ACM and PACM with an NEA. Class III asbestos work includes repair and maintenance operations, where ACM, including thermal system insulation and surfacing material, is likely to be disturbed. Operations where TSI or surfacing are worked on using "aggressive" methods, such as drilling, cutting, abrading, etc. are Level C work, as OSHA requires area isolation for these procedures whether or not a negative exposure assessment is made. In the general industry standard, clean up of ACM waste, debris and accompanying dust that are not from construction activities, and where the PEL is not exceeded is Level B work. If the quantity of material disturbed during Class III work exceeds one 60 inch x 60 inch glovebag or waste bag, then the activity becomes Class I or II and exceeds the limitation of the work practices in this manual. Refer to the NIBS manual *Model Guide Specifications, Asbestos Abatement and Management in Buildings* for more information.

Work practices: required for Level B are those set forth in paragraph (g) (9) of the OSHA construction standard for

Class III work and (g)(7, 8 and 11) for Class II work. These include O&M training, respirators, engineering controls and work practices, wet methods, local exhaust ventilation (Note: A respirator is not required if work is on non-TSI or non-surfacing material, there is a negative exposure assessment, wet methods are used, and the material remains intact.). In the construction standard, asbestos containing debris and waste from construction activities (including O&M) are to be promptly cleaned up and disposed of in leak-tight containers. The general industry standard covers cleanup of non-construction waste, debris and accompanying dust. These must be cleaned up with wet methods and HEPA vacuums. The construction standard requires that in areas with accessible, friable TSI and surfacing material, waste or debris must be presumed to contain asbestos. See Figure 1 for checklist of requirements.

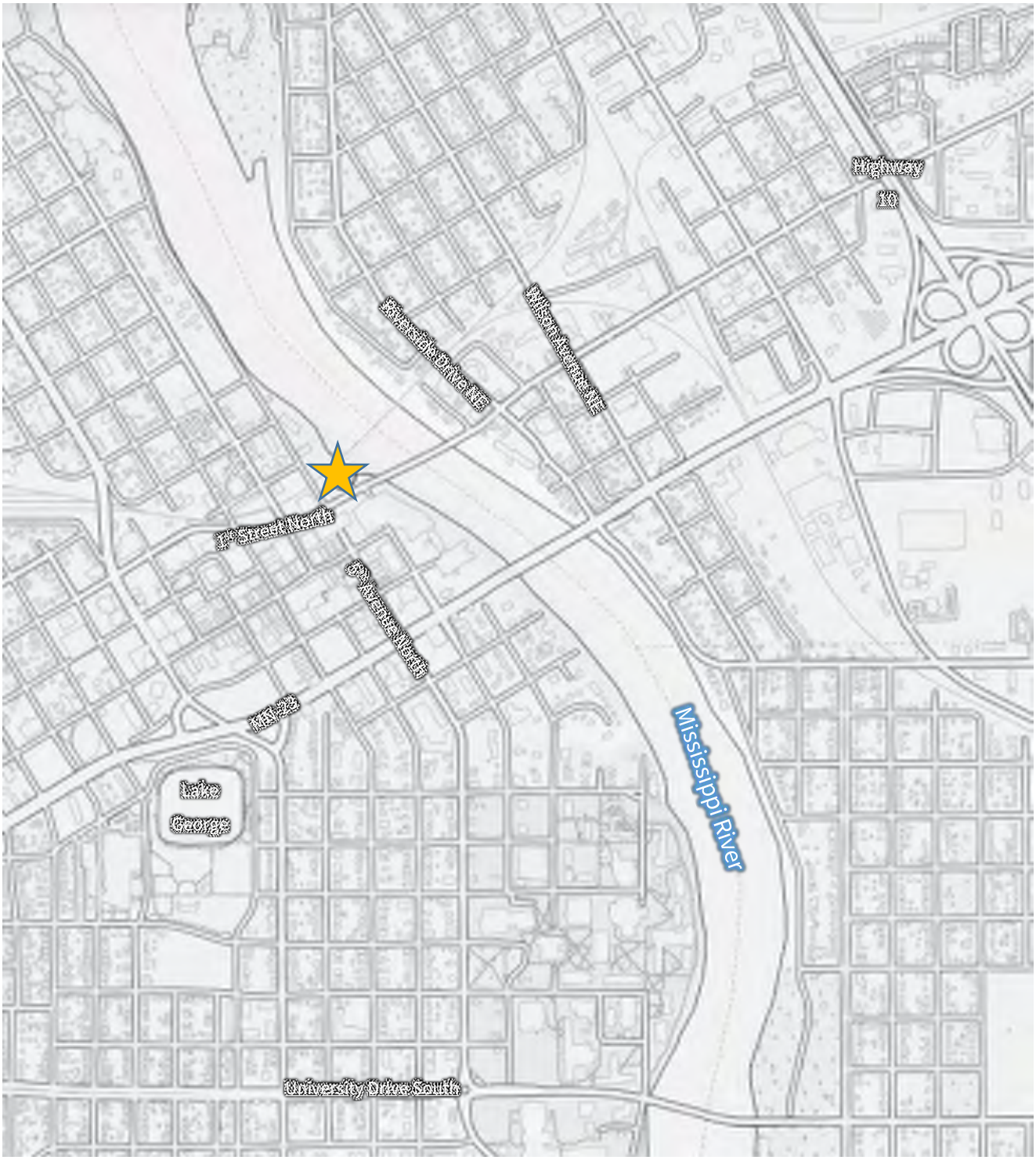
Work Practice Level C: is work where ACM is disturbed and the PEL may be exceeded or ACM, dust, and/or debris may be scattered beyond the immediate location of the disturbance. It is Class III work described in the OSHA construction standard: paragraph (g)(9)(iii) where the disturbance involves drilling, cutting, abrading, sanding, chipping, breaking, or sawing of thermal system insulation or surfacing material; or (g)(9)(iv) where there is no negative exposure assessment or where the PEL is exceeded. It is also Class II work without an NEA.

Work practices: required for Level C are mini-enclosures, glove bags and other enclosure devices set forth in paragraph (g)(5) of the construction standard as well as work practices set forth in paragraph (g)(9) of the OSHA construction standard for Class III work. These include O&M training, respirators, engineering controls and work practices, wet methods, and local exhaust ventilation. Debris and waste are to be promptly cleaned up and disposed of in leak-tight containers. See Figure 1 for checklist of requirements.
A "disturbance" of ACM, as used in the level definitions, refers to any activity that disrupts the matrix of ACM or PACM, crumbles or pulverizes ACM or PACM, or generates visible debris or dust from ACM or PACM..

Figure 1 which follows, summarizes the engineering controls and practices recommended for each level. The APM should determine the appropriate level, based on the O&M program objectives, the O&M program elements, and level of training needed for each level of work practices used in a facility.

APPENDIX A

Figure: Site Location Map



Site Location Map
Empire Apartments
54 4th Street, St. Cloud, MN 56303

Figure 1

APPENDIX B

Certifications and Licenses

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 200349-0

Crisp Analytical Laboratory

Carrollton, TX

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

Asbestos Fiber Analysis

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

2021-10-01 through 2022-09-30

Effective Dates

DEPARTMENT OF COMMERCE · UNITED STATES OF AMERICA

For the National Voluntary Laboratory Accreditation Program

NVLAP® National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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http://www.calabsinc.com

ASBESTOS FIBER ANALYSIS — NVLAP LAB CODE 200349-0

Bulk Asbestos Analysis

Code	*Description*
18/A01	EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples
18/A03	EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

Airborne Asbestos Analysis

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

For the National Voluntary Laboratory Accreditation Program

Certificate No: 5LM02182202IR *Expiration Date: February 18, 2023*

This is to certify that

Kristine F. Stahl

has attended and successfully completed an

ASBESTOS INSPECTOR

REFRESHER TRAINING COURSE

permitted by

the State of Minnesota under Minnesota Rules 4620.3702 to 4620.3722

and meets the requirements of

Section 206 of Title II of the Toxic Substances Control Act (TSCA)

conducted by

Lake States Environmental, Ltd.

in

Remotely Attended on February 18, 2022

Examination Date: February 18, 2022

Lake States Environmental, Ltd.
P. O. Box 645, Rice Lake, WI 54868
(800) 254-9811

Grant J Grosse

Training Instructor

Certificate No: 5LM02182202MPR *Expiration Date: February 18, 2023*

This is to certify that

Kristine F. Stahl

has attended and successfully completed an

ASBESTOS MANAGEMENT PLANNER
REFRESHER TRAINING COURSE

permitted by
the State of Minnesota under Minnesota Rules 4620.3702 to 4620.3722
and meets the requirements of
Section 206 of Title II of the Toxic Substances Control Act (TSCA)
conducted by

Lake States Environmental, Ltd.

in

Remotely Attended on February 18, 2022
Examination Date: February 18, 2022

Lake States Environmental, Ltd.
P. O. Box 645, Rice Lake, WI 54868
(800) 254-9811

Grant J Grosse

Training Instructor

Certificate No: 5LM01052209PDR *Expiration Date: January 5, 2023*

This is to certify that

Kristine F. Stahl

has attended and successfully completed an

ASBESTOS PROJECT DESIGNER
REFRESHER TRAINING COURSE

permitted by
the State of Minnesota under Minnesota Rules 4620.3702 to 4620.3722
and meets the requirements of
Section 206 of Title II of the Toxic Substances Control Act (TSCA)
conducted by

Lake States Environmental, Ltd.

Remotely Attended on January 5, 2022
Examination Date: January 5, 2022

Lake States Environmental, Ltd.
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(800) 254-9811

Grant J Grasse

Training Instructor

APPENDIX C

Table 1: Abatement Summary – List of Abated Materials and Locations

TABLE 1

Abatement Summary - List of Abated Materials and Locations

2021/22 Asbestos Abatement

Unit	Room/Area	Building Material
community room		partial ceiling
		pipe elbow insulation
202	entire unit	ceiling
	kitchen	flooring
	bathroom	flooring
301	living room	ceiling
303	bedroom	ceiling
403	kitchen	flooring
501	entire unit	ceiling
502	entire unit	ceiling
503	entire unit	ceiling
603	entire unit	ceiling
701	entire unit	ceiling
702	entire unit	ceiling
703	entire unit	ceiling
801	entire unit	ceiling
802	entire unit	ceiling
901 (fire unit)	entire unit	ceiling
	entire unit	black mastic
903	kitchen	flooring
	bathroom	flooring

APPENDIX D

Table 2: Inventory of Suspect Asbestos-Containing Materials with Laboratory Analytical Results & Laboratory Analytical Report

TABLE 2

Inventory of Suspect Asbestos-Containing Materials with Laboratory Analytical Results

Empire Apartments | 54 4th Street, St. Cloud, MN 56303 | Sampling Date: October 2022

Sample #	On-site Material description	Sample Location	laboratory description layer 1	asbestos content	laboratory description layer 2	asbestos content	laboratory description layer 3/composite	asbestos content
1ML0922	18"x 18" green vinyl floor tile	Main lobby by elevators	tan self-adhesive floor tile	none detected				
1BA0922	Tan top linoleum and blue underlying linoleum	1st floor common bathroom	tan linoleum	none detected	tan mastic	none detected	gray leveling compound	none detected
1GR0922	White 2x4 ceiling tile	1st floor game room	white surfacing	none detected	tan ceiling tile	none detected		
2MR0922-1	Tan sheet flooring	2nd floor meeting room	tan flooring	none detected	tan mastic	none detected	gray leveling compound	none detected
2MR0922-2	Gray window glaze	2nd floor meeting room	gray sealant	none detected				
2MR0922-3	Yellow carpet mastic	2nd floor meeting room	tan mastic	none detected				
2NS0922-1	White drywall, drywall tape & compound	2nd floor north storage room	tan surfaced white compound	2%	white compound (beneath tape)	2%	composite with non-ACM white drywall with brown paper	<1%
2NS0922-2	White popcorn ceiling texture	2nd floor north storage room	white textured surfacing	2%				
2SS0922	White popcorn ceiling texture	2nd floor south storage room	white textured surfacing	3%				
2L0922-1	Yellow baseboard mastic	2nd floor laundry room	tan mastic	none detected				
2L0922-2	Brown vinyl sheet flooring	2nd floor laundry room	tan and black mastic	2%				
2H0922	White wall texture (10 x 10 area across elevators)	2nd floor hall	white surfaced white compound	2%	composite	<1%		
3NS0922-1	White drywall, drywall tape & compound	3rd floor north storage room	tan surfaced white compound	2%	white compound (beneath tape)	2%	composite with non-ACM white drywall with brown paper	<1%
3NS0922-2	White popcorn ceiling texture	3rd floor north storage room	white textured surfacing	3%		3%		
3SS0922	white popcorn ceiling texture	3rd floor south storage room	white textured surfacing	3%				
4NS0922	White drywall, drywall tape & compound	4th floor north storage room	tan surfaced white compound	2%	white compound (beneath tape)	2%	composite with non-ACM white drywall with brown paper	<1%

TABLE 2

Inventory of Suspect Asbestos-Containing Materials with Laboratory Analytical Results

Empire Apartments | 54 4th Street, St. Cloud, MN 56303 | Sampling Date: October 2022

Sample #	On-site Material description	Sample Location	laboratory description layer 1	asbestos content	laboratory description layer 2	asbestos content	laboratory description layer 3/composite	asbestos content
4SS0922	White popcorn ceiling texture	4th floor south storage room	white textured surfacing	3%				
4NS0922	White popcorn ceiling texture	4th floor north storage room	white textured surfacing	3%				
5NS0922	White drywall, drywall tape & compound	5th floor north storage room	white textured surfacing	2%	white compound (beneath tape)	2%	composite with non-ACM white drywall with brown paper	<1%
5SS0922	White popcorn ceiling texture	5th floor south storage room	white textured surfacing	3%				
5NS0922	White popcorn ceiling texture	5th floor north storage room	white textured surfacing	3%				
506KT0922	White linoleum flooring	Unit 506, kitchen	off-white linoleum	none detected				
509BA0922	Tan linoleum flooring	Unit 509, bathroom	gray linoleum	none detected	tan mastic	none detected		
6SS0922	White popcorn ceiling texture	6th floor south storage room	white textured surfacing	3%				
6NS0922-1	White popcorn ceiling texture	6th floor north storage room	white textured surfacing	3%				
6NS0922-2	Tan vinyl 9x9 floor tile	6th floor north storage room	off-white floor tile	3%	black mastic	2%		
6NS0922-3	White drywall, drywall tape & compound	6th floor north storage room	white surfaced white compound	2%	white compound (beneath tape)	2%	composite with non-ACM white drywall with brown paper	<1%
606KT0922	Tan linoleum flooring	Unit 606, kitchen	off-white linoleum	none detected				
609BA0922	White with blue linoleum flooring	Unit 609, bathroom	off-white linoleum	none detected	tan mastic	none detected		
7SS0922	White popcorn ceiling texture	7th floor south storage room	white surfaced white compound	2%	white compound (beneath tape)	2%	composite with non-ACM white drywall with brown paper	<1%
7NS0922-1	White drywall, drywall tape & compound	7th floor north storage room	white textured surfacing	3%				
7NS0922-2	White popcorn ceiling texture	7th floor north storage room	white textured surfacing	3%				
707BA0922	Tan linoleum flooring	Unit 707, bathroom	off-white linoleum	none detected	tan mastic	none detected		
710KT0922	Tan linoleum flooring with white lines	Unit 710, kitchen	tan linoleum	none detected	tan mastic	none detected		

TABLE 2

Inventory of Suspect Asbestos-Containing Materials with Laboratory Analytical Results

Empire Apartments | 54 4th Street, St. Cloud, MN 56303 | Sampling Date: October 2022

Sample #	On-site Material description	Sample Location	laboratory description layer 1	asbestos content	laboratory description layer 2	asbestos content	laboratory description layer 3/composite	asbestos content
8NS0922-1	White popcorn ceiling texture	8th floor north storage room	white surfaced white compound	2%	white compound (beneath tape)	2%	composite with non-ACM white drywall with brown paper	<1%
8NS0922-2	White drywall, drywall tape & compound	8th floor north storage room	white textured surfacing	2%				
8R0922	White 9x9 vinyl floor tile & tan mastic	8th floor rubbish room	tan flooring	2%	black mastic	2%		
8SS0922	White popcorn ceiling texture	8th floor south storage room	white textured surfacing	2%				
806BA0922	Tan linoleum flooring	Unit 806, bathroom	tan linoleum	none detected				
810LR0922-1	Yellow baseboard mastic	Unit 810, living room	tan mastic with debris	none detected				
810LR0922-2	Yellow carpet mastic	Unit 810, living room	tan mastic with debris	none detected				
9NS0922-1	White popcorn ceiling texture	9th floor north storage room	white textured surfacing					
9NS0922-2	White drywall, drywall tape & compound	9th floor north storage room	tan surfaced off-white compound	2%			composite with non-ACM white drywall with brown paper	<1%
9SS0922	White popcorn ceiling texture	9th floor south storage room	white textured surfacing	2%				
905KT0922	White linoleum flooring	Unit 905, kitchen	tan linoleum	none detected				
907KT0922	Tan linoleum flooring	Unit 907, kitchen	tan linoleum	none detected	tan mastic	none detected		
909BA0922	White & blue linoleum flooring	Unit 909, bathroom	gray linoleum	none detected				
10NS0922	White drywall, drywall tape & compound	10th floor north storage room	tan surfaced off-white compound	2%	tan compound (beneath tape)	2%	composite with non-ACM white drywall with brown paper	<1%
10H0922-1	White popcorn ceiling texture	10th floor hall, near north storage	white textured surfacing	2%				
10H0922-2	White popcorn ceiling texture	10th floor hall, near south storage	white textured surfacing	2%				
1001LR0922	Yellow baseboard mastic	Unit 1001, living room	tan mastic with debris	none detected				

TABLE 2

Inventory of Suspect Asbestos-Containing Materials with Laboratory Analytical Results

Empire Apartments | 54 4th Street, St. Cloud, MN 56303 | Sampling Date: October 2022

Sample #	On-site Material description	Sample Location	laboratory description layer 1	asbestos content	laboratory description layer 2	asbestos content	laboratory description layer 3/composite	asbestos content
1005KT0922	Tan linoleum flooring	Unit 105, kitchen	tan linoleum	none detected				
1006BA0922	Epoxy material between wall and baseboard	Unit 1006, bathroom	tan covering	none detected	tan compound with debris	2%		
1008LR0922	Yellow carpet mastic	Unit 1008, living room	tan mastic with debris	none detected				
1010KT0922	White vinyl flooring	Unit 1010, kitchen	brown linoleum	none detected	tan mastic	none detected		

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Materials Characterization - Bulk Asbestos Analysis

Laboratory Analysis Report - Polarized Light

Environmental Health Testing Services

2950 Aquila Ave South
St Louis Park, MN 55426

Customer Project: 014-18-F Empire Apartments
Reference #: CAL221010348RL Date: 10/19/22

Analysis and Method

Summary of polarized light microscopy (PLM / Stereomicroscopy bulk asbestos analysis) using the methods described in 40CFR Part 763 Appendix E to Subpart E (Interim and EPA 600 / R-93 / 116 (Improved). The sample is first viewed with the aid of a stereomicroscope. Numerous liquid slide preparations are created for analysis under the polarized microscope where identifications and quantifications are preformed. Calibrated liquid refractive oils are used as liquid mouting medium. These oils are used for identification (dispersion staining). A calibrated visual estimation is reported, should any asbestiform mineral be present. Other techniques such as acid washing are used in conjugation with refractive oils for detection of smaller quantities of asbestos. All asbestos percentages are based on calibrated visual estimation traceable to NIST standards for regulated asbestos. Traceability to measurement and calibration is achieved by using known amounts and types of asbestos from standards where analyst and laboratory accuracy are measured. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 0.50% (well above the laboratory definition of trace).

Discussion

Vermiculite containing samples may contain trace amounts of actinolite/tremolite. When not detected by PLM, these samples should be analyzed using TEM methods and / or water separation techniques. Suspected actinolite/vermiculite presence will be indicated through the sample comment section of this report.

Fibrous talc containing samples may contain a regulated asbestos fiber known as anthophyllite. Under certain conditions the same fiber may actually contain both talc and anthophyllite (a phenomenon called intergrowth). Again, TEM detection methods are recommended. CA Labs PLM report comments will denote suspected amounts of asbestiform anthophyllite with talc, where further analysis is recommended.

Some samples (floor tiles, surfacings, etc.) may contain fibers too small to be detectable by PLM analysis and should be analyzed by TEM bulk protocols.

A "trace asbestos" will be reported if the analyst observes far less than 1% asbestos. CA Labs defines "trace asbestos" as a few fibers detected by the analyst in several preparations and will indicate as such under these circumstances.

Since allowable variation in quantification of samples close to 1% is high, <1% may be reported. Such results are ideal for point counting, and the technique is mandatory for friable samples (NESHAP, Nov. 1990 and clarification letter 8 May 1991) under 1% percent asbestos or "trace asbestos". **In order to make all initial PLM reports issued from CA Labs NESHAP compliant, all <1% asbestos results (except floor tiles) will be point counted at no additional charge.**

Qualifications

CA Labs is accredited by the National Voluntary Accreditation Program (NVLAP) for selected test methods for airborne fiber analysis (TEM), and for bulk asbestos fiber analysis (PLM). CA Labs is also accredited by AIHA LAP, LLC. in the PLM asbestos field of testing for Industrial Hygiene. All analysts have completed college courses or hold a degree in a natural science (geology, biology, or environmental science). Recognition by a state professional board in one these disciplines is preferred, but not required. Extensive in-house training programs are used to augment the educational background of the analyst. The Laboratory Director and Quality Manager have received supplemental McCrone Research training for asbestos identification. Analysis performed at Crisp Analytical Labs, LLC 1929 Old Denton Road Carrollton, TX 75006

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235
AIHA LAP, LLC Laboratory #102929

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Phone 225-751-5632
Fax 225-751-5634

Overview of Project Sample Material Containing Asbestos

Customer Project: 014-18-F Empire Apartments **CA Labs Project #:** CAL221010348RL

Laboratory Sample ID	Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types
89527	2NS0922-1	*2NS0922-1-1*	*tan surfaced white compound*	***2% Chrysotile***	***tan surfaced white compound***
					white compound (beneath tape)
					composite of layers 1, 2, and 3
89527		*2NS0922-1-2*	*white compound (beneath tape)*	***2% Chrysotile***	***white textured surfacing***
					tan and black mastic
					white surfaced white compound
					composite of layers 1 and 2
89527		*2NS0922-1-4*	*composite of layers 1, 2, and 3*	***<1% Chrysotile***	***off-white floor tile***
					tan flooring
					tan surfaced off-white compound
89528	2NS0922-2	*2NS0922-2-1*	*white textured surfacing*	***2% Chrysotile***	***tan compound (beneath tape)***
					tan compound with debris
					black mastic
89529	2SS0922	*2SS0922-1*	*white textured surfacing*	***3% Chrysotile***	
89531	2L0922-2	*2L0922-2-2*	*tan and black mastic*	***2% Chrysotile***	
89532	2H0922	*2H0922-1*	*white surfaced white compound*	***2% Chrysotile***	
89532		*2H0922-3*	*composite of layers 1 and 2*	***<1% Chrysotile***	

Dallas NVLAP Lab Code 200349-0 TEM/PLM *TCEQ# T104704513-15-3* *TDH 30-0235*

AIHA LAP, LLC Laboratory #102929

Glossary of abbreviations (non-asbestos fibers and non-fibrous minerals):

ca - carbonate
gypsum - gypsum
bi - binder
or - organic
ma - matrix
mi - mica
ve - vermiculite
ot - other
pe - perlite
qu - quartz
fg - fiberglass
mw - mineral wool
wo - wollastinite
ta - talc
sy - synthetic
ce - cellulose
br - brucite
ka - kaolin (clay)
pa - palygorskite (clay)

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Overview of Project Sample Material Containing Asbestos

Customer Project: 014-18-F Empire Apartments **CA Labs Project #:** CAL221010348RL

Laboratory Sample ID	Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types
89533	3NS0922-1	*3NS0922-1-1*	*tan surfaced white compound*	***2% Chrysotile***	
89533		*3NS0922-1-2*	*white compound (beneath tape)*	***2% Chrysotile***	
89533		*3NS0922-1-4*	*composite of layers 1, 2, and 3*	***<1% Chrysotile***	
89534	3NS0922-2	*3NS0922-2-1*	*white textured surfacing*	***3% Chrysotile***	
89535	3SS0922	*3SS0922-1*	*white textured surfacing*	***3% Chrysotile***	
89536	4NS0922	*4NS0922-1*	*tan surfaced white compound*	***2% Chrysotile***	
89536		*4NS0922-2*	*white compound (beneath tape)*	***2% Chrysotile***	
89536		*4NS0922-4*	*composite of layers 1, 2, and 3*	***<1% Chrysotile***	

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

AIHA LAP, LLC Laboratory #102929

Glossary of abbreviations (non-asbestos fibers and non-fibrous minerals):

ca - carbonate
gypsum - gypsum
bi - binder
or - organic
ma - matrix
mi - mica
ve - vermiculite
ot - other
pe - perlite
qu - quartz
fg - fiberglass
mw - mineral wool
wo - wollastinite
ta - talc
sy - synthetic
ce - cellulose
br - brucite
ka - kaolin (clay)
pa - palygorskite (clay)

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Overview of Project Sample Material Containing Asbestos

Customer Project: 014-18-F Empire Apartments **CA Labs Project #:** CAL221010348RL

Laboratory Sample ID	Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types
89537	4SS0922	*4SS0922-1*	*white textured surfacing*	***3% Chrysotile***	
89538	4NS0922	*4NS0922-1*	*white textured surfacing*	***3% Chrysotile***	
89539	5NS0922	*5NS0922-1*	*white textured surfacing*	***2% Chrysotile***	
89539		*5NS0922-2*	*white compound (beneath tape)*	***2% Chrysotile***	
89539		*5NS0922-4*	*composite of layers 1, 2, and 3*	***<1% Chrysotile***	
89540	5SS0922	*5SS0922-1*	*white textured surfacing*	***3% Chrysotile***	
89541	5NS0922	*5NS0922-1*	*white textured surfacing*	***3% Chrysotile***	
89544	6SS0922	*6SS0922-1*	*white textured surfacing*	***3% Chrysotile***	

Dallas NVLAP Lab Code 200349-0 TEM/PLM *TCEQ# T104704513-15-3* *TDH 30-0235*

AIHA LAP, LLC Laboratory #102929

Glossary of abbreviations (non-asbestos fibers and non-fibrous minerals):

ca - carbonate
gypsum - gypsum
bi - binder
or - organic
ma - matrix
mi - mica
ve - vermiculite
ot - other
pe - perlite
qu - quartz
fg - fiberglass
mw - mineral wool
wo - wollastinite
ta - talc
sy - synthetic
ce - cellulose
br - brucite
ka - kaolin (clay)
pa - palygorskite (clay)

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CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Overview of Project Sample Material Containing Asbestos

Customer Project: 014-18-F Empire Apartments **CA Labs Project #:** CAL221010348RL

Laboratory Sample ID	Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types
89545	6NS0922-1	*6NS0922-1-1*	*white textured surfacing*	***3% Chrysotile***	
89546	6NS0922-2	*6NS0922-2-1*	*off-white floor tile*	***3% Chrysotile***	
89546		*6NS0922-2-2*	*black mastic*	***2% Chrysotile***	
89547	6NS0922-3	*6NS0922-3-1*	*white surfaced white compound*	***2% Chrysotile***	
89547		*6NS0922-3-2*	*white compound (beneath tape)*	***2% Chrysotile***	
89547		*6NS0922-3-4*	*composite of layers 1, 2, and 3*	***<1% Chrysotile***	
89550	7SS0922	*7SS0922-1*	*white surfaced white compound*	***2% Chrysotile***	
89550		*7SS0922-2*	*white compound (beneath tape)*	***2% Chrysotile***	

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Laboratory Sample ID	Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types
89550		*7SS0922-4*	*composite of layers 1, 2, and 3*	***<1% Chrysotile***	
89551	7NS0922-1	*7NS0922-1-1*	*white textured surfacing*	***3% Chrysotile***	
89552	7NS0922-2	*7NS0922-2-1*	*white textured surfacing*	***3% Chrysotile***	
89555	8NS0922-1	*8NS0922-1-1*	*white surfaced white compound*	***2% Chrysotile***	
89555		*8NS0922-1-2*	*white compound (beneath tape)*	***2% Chrysotile***	
89555		*8NS0922-1-4*	*composite of layers 1, 2, and 3*	***<1% Chrysotile***	
89556	8NS0922-2	*8NS0922-2-1*	*white textured surfacing*	***2% Chrysotile***	
89557	8R0922	*8R0922-1*	*tan flooring*	***2% Chrysotile***	

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Laboratory Sample ID	Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types
89557		*8R0922-2*	*black mastic*	***2% Chrysotile***	
89558	8SS0922	*8SS0922-1*	*white textured surfacing*	***2% Chrysotile***	
89562	9NS0922-1	*9NS0922-1-1*	*white textured surfacing*	***2% Chrysotile***	
89563	9NS0922-2	*9NS0922-2-1*	*tan surfaced off-white compound*	***2% Chrysotile***	
89563		*9NS0922-2-3*	*composite of layers 1 and 2*	***<1% Chrysotile***	
89564	9SS0922	*9SS0922-1*	*white textured surfacing*	***2% Chrysotile***	
89568	10NS0922	*10NS0922-1*	*tan surfaced off-white compound*	***2% Chrysotile***	
89568		*10NS0922-2*	*tan compound (beneath tape)*	***2% Chrysotile***	

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Overview of Project Sample Material Containing Asbestos

Customer Project: 014-18-F Empire Apartments **CA Labs Project #:** CAL221010348RL

Laboratory Sample ID	Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types
89568		*10NS0922-4*	*composite of layers 1, 2, and 3*	***<1% Chrysotile***	
89569	10H0922-1	*10H0922-1-1*	*white textured surfacing*	***2% Chrysotile***	
89570	10H0922-2	*10H0922-2-1*	*white textured surfacing*	***2% Chrysotile***	
89573	1006BA0922	*1006BA0922-2*	*tan compound with debris*	***2% Chrysotile***	

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Polarized Light Asbestiform Materials Characterization

Customer Info: **Attn:**
Environmental Health Testing Services
2950 Aquila Ave South
St Louis Park, MN 55426

Phone # 952-297-5169
Fax #

Customer Project:
014-18-F Empire Apartments
Turnaround Time:
5 Days

CA Labs Project #:
CAL221010348RL
Date: 10/19/2022
Samples Rec'd: 10/12/22 10:30am
Date Of Sampling: 9/26/2022
Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
89521	1ML0922		*1ML0922-1*	*tan self-adhesive floor tile*	*y*	***None Detected***		100% qu,gy,ma
89522	1BA0922		*1BA0922-1*	*tan linoleum*	*y*	***None Detected***	20% ce	80% gy,ma
89522			*1BA0922-2*	*tan mastic*	*y*	***None Detected***		100% gy,bi
89522			*1BA0922-3*	*gray leveling compound*	*y*	***None Detected***		100% qu,ca
89523	1GR0922		*1GR0922-1*	*white surfacing*	*y*	***None Detected***		100% qu,bi
89523			*1GR0922-2*	*tan ceiling tile*	*y*	***None Detected***	40% ce 30% fg	30% qu,pe,ca
89524	2MR0922-1		*2MR0922-1-1*	*tan flooring*	*y*	***None Detected***		100% qu,gy,ma

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
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or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Jose Matute
Analyst

Robert Olivarez
Analyst

Julio Robles
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

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Polarized Light Asbestiform Materials Characterization

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Environmental Health Testing Services
2950 Aquila Ave South
St Louis Park, MN 55426

Phone # 952-297-5169
Fax #

Customer Project:
014-18-F Empire Apartments
Turnaround Time:
5 Days

CA Labs Project #:
CAL221010348RL
Date: 10/19/2022
Samples Rec'd: 10/12/22 10:30am
Date Of Sampling: 9/26/2022
Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
89524			*2MR0922-1-2*	*tan mastic*	*y*	***None Detected***		100% gy,bi
89524			*2MR0922-1-3*	*gray leveling compound*	*y*	***None Detected***		100% qu,ca
89525	2MR0922-2		*2MR0922-2-1*	*gray sealant*	*y*	***None Detected***		100% qu,gy,bi
89526	2MR0922-3		*2MR0922-3-1*	*tan mastic*	*y*	***None Detected***		100% gy,bi
89527	2NS0922-1		*2NS0922-1-1*	*tan surfaced white compound*	*n*	***2% Chrysotile***		98% mi,bi,ca
89527			*2NS0922-1-2*	*white compound (beneath tape)*	*y*	***2% Chrysotile***		98% mi,ca
89527			*2NS0922-1-3*	*white drywall with brown paper*	*n*	***None Detected***	20% ce	80% qu,gy

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

AIHA LAP, LLC Laboratory #102929

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Technical Manager
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Senior Analyst
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1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

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Polarized Light Asbestiform Materials Characterization

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Fax #

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CA Labs Project #:
CAL221010348RL
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Date Of Sampling: 9/26/2022
Purchase Order #:

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89527			*2NS0922-1-4*	*composite of layers 1, 2, and 3*	*n*	***<1% Chrysotile***	10% ce	90% qu,mi,bi,gy,ca
89528	2NS0922-2		*2NS0922-2-1*	*white textured surfacing*	*y*	***2% Chrysotile***		98% mi,bi,ca
89529	2SS0922		*2SS0922-1*	*white textured surfacing*	*y*	***3% Chrysotile***		97% mi,bi,ca
89530	2L0922-1		*2L0922-1-1*	*tan mastic*	*y*	***None Detected***		100% gy,bi
89531	2L0922-2		*2L0922-2-1*	*brown self-adhesive floor tile*	*y*	***None Detected***		100% qu,gy,ma
89531			*2L0922-2-2*	*tan and black mastic*	*n*	***2% Chrysotile***		98% gy,bi
89532	2H0922		*2H0922-1*	*white surfaced white compound*	*n*	***2% Chrysotile***		98% mi,bi,ca

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

AIHA LAP, LLC Laboratory #102929

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89532			*2H0922-2*	*white drywall with brown paper*	*n*	***None Detected***	20% ce	80% qu,gy
89532			*2H0922-3*	*composite of layers 1 and 2*	*n*	***<1% Chrysotile***	10% ce	90% qu,mi,bi,gy,ca
89533	3NS0922-1		*3NS0922-1-1*	*tan surfaced white compound*	*n*	***2% Chrysotile***		98% mi,bi,ca
89533			*3NS0922-1-2*	*white compound (beneath tape)*	*y*	***2% Chrysotile***		98% mi,ca
89533			*3NS0922-1-3*	*white drywall with brown paper*	*n*	***None Detected***	20% ce	80% qu,gy
89533			*3NS0922-1-4*	*composite of layers 1, 2, and 3*	*n*	***<1% Chrysotile***	10% ce	90% qu,mi,bi,gy,ca
89534	3NS0922-2		*3NS0922-2-1*	*white textured surfacing*	*y*	***3% Chrysotile***		97% mi,bi,ca

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

AIHA LAP, LLC Laboratory #102929

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Polarized Light Asbestiform Materials Characterization

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CAL221010348RL
Date: 10/19/2022
Samples Rec'd: 10/12/22 10:30am
Date Of Sampling: 9/26/2022
Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
89535	3SS0922		*3SS0922-1*	*white textured surfacing*	*y*	***3% Chrysotile***		97% mi,bi,ca
89536	4NS0922		*4NS0922-1*	*tan surfaced white compound*	*n*	***2% Chrysotile***		98% mi,bi,ca
89536			*4NS0922-2*	*white compound (beneath tape)*	*y*	***2% Chrysotile***		98% mi,ca
89536			*4NS0922-3*	*white drywall with brown paper*	*n*	***None Detected***	20% ce	80% qu,gy
89536			*4NS0922-4*	*composite of layers 1, 2, and 3*	*n*	***<1% Chrysotile***	10% ce	90% qu,mi,bi,gy,ca
89537	4SS0922		*4SS0922-1*	*white textured surfacing*	*y*	***3% Chrysotile***		97% mi,bi,ca
89538	4NS0922		*4NS0922-1*	*white textured surfacing*	*y*	***3% Chrysotile***		97% mi,bi,ca

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Jose Matute
Analyst

Robert Olivarez
Analyst

Julio Robles
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
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4. Layer not analyzed - attached to previous positive layer and contamination is suspected
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8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

CA Labs
Dedicated to Quality

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Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Polarized Light Asbestiform Materials Characterization

Customer Info: **Attn:**
Environmental Health Testing Services
2950 Aquila Ave South
St Louis Park, MN 55426

Phone # 952-297-5169
Fax #

Customer Project:
014-18-F Empire Apartments
Turnaround Time:
5 Days

CA Labs Project #:
CAL221010348RL
Date: 10/19/2022
Samples Rec'd: 10/12/22 10:30am
Date Of Sampling: 9/26/2022
Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
89539	5NS0922		*5NS0922-1*	*white textured surfacing*	*y*	***2% Chrysotile***		98% qu,bi,ca
89539			*5NS0922-2*	*white compound (beneath tape)*	*y*	***2% Chrysotile***		98% qu,ca
89539			*5NS0922-3*	*white drywall with brown paper*	*n*	***None Detected***	22% ce	78% qu,gy
89539			*5NS0922-4*	*composite of layers 1, 2, and 3*	*n*	***<1% Chrysotile***	12% ce	88% qu,gy,ca
89540	5SS0922		*5SS0922-1*	*white textured surfacing*	*y*	***3% Chrysotile***		97% qu,bi,ca,pe
89541	5NS0922		*5NS0922-1*	*white textured surfacing*	*y*	***3% Chrysotile***		97% qu,bi,ca,pe
89542	506KT0922		*506KT0922-1*	*off-white linoleum*	*y*	***None Detected***	10% fg 10% ce	80% gy,ma

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
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ma - matrix	qu - quartz	sy - synthetic	

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CA Labs Project #:
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Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
89543	509BA0922		*509BA0922-1*	*gray linoleum*	*y*	***None Detected***	10% fg 10% ce	80% gy,ma
89543			*509BA0922-2*	*tan mastic*	*y*	***None Detected***		100% gy,bi
89544	6SS0922		*6SS0922-1*	*white textured surfacing*	*y*	***3% Chrysotile***		97% qu,bi,ca,pe
89545	6NS0922-1		*6NS0922-1-1*	*white textured surfacing*	*y*	***3% Chrysotile***		97% qu,bi,ca,pe
89546	6NS0922-2		*6NS0922-2-1*	*off-white floor tile*	*y*	***3% Chrysotile***		97% qu,ca
89546			*6NS0922-2-2*	*black mastic*	*y*	***2% Chrysotile***		98% gy,bi
89547	6NS0922-3		*6NS0922-3-1*	*white surfaced white compound*	*n*	***2% Chrysotile***		98% qu,bi,ca

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
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CA Labs Project #:
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Samples Rec'd: 10/12/22 10:30am
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Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
89547			*6NS0922-3-2*	*white compound (beneath tape)*	*y*	***2% Chrysotile***		98% qu,ca
89547			*6NS0922-3-3*	*white drywall with brown paper*	*n*	***None Detected***	23% ce	77% qu,gy
89547			*6NS0922-3-4*	*composite of layers 1, 2, and 3*	*n*	***<1% Chrysotile***	12% ce	88% qu,gy,ca
89548	606KT0922		*606KT0922-1*	*off-white linoleum*	*y*	***None Detected***	10% ce 10% fg	80% gy,ma
89549	609BA0922		*609BA0922-1*	*off-white linoleum*	*y*	***None Detected***	10% ce 10% fg	80% gy,ma
89549			*609BA0922-2*	*tan mastic*	*y*	***None Detected***		100% gy,bi
89550	7SS0922		*7SS0922-1*	*white surfaced white compound*	*n*	***2% Chrysotile***		98% qu,bi,ca

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
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ma - matrix	qu - quartz	sy - synthetic	

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Polarized Light Asbestiform Materials Characterization

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CA Labs Project #:
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Date Of Sampling: 9/26/2022
Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
89550			*7SS0922-2*	*white compound (beneath tape)*	*y*	***2% Chrysotile***		98% qu,ca
89550			*7SS0922-3*	*white drywall with brown paper*	*n*	***None Detected***	23% ce	77% qu,gy
89550			*7SS0922-4*	*composite of layers 1, 2, and 3*	*n*	***<1% Chrysotile***	13% ce	87% qu,gy,ca
89551	7NS0922-1		*7NS0922-1-1*	*white textured surfacing*	*y*	***3% Chrysotile***		97% qu,bi,ca,pe
89552	7NS0922-2		*7NS0922-2-1*	*white textured surfacing*	*y*	***3% Chrysotile***		97% qu,bi,ca,pe
89553	707BA0922		*707BA0922-1*	*off-white linoleum*	*y*	***None Detected***	10% ce 10% fg	80% gy,ma
89553			*707BA0922-2*	*tan mastic*	*y*	***None Detected***		100% gy,bi

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
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or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

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Polarized Light Asbestiform Materials Characterization

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014-18-F Empire Apartments
Turnaround Time:
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CA Labs Project #:
CAL221010348RL
Date: 10/19/2022
Samples Rec'd: 10/12/22 10:30am
Date Of Sampling: 9/26/2022
Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
89554	710KT0922		*710KT0922-1*	*tan linoleum*	*y*	***None Detected***	10% ce 10% fg	80% gy,ma
89554			*710KT0922-2*	*tan mastic*	*y*	***None Detected***		100% gy,bi
89555	8NS0922-1		*8NS0922-1-1*	*white surfaced white compound*	*n*	***2% Chrysotile***		98% qu,bi,ca
89555			*8NS0922-1-2*	*white compound (beneath tape)*	*y*	***2% Chrysotile***		98% qu,ca
89555			*8NS0922-1-3*	*white drywall with brown paper*	*n*	***None Detected***	23% ce	77% qu,gy
89555			*8NS0922-1-4*	*composite of layers 1, 2, and 3*	*n*	***<1% Chrysotile***	13% ce	87% qu,gy,ca
89556	8NS0922-2		*8NS0922-2-1*	*white textured surfacing*	*y*	***2% Chrysotile***		98% qu,pe,ca

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
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Polarized Light Asbestiform Materials Characterization

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Date: 10/19/2022
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Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
89557	8R0922		*8R0922-1*	*tan flooring*	*y*	***2% Chrysotile***		98% qu,ca
89557			*8R0922-2*	*black mastic*	*y*	***2% Chrysotile***		98% gy,bi
89558	8SS0922		*8SS0922-1*	*white textured surfacing*	*y*	***2% Chrysotile***		98% qu,pe,ca
89559	806BA0922		*806BA0922-1*	*tan linoleum*	*y*	***None Detected***	15% ce 5% fg	80% gy,ma
89560	810LR0922-1		*810LR0922-1-1*	*tan mastic with debris*	*n*	***None Detected***		100% gy,bi
89561	810LR0922-2		*810LR0922-2-1*	*tan mastic with debris*	*n*	***None Detected***		100% gy,bi
89562	9NS0922-1		*9NS0922-1-1*	*white textured surfacing*	*y*	***2% Chrysotile***		98% qu,pe,ca

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
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Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
89563	9NS0922-2		*9NS0922-2-1*	*tan surfaced off-white compound*	*n*	***2% Chrysotile***		98% qu,bi,ca
89563			*9NS0922-2-2*	*white drywall with brown paper*	*n*	***None Detected***	20% ce	80% qu,gy
89563			*9NS0922-2-3*	*composite of layers 1 and 2*	*n*	***<1% Chrysotile***	10% ce	90% qu,gy,bi,ca
89564	9SS0922		*9SS0922-1*	*white textured surfacing*	*y*	***2% Chrysotile***		98% qu,pe,ca
89565	905KT0922		*905KT0922-1*	*tan linoleum*	*y*	***None Detected***	15% ce 5% fg	80% gy,ma
89566	907KT0922		*907KT0922-1*	*tan linoleum*	*y*	***None Detected***	15% ce 5% fg	80% gy,ma
89566			*907KT0922-2*	*tan mastic*	*y*	***None Detected***		100% gy,bi

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Jose Matute
Analyst

Robert Olivarez
Analyst

Julio Robles
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Polarized Light Asbestiform Materials Characterization

Customer Info: **Attn:**
Environmental Health Testing Services
2950 Aquila Ave South
St Louis Park, MN 55426

Phone # 952-297-5169
Fax #

Customer Project:
014-18-F Empire Apartments
Turnaround Time:
5 Days

CA Labs Project #:
CAL221010348RL
Date: 10/19/2022
Samples Rec'd: 10/12/22 10:30am
Date Of Sampling: 9/26/2022
Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
89567	909BA0922		*909BA092 2-1*	*gray linoleum*	*y*	***None Detected***	15% ce 5% fg	80% gy,ma
89568	10NS0922		*10NS0922-1*	*tan surfaced off-white compound*	*n*	***2% Chrysotile***		98% qu,bi,ca
89568			*10NS0922-2*	*tan compound (beneath tape)*	*y*	***2% Chrysotile***		98% qu,ca
89568			*10NS0922-3*	*white drywall with brown paper*	*n*	***None Detected***	20% ce	80% qu,gy
89568			*10NS0922-4*	*composite of layers 1, 2, and 3*	*n*	***<1% Chrysotile***	10% ce	90% qu,gy,bi,ca
89569	10H0922-1		*10H0922-1-1*	*white textured surfacing*	*y*	***2% Chrysotile***		98% qu,pe,ca
89570	10H0922-2		*10H0922-2-1*	*white textured surfacing*	*y*	***2% Chrysotile***		98% qu,pe,ca

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gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

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Analyst

Robert Olivarez
Analyst

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Analyst

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Tanner Rasmussen

Senior Analyst
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Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
89571	1001LR0922		*1001LR092 2-1*	*tan mastic with debris*	*n*	***None Detected***		100% gy,bi
89572	1005KT0922		*1005 KT09 22-1*	*tan linoleum*	*y*	***None Detected***	15% ce 5% fg	80% gy,ma
89573	1006BA0922		*1006 BA09 22-1*	*tan covering*	*y*	***None Detected***	60% ce	40% qu,ca, ma
89573			*1006 BA09 22-2*	*tan compound with debris*	*n*	***2% Chrysotile***		98% qu,ca
89574	1008LR0922		*1008LR092 2-1*	*tan mastic with debris*	*n*	***None Detected***		100% gy,bi
89575	1010KT0922		*1010 KT09 22-1*	*brown linoleum*	*y*	***None Detected***	15% ce 5% fg	80% gy,ma
89575			*1010 KT09 22-2*	*tan mastic*	*y*	***None Detected***		100% gy,bi

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

AIHA LAP, LLC Laboratory #102929

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9. < 1% Result point counted positive
10. TEM analysis suggested

CAL2210103418

CA Labs

CA Labs
1929 Old Denton Rd.
Carrollton, TX 75006

Phone: 972-242-2754
Fax: 972-242-2798
Mobile: 469-222-6967

Asbestos Chain of Custody

Company: Environmental Health Testing Services
Address: 2950 Aquila Avenue South, St. Louis Park, MN 55426
Phone#: 952-297-5169
E-mail: kris@EHTserivces.com

EHTS Project No.: 014-18-F Date of collection: 9/26 – 9/30, 2022 Collected by: K. Stahl
Project Name & Site Address: Empire Apartments
State of Collection: MN
Send Results Via: ☒ E-mail ☐ Verbal

Bulk Analysis		
PLM EPA 600/R-93/116	☒	
PLM EPA 600/R-93/116	☒	For drywall materials, please provide results as composite as well as separate layers
Point Count – (NESHAPS)	☒	Please provide PLM point-count analysis for any samples resulting in the detection of 1% or less asbestos

Turn Around Time	3 HR (4 HR TEM) ☐	6 HR (8 HR TEM) ☐	12 HR ☐	24 HR ☐
	2 Days ☐	3 Days ☐	4 Days ☐	5 Days ☒

Sample #	Material	Sample Location
1ML0922	18"x 18" green vinyl floor tile	Main lobby by elevators
1BA0922	Tan top linoleum and blue underlying linoleum	1st floor common bathroom
1GR0922	White 2x4 ceiling tile	1st floor game room
2MR0922-1	Tan sheet flooring	2nd floor meeting room
2MR0922-2	Gray window glaze	2nd floor meeting room
2MR0922-3	Yellow carpet mastic	2nd floor meeting room
2NS0922-1	White drywall, drywall tape & compound	2nd floor north storage room
2NS0922-2	White popcorn ceiling texture	2nd floor north storage room
2SS0922	White popcorn ceiling texture	2nd floor south storage room
2L0922-1	Yellow baseboard mastic	2nd floor laundry room
2L0922-2	Brown vinyl sheet flooring	2nd floor laundry room
2H0922	White wall texture (10 x 10 area across elevators)	2nd floor hall
3NS0922-1	White drywall, drywall tape & compound	3rd floor north storage room
3NS0922-2	White popcorn ceiling texture	3rd floor north storage room
3SS0922	white popcorn ceiling texture	3rd floor south storage room
4NS0922	White drywall, drywall tape & compound	4th floor north storage room
4SS0922	White popcorn ceiling texture	4th floor south storage room
4NS0922	White popcorn ceiling texture	4th floor north storage room
5NS0922	White drywall, drywall tape & compound	5th floor north storage room
5SS0922	White popcorn ceiling texture	5th floor south storage room
5NS0922	White popcorn ceiling texture	5th floor north storage room

10:30AM

OCT 12 2022

CAL2210603 48

CA Labs

CA Labs
1929 Old Denton Rd.
Carrollton, TX 75006

Phone: 972-242-2754
Fax: 972-242-2798
Mobile: 469-222-6967

Asbestos Chain of Custody

Sample #	Material	Sample Location
506KT0922	White linoleum flooring	Unit 506, kitchen
509BA0922	Tan linoleum flooring	Unit 509, bathroom
6SS0922	White popcorn ceiling texture	6th floor south storage room
6NS0922-1	White popcorn ceiling texture	6th floor north storage room
6NS0922-2	Tan vinyl 9x9 floor tile	6th floor north storage room
6NS0922-3	White drywall, drywall tape & compound	6th floor north storage room
606KT0922	Tan linoleum flooring	Unit 606, kitchen
609BA0922	White with blue linoleum flooring	Unit 609, bathroom
7SS0922	White popcorn ceiling texture	7th floor south storage room
7NS0922-1	White drywall, drywall tape & compound	7th floor north storage room
7NS0922-2	White popcorn ceiling texture	7th floor north storage room
707BA0922	Tan linoleum flooring	Unit 707, bathroom
710KT0922	Tan linoleum flooring with white lines	Unit 710, kitchen
8NS0922-1	White popcorn ceiling texture	8th floor north storage room
8NS0922-2	White drywall, drywall tape & compound	8th floor north storage room
8R0922	White 9x9 vinyl floor tile & tan mastic	8th floor rubbish room
8SS0922	White popcorn ceiling texture	8th floor south storage room
806BA0922	Tan linoleum flooring	Unit 806, bathroom
810LR0922-1	Yellow baseboard mastic	Unit 810, living room
810LR0922-2	Yellow carpet mastic	Unit 810, living room
9NS0922-1	White popcorn ceiling texture	9th floor north storage room
9NS0922-2	White drywall, drywall tape & compound	9th floor north storage room
9SS0922	White popcorn ceiling texture	9th floor south storage room
905KT0922	White linoleum flooring	Unit 905, kitchen
907KT0922	Tan linoleum flooring	Unit 907, kitchen
909BA0922	White & blue linoleum flooring	Unit 909, bathroom
10NS0922	White drywall, drywall tape & compound	10th floor north storage room
10H0922-1	White popcorn ceiling texture	10th floor hall, near north storage
10H0922-2	White popcorn ceiling texture	10th floor hall, near south storage
1001LR0922	Yellow baseboard mastic	Unit 1001, living room
1005KT0922	Tan linoleum flooring	Unit 105, kitchen
1006BA0922	Epoxy material between wall and baseboard	Unit 1006, bathroom
1008LR0922	Yellow carpet mastic	Unit 1008, living room
1010KT0922	White vinyl flooring	Unit 1010, kitchen

Relinquished by	Date	Time	Received by	Date	Time
Kris Starr	9-30-22	22:30			

10:30AM

OCT 12 2022

Appendix E

Photographs – Apartment Unit Kitchen & Bathroom Flooring

KITCHEN



BATHROOM



UNIT 201

KITCHEN



BATHROOM



UNIT 202

KITCHEN

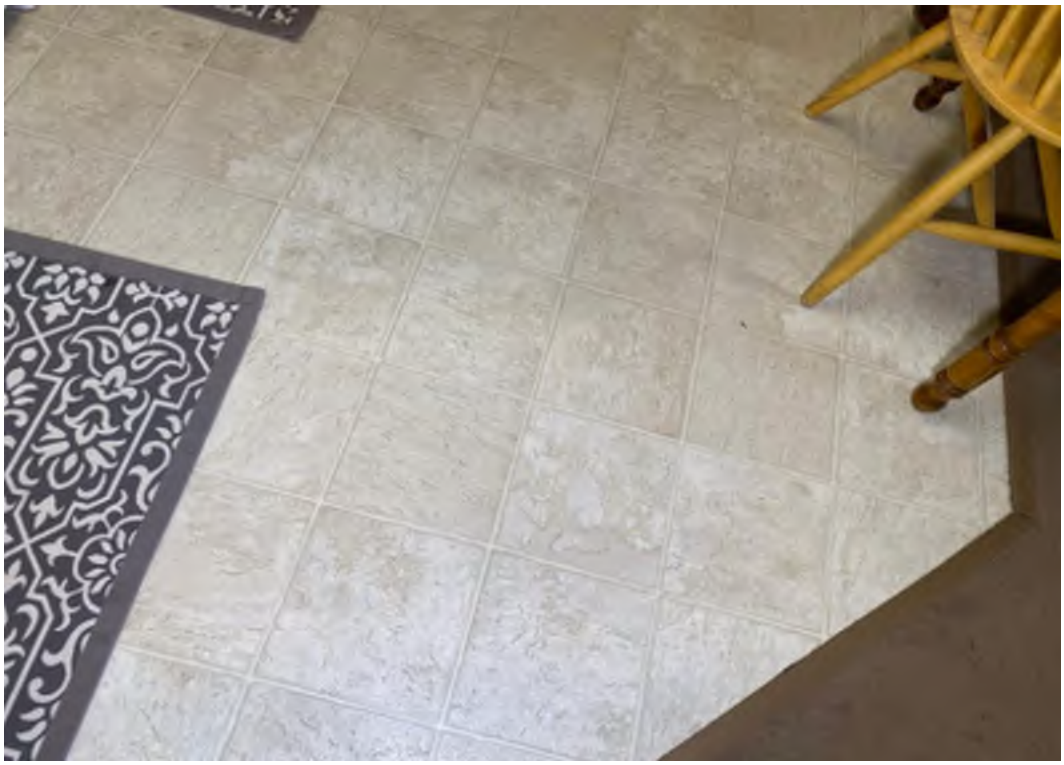


BATHROOM



UNIT 203

KITCHEN



BATHROOM

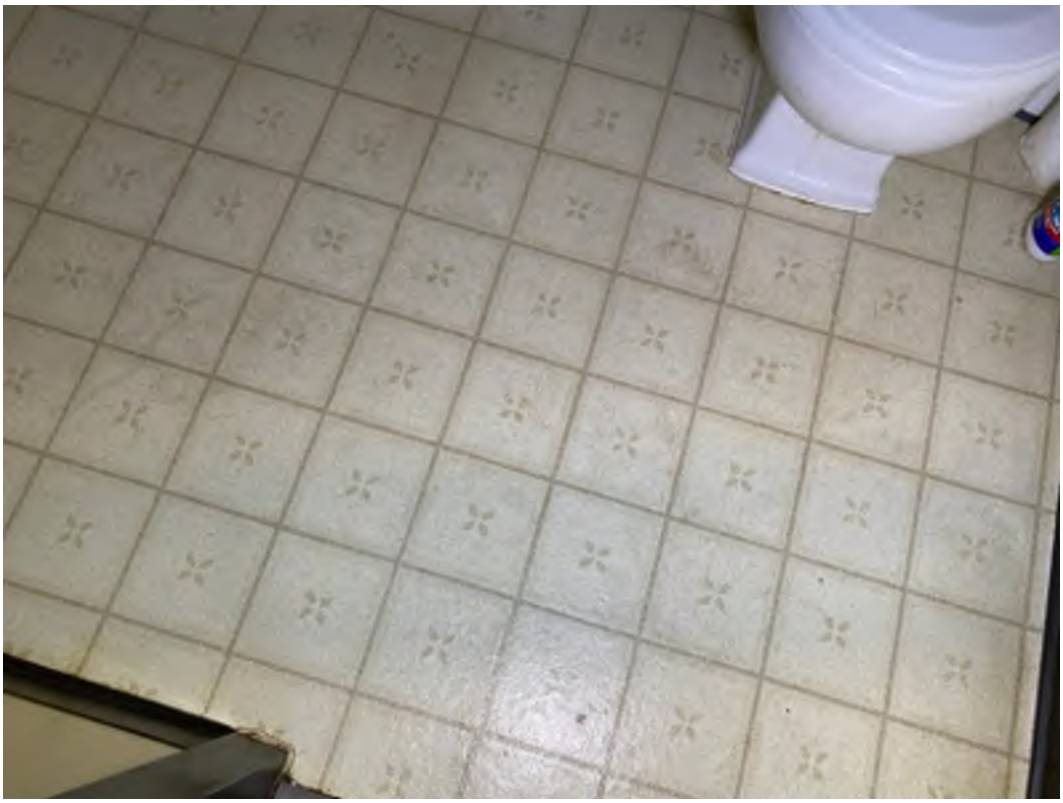


UNIT 204

KITCHEN



BATHROOM

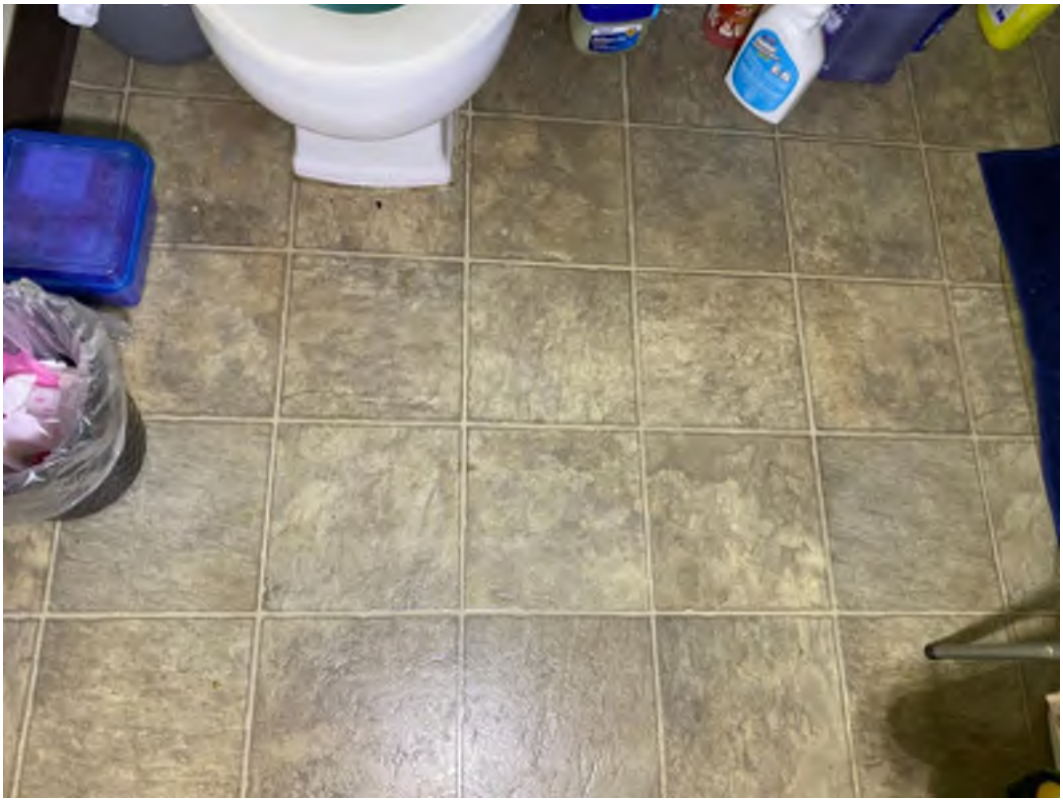


UNIT 205

KITCHEN



BATHROOM

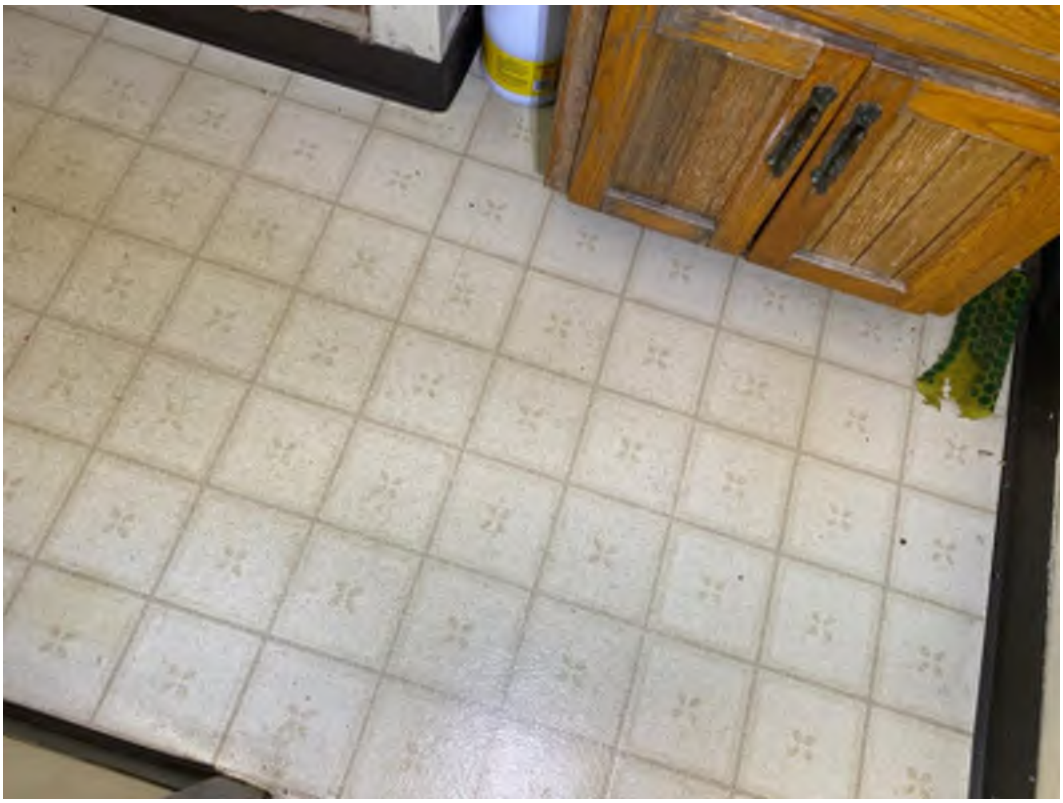


UNIT 207

KITCHEN



BATHROOM

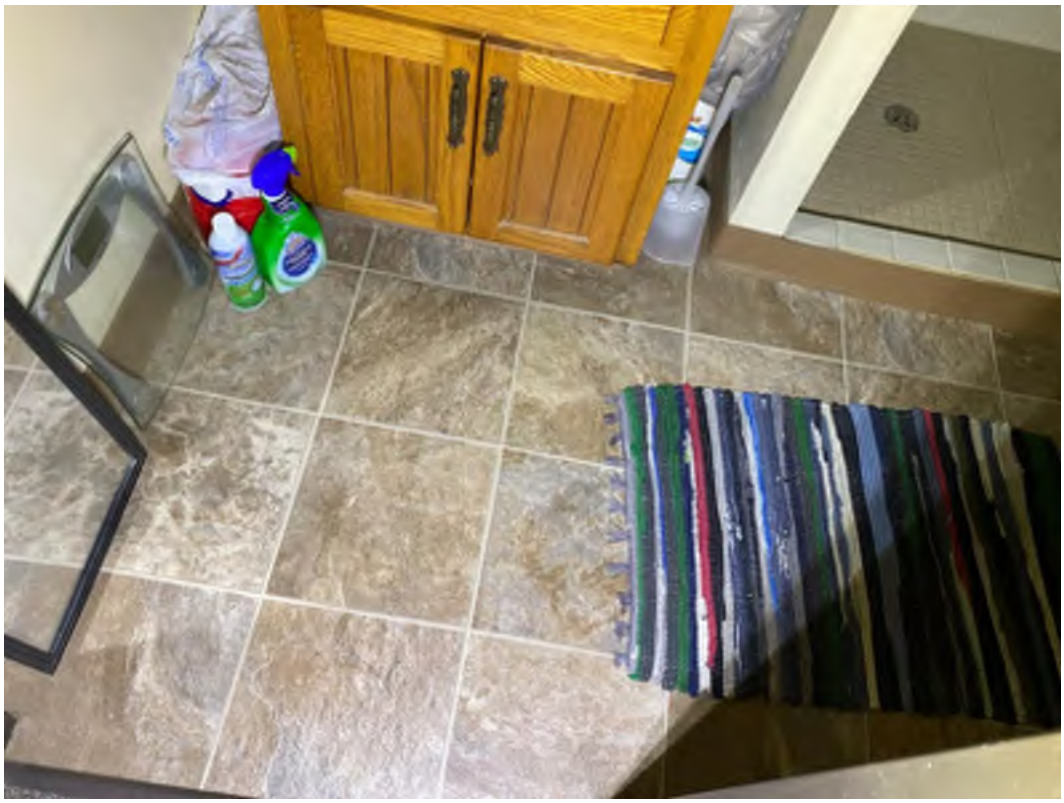


UNIT 209

KITCHEN



BATHROOM

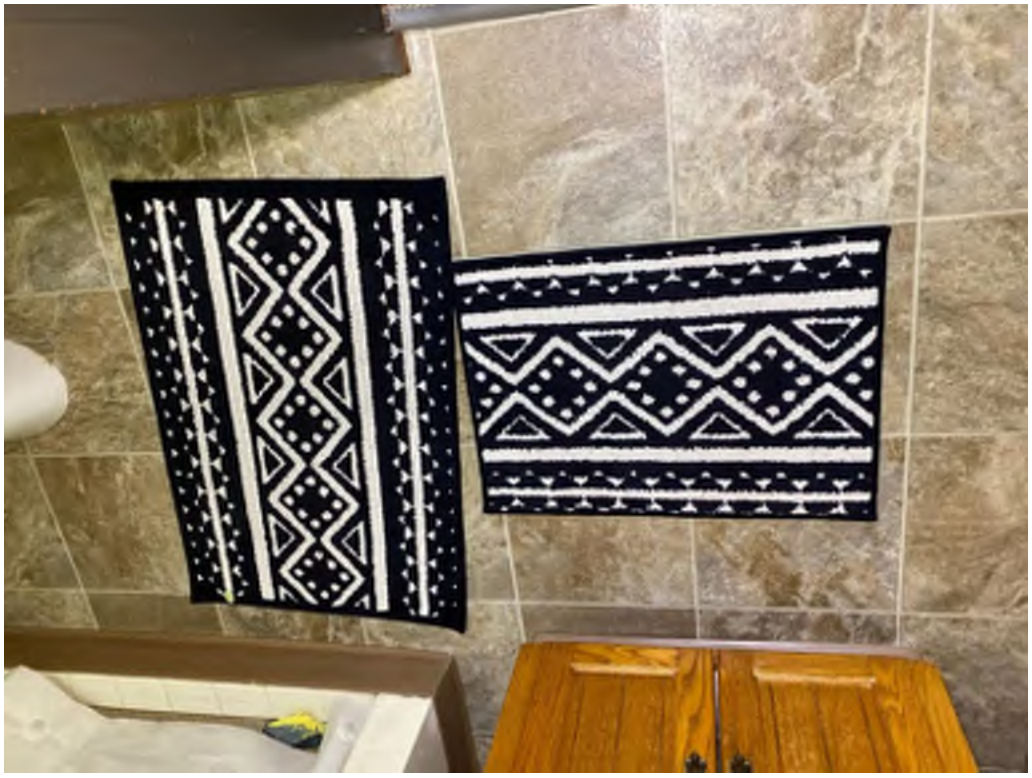


UNIT 210

KITCHEN



BATHROOM



UNIT 301

KITCHEN



BATHROOM



UNIT 302

KITCHEN



BATHROOM



UNIT 303

KITCHEN



BATHROOM

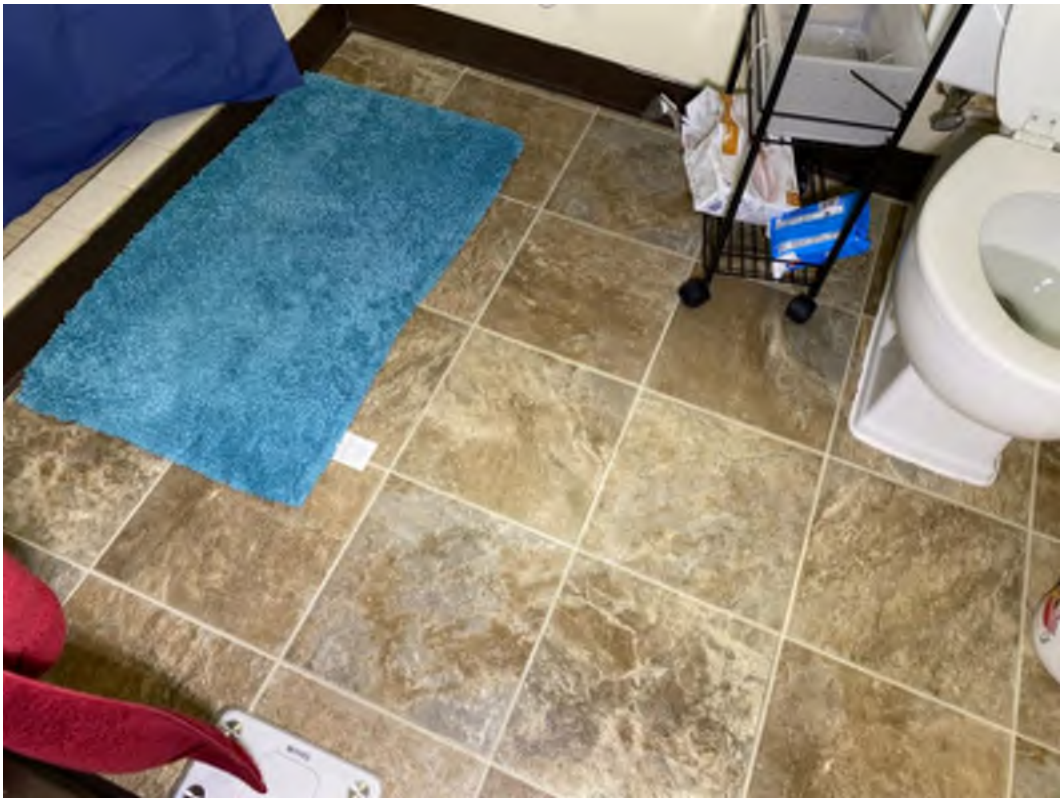


UNIT 304

KITCHEN



BATHROOM



UNIT 305

KITCHEN



BATHROOM



UNIT 306

KITCHEN



BATHROOM



UNIT 307

KITCHEN



BATHROOM



UNIT 309

KITCHEN

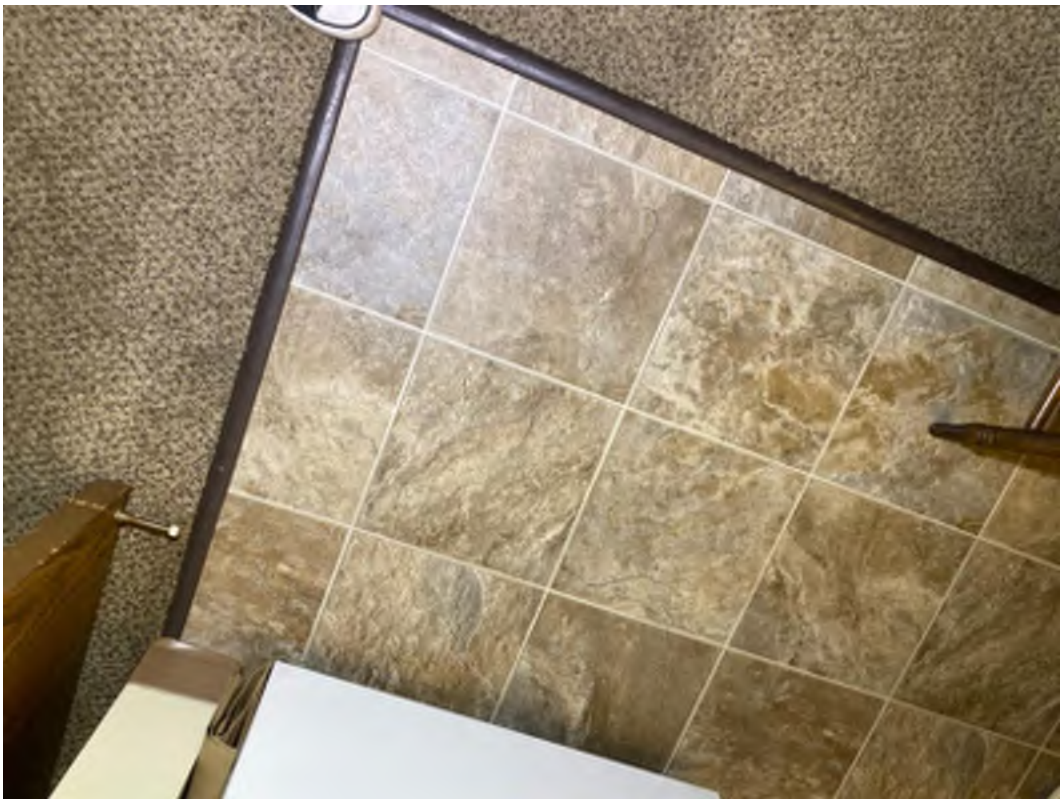


BATHROOM



UNIT 310

KITCHEN



BATHROOM



UNIT 402

KITCHEN



BATHROOM



UNIT 403

KITCHEN

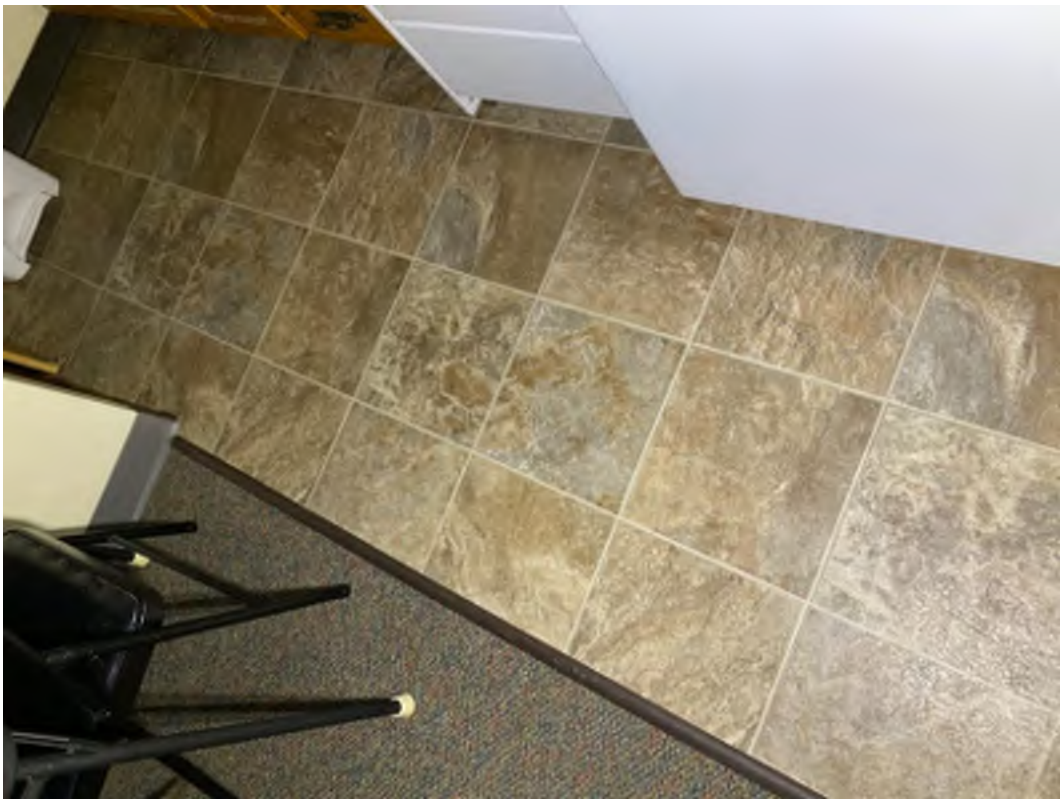


BATHROOM



UNIT 404

KITCHEN



BATHROOM

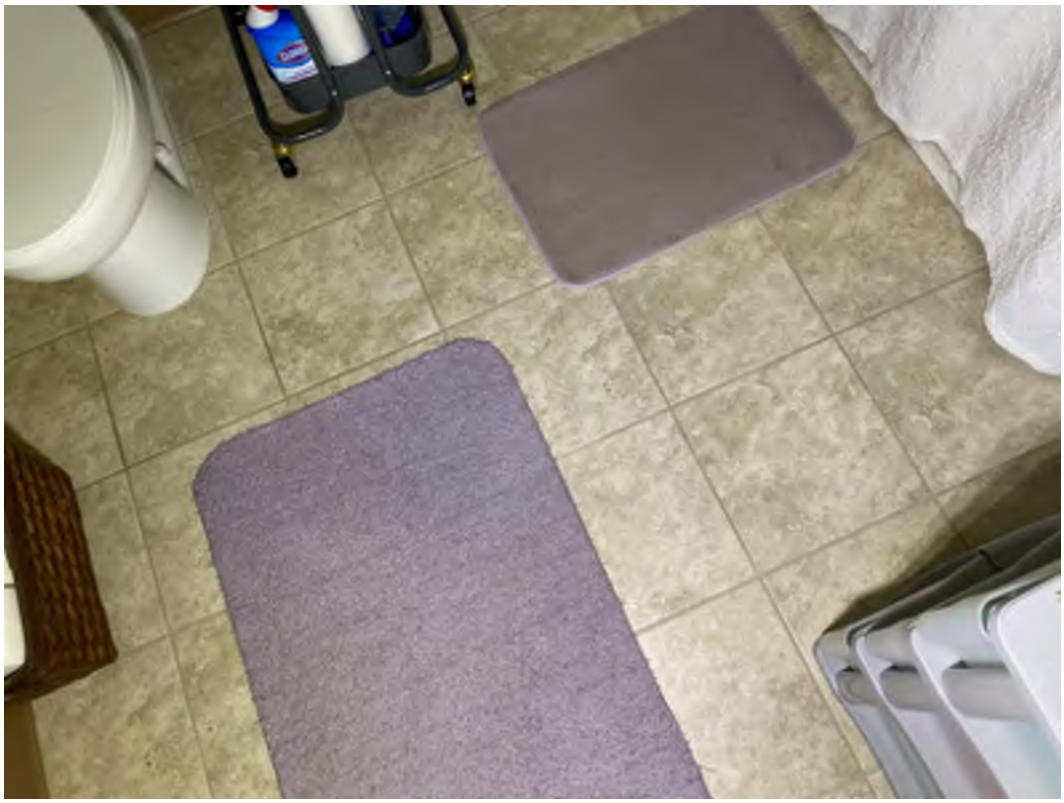


UNIT 405

KITCHEN



BATHROOM



UNIT 406

KITCHEN



BATHROOM

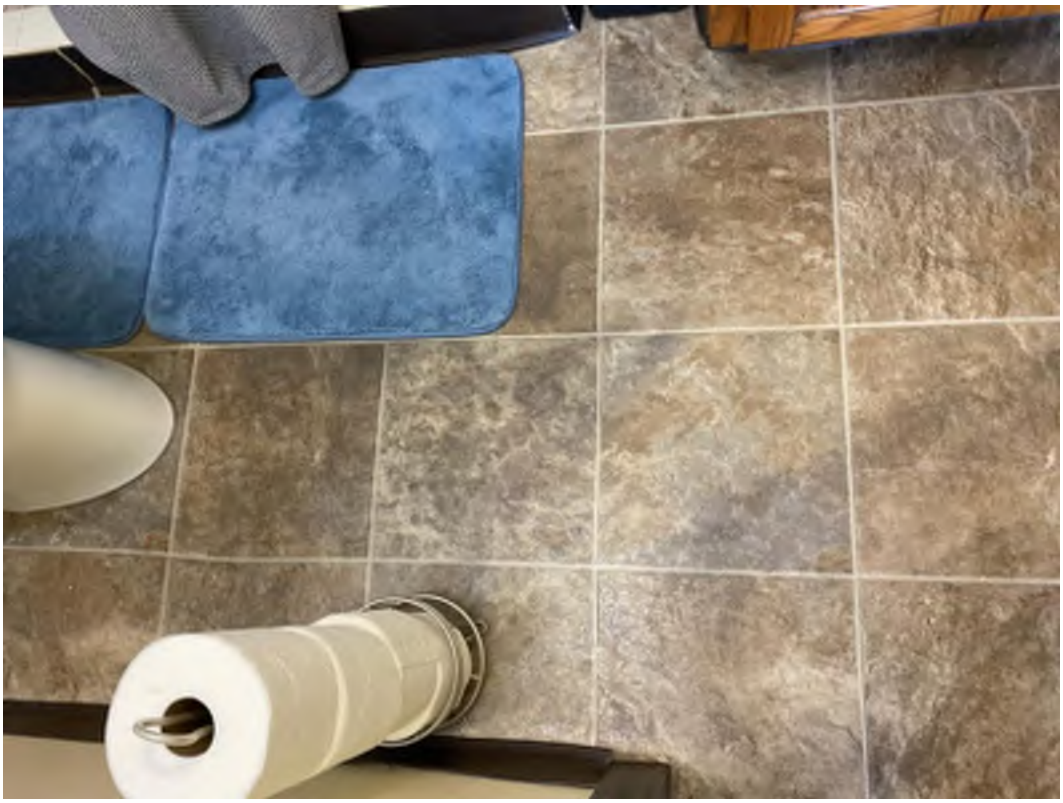


UNIT 408

KITCHEN



BATHROOM



UNIT 409

KITCHEN

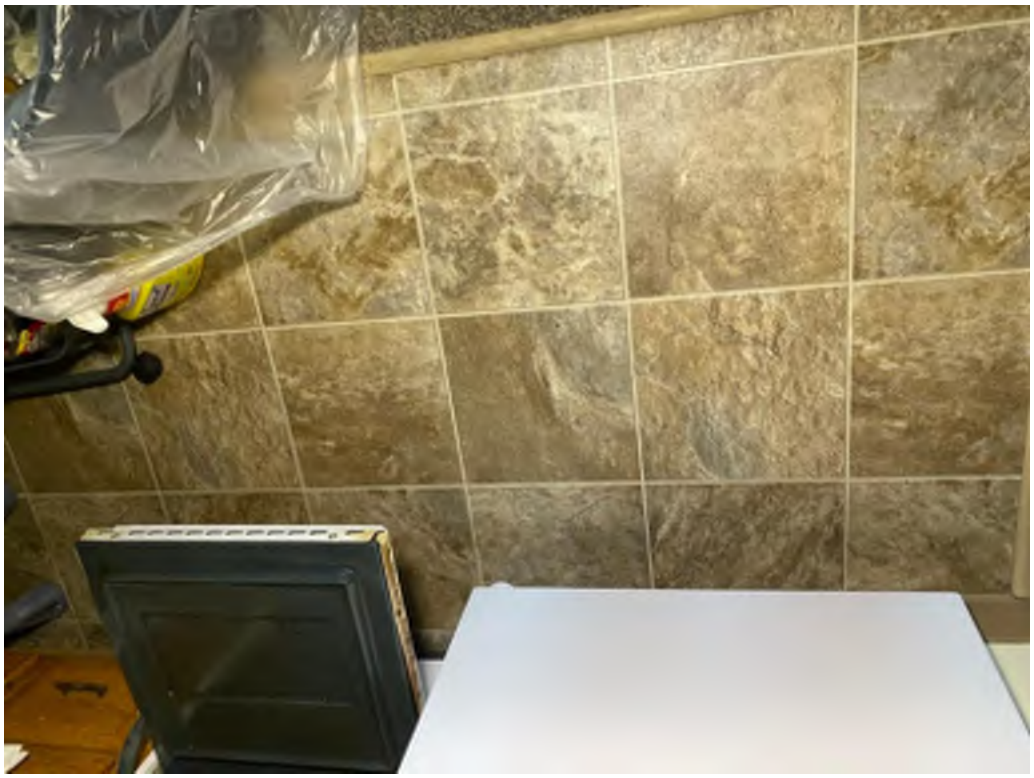


BATHROOM



UNIT 410

KITCHEN

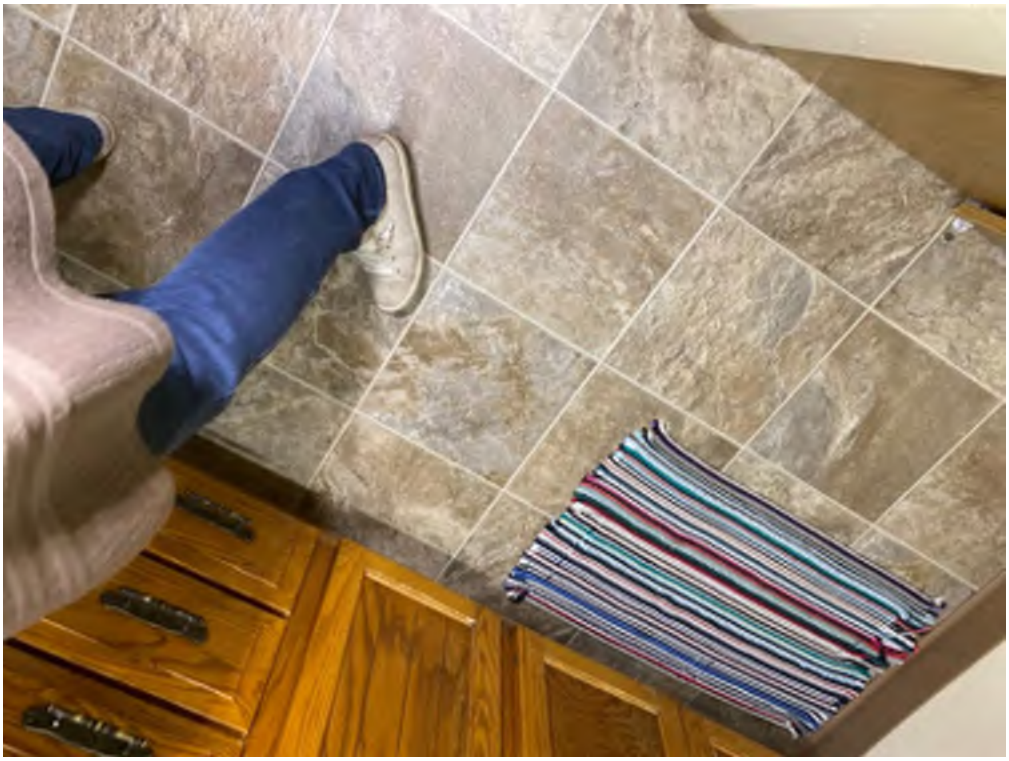


BATHROOM



UNIT 501

KITCHEN

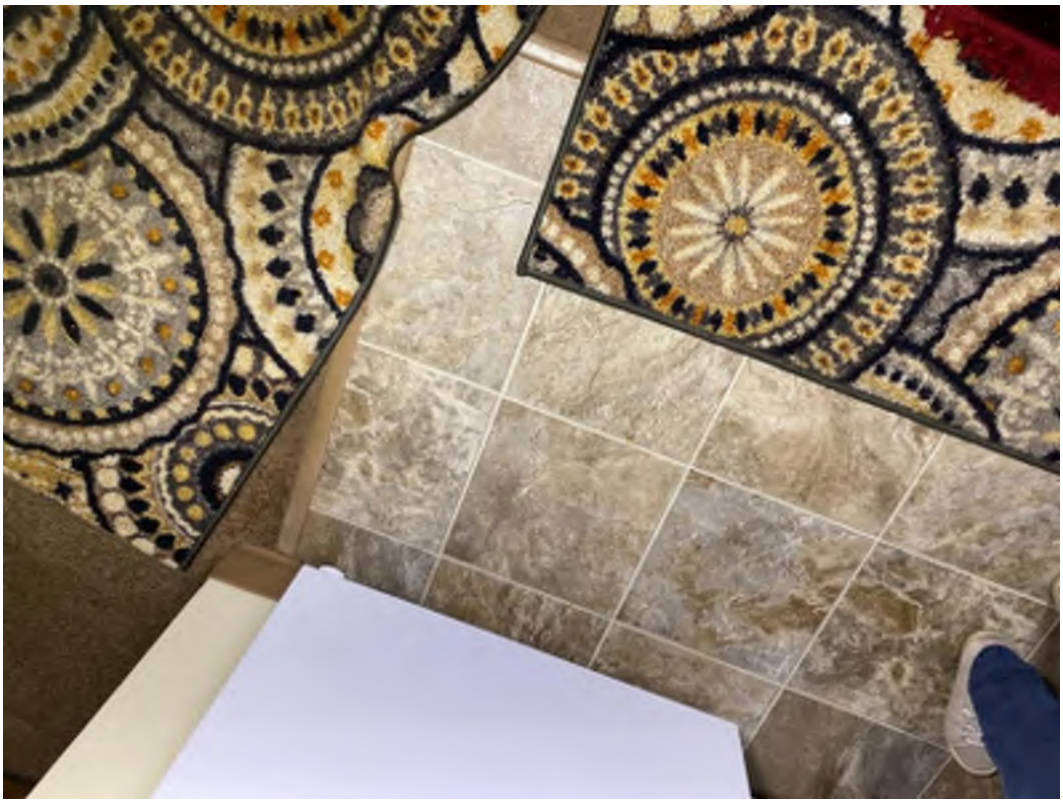


BATHROOM

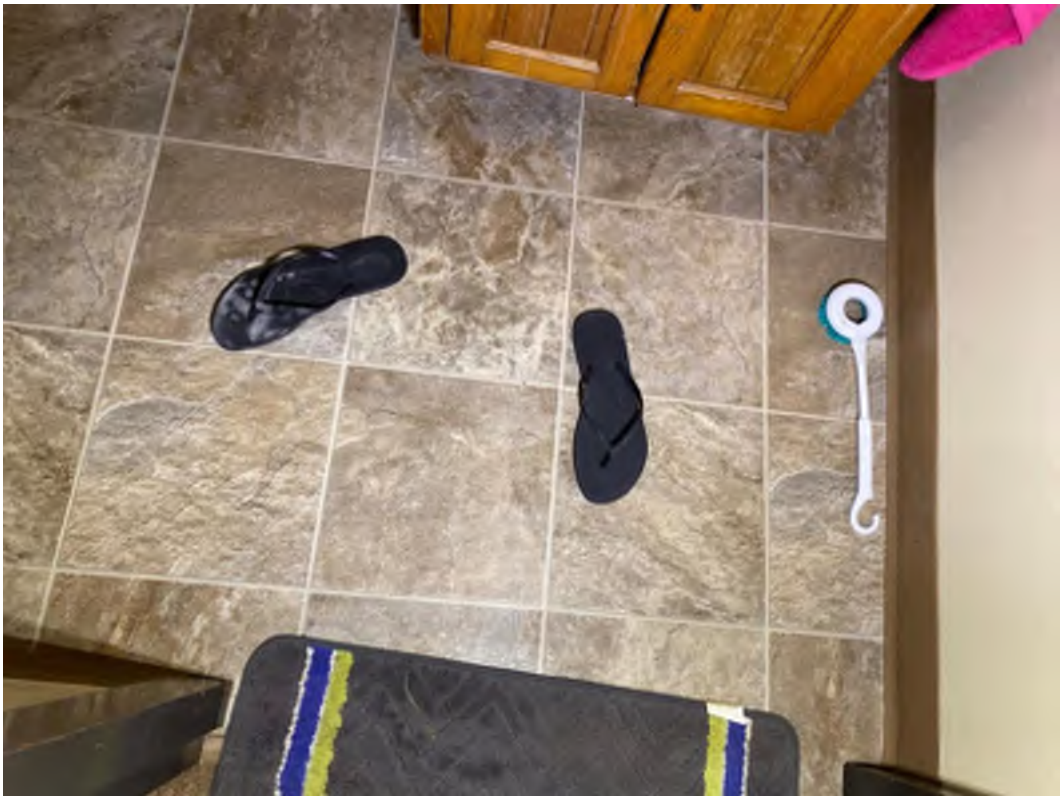


UNIT 502

KITCHEN

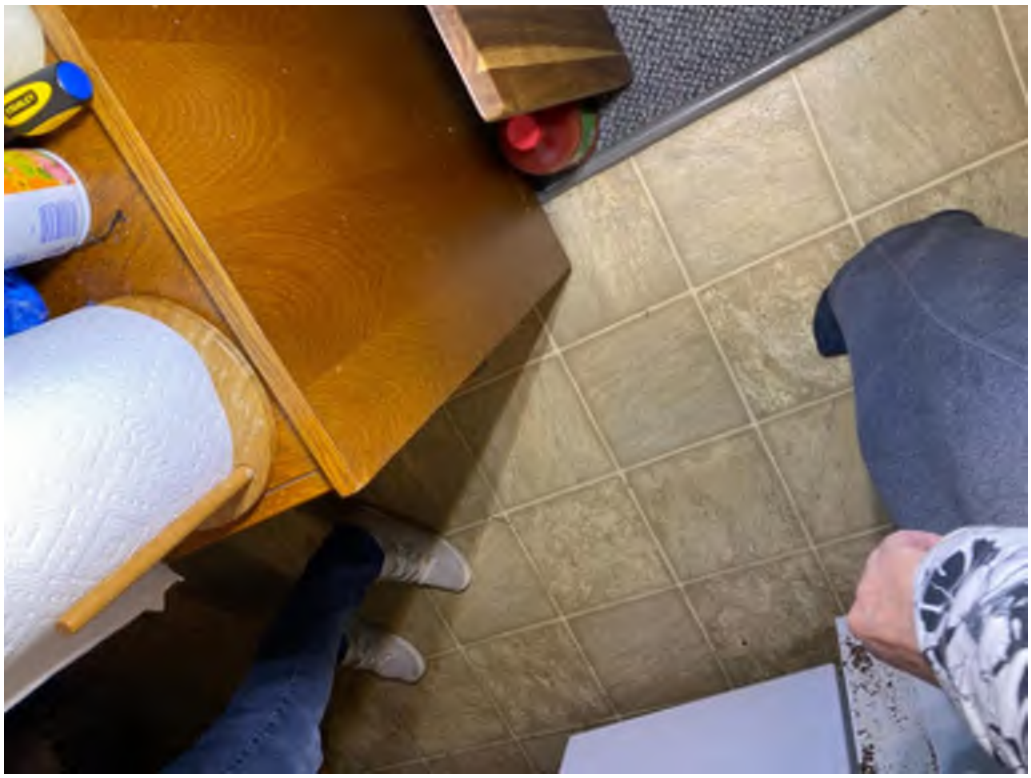


BATHROOM



UNIT 503

KITCHEN



BATHROOM

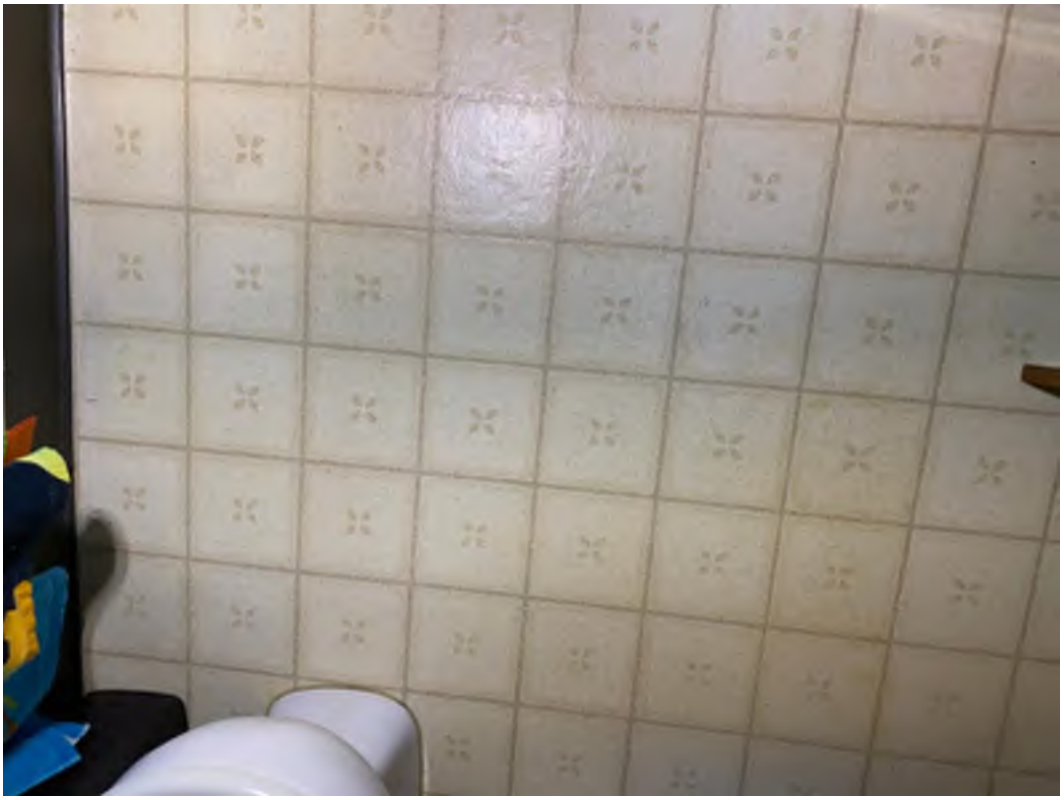


UNIT 504

KITCHEN



BATHROOM



UNIT 505

KITCHEN



BATHROOM



UNIT 506

KITCHEN

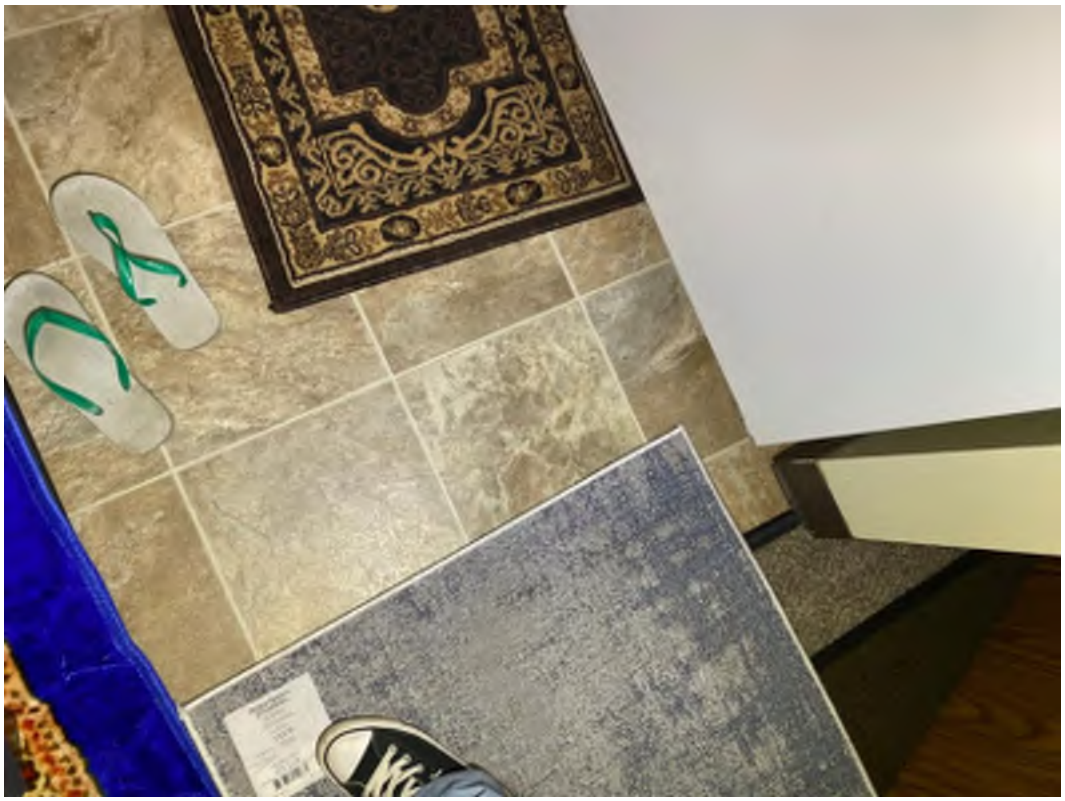


BATHROOM



UNIT 507

KITCHEN



BATHROOM



UNIT 508

KITCHEN



BATHROOM

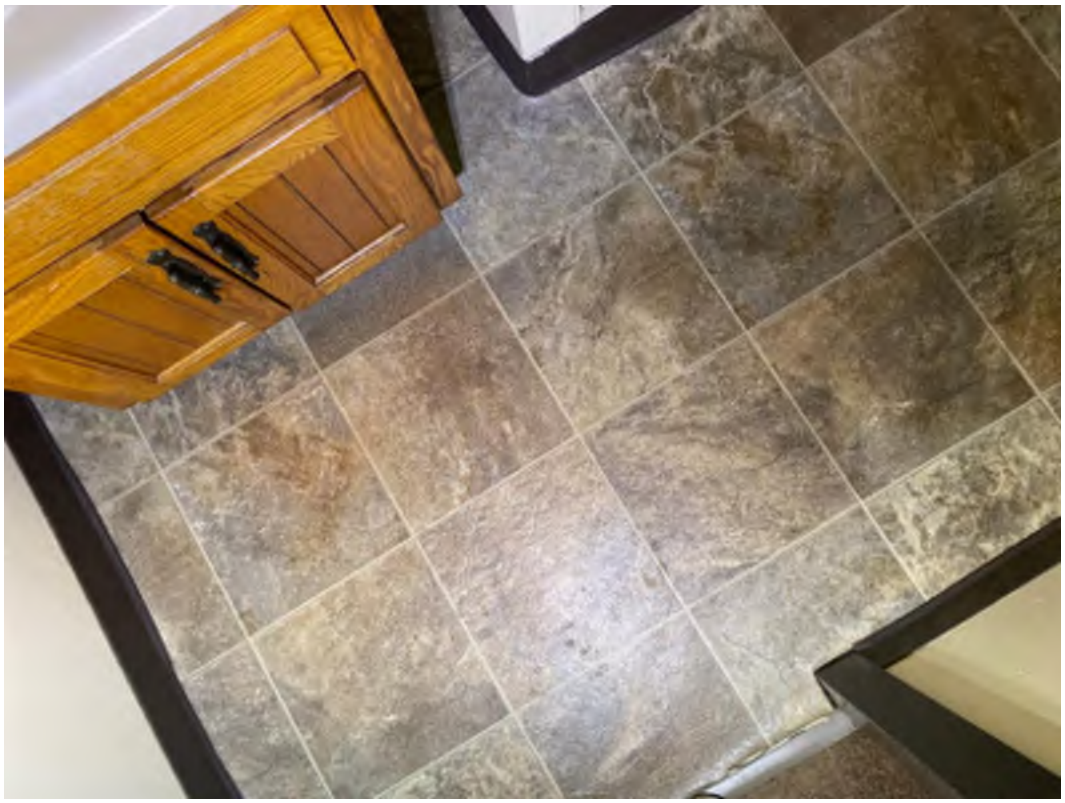


UNIT 509

KITCHEN



BATHROOM

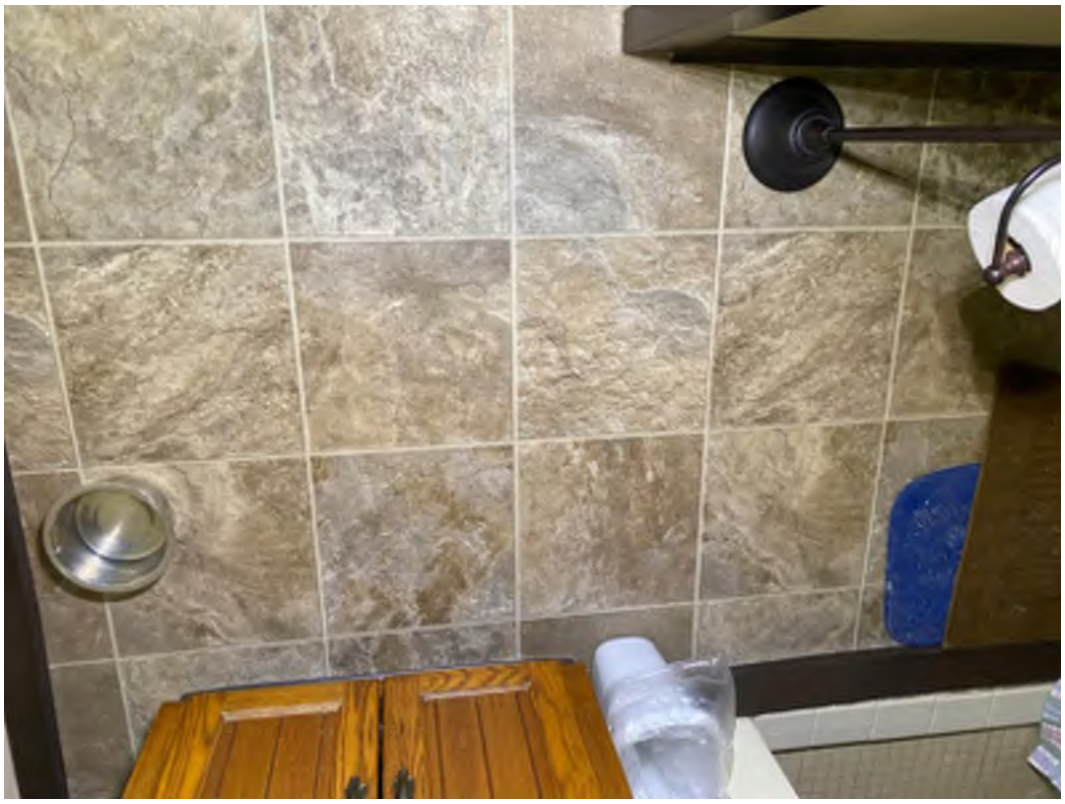


UNIT 510

KITCHEN



BATHROOM

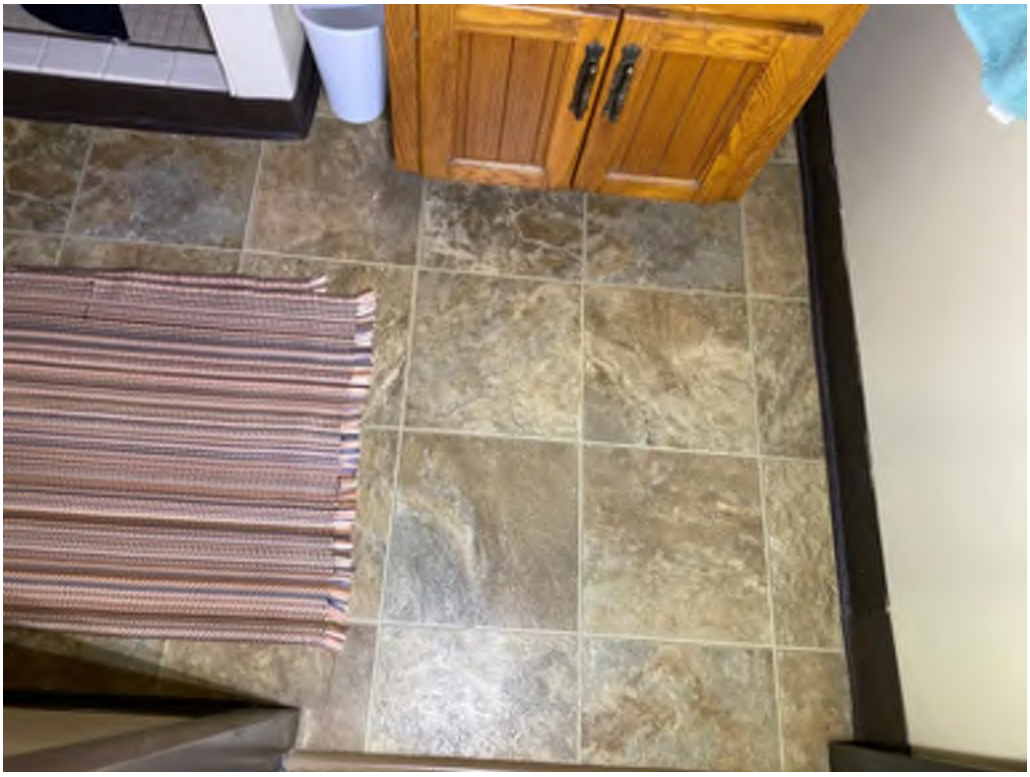


UNIT 601

KITCHEN



BATHROOM



UNIT 602

KITCHEN



BATHROOM

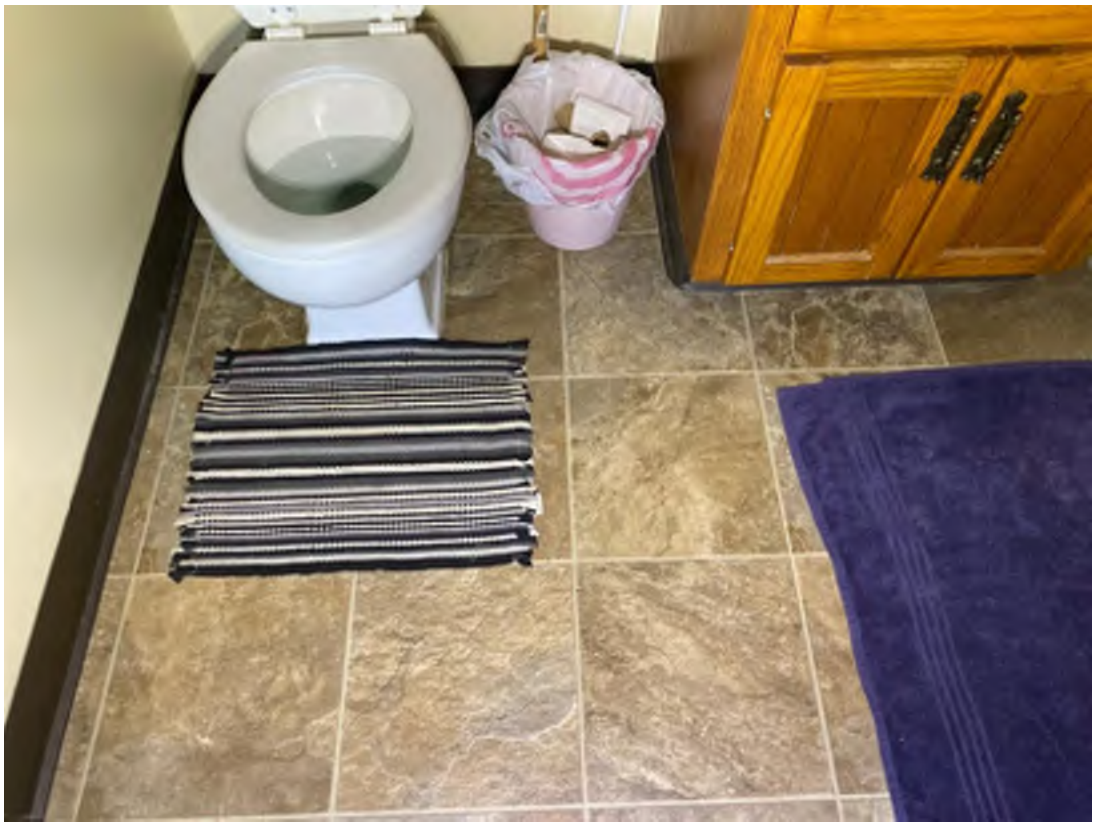


UNIT 603

KITCHEN

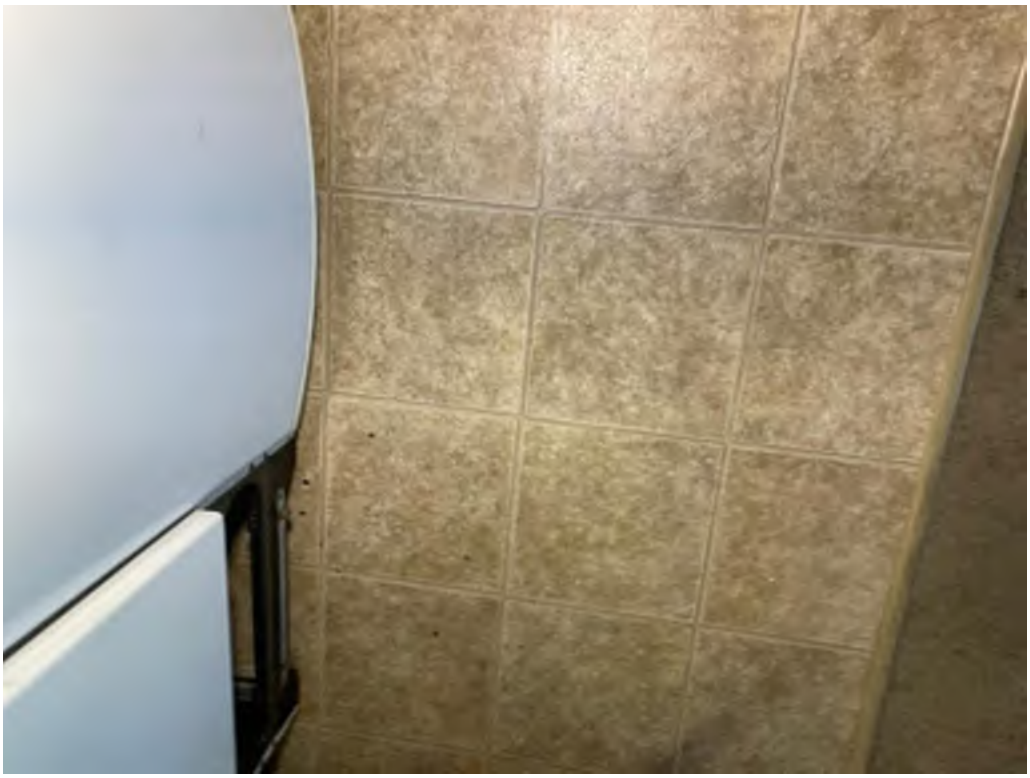


BATHROOM



UNIT 604

KITCHEN



BATHROOM



UNIT 605

KITCHEN



BATHROOM

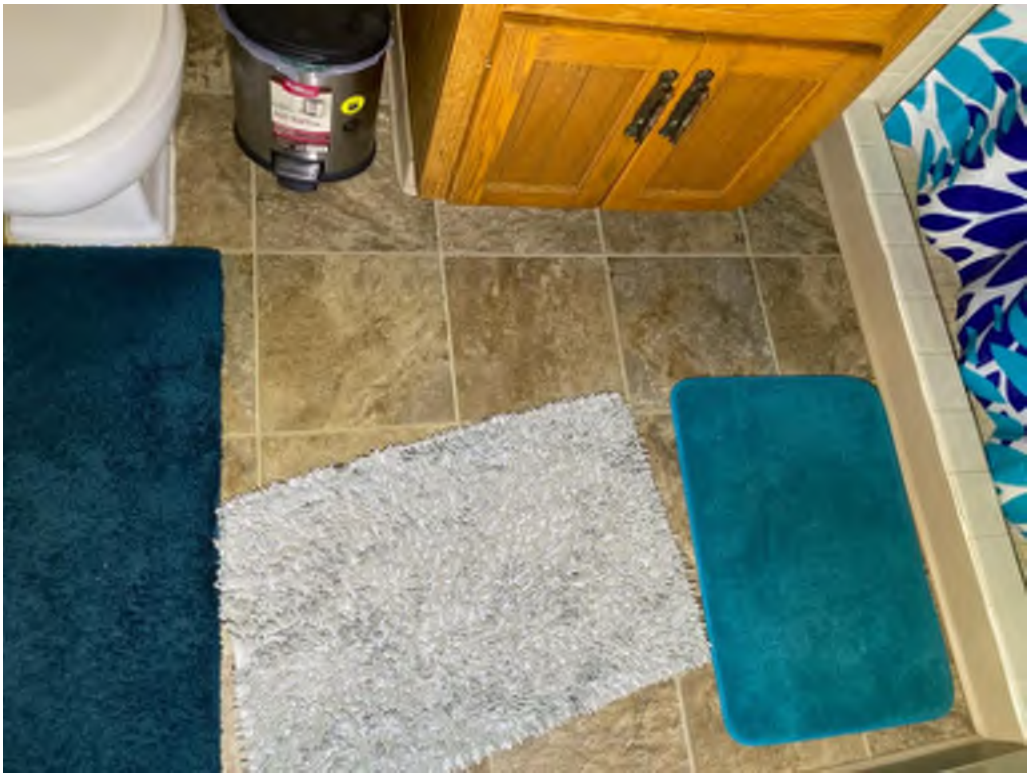


UNIT 606

KITCHEN



BATHROOM



UNIT 607

KITCHEN



BATHROOM



UNIT 608

KITCHEN

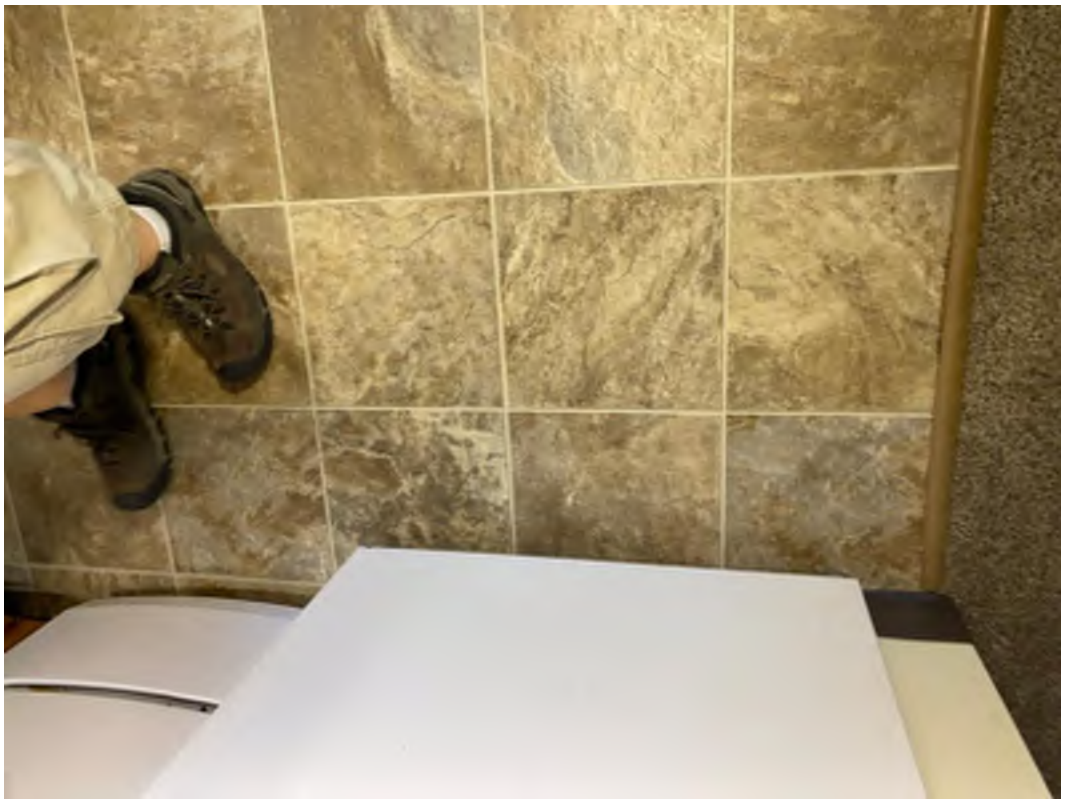


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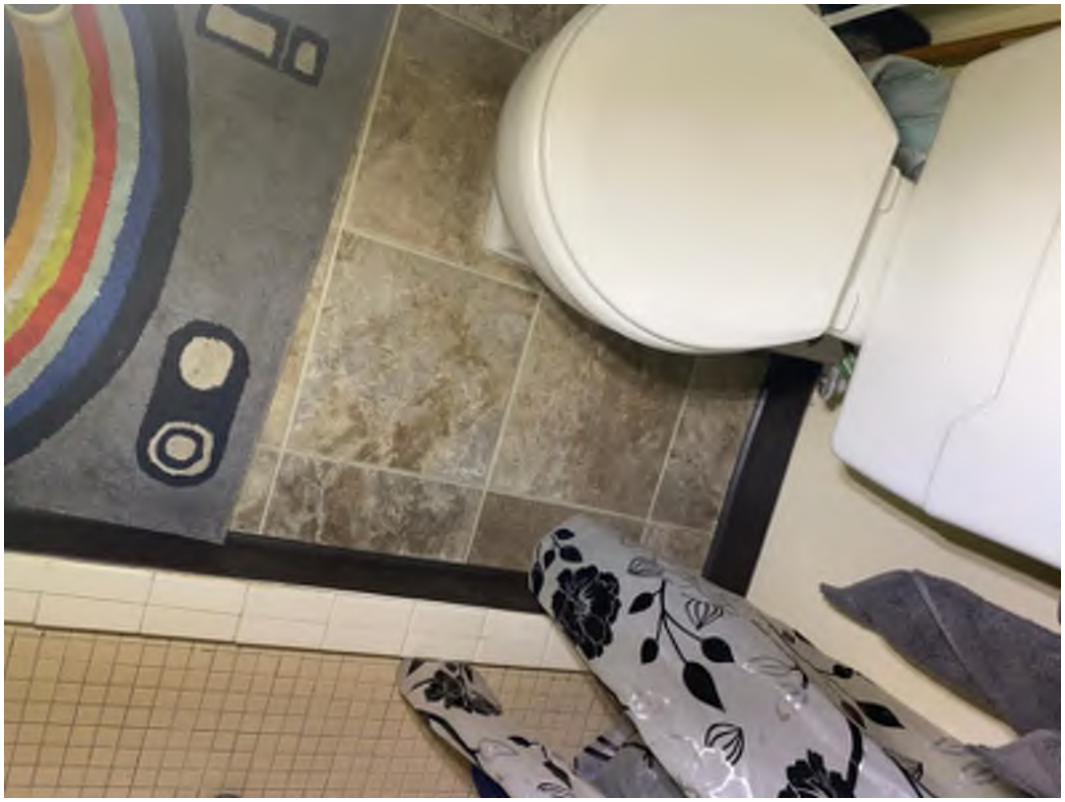


UNIT 609

KITCHEN



BATHROOM



UNIT 701

KITCHEN



BATHROOM



UNIT 703

KITCHEN

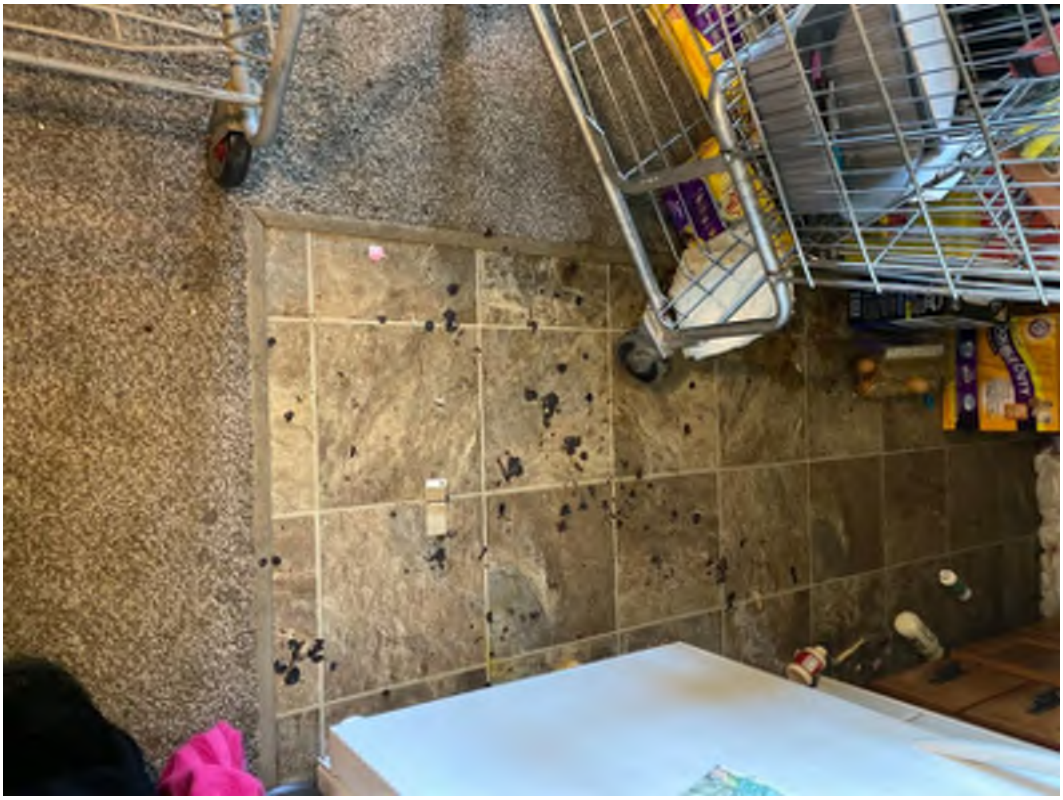


BATHROOM



UNIT 704

KITCHEN



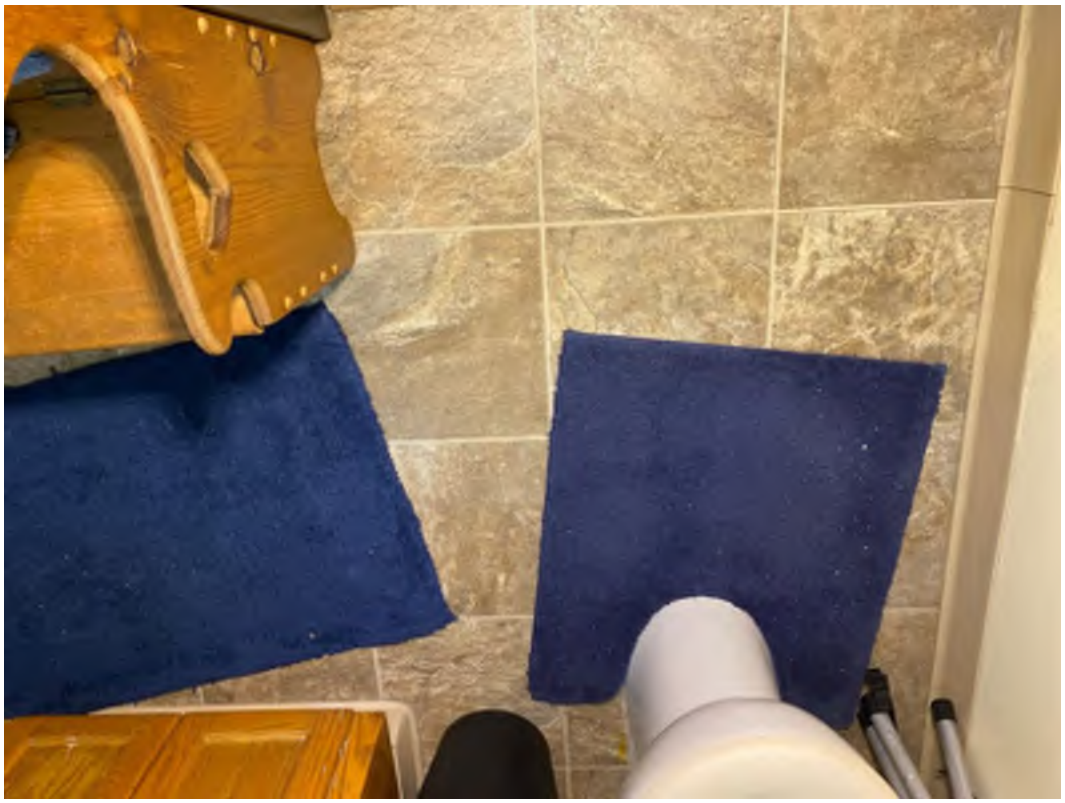
BATHROOM

UNIT 705

KITCHEN

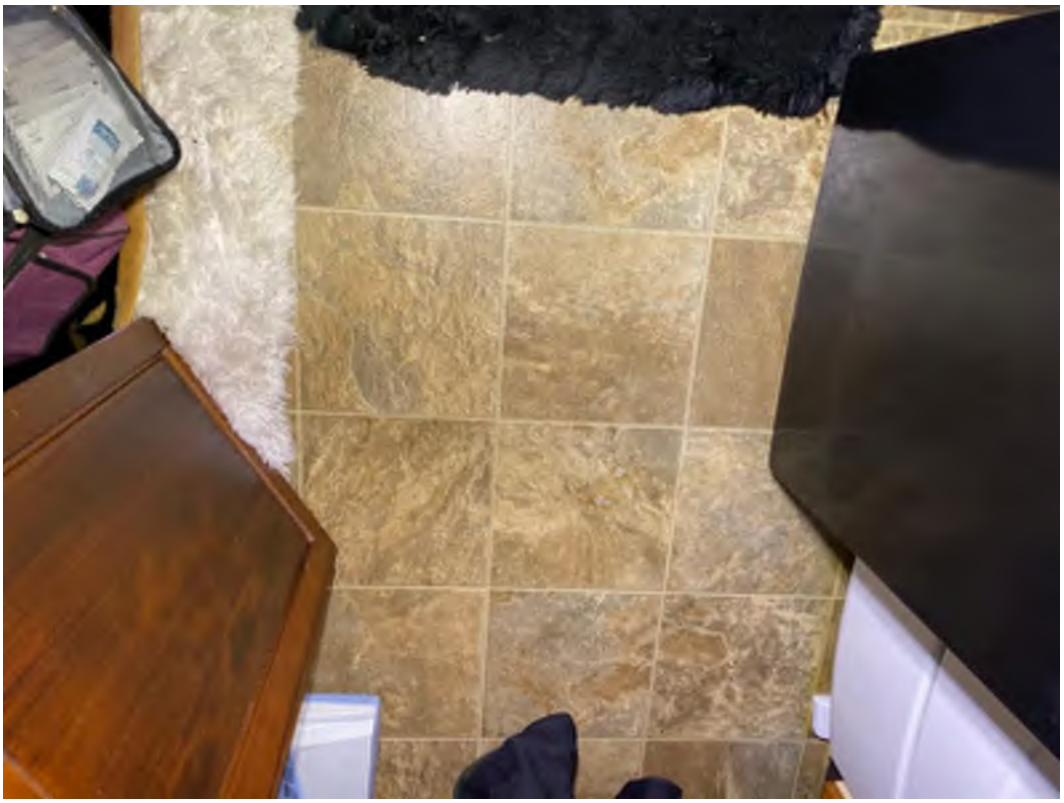


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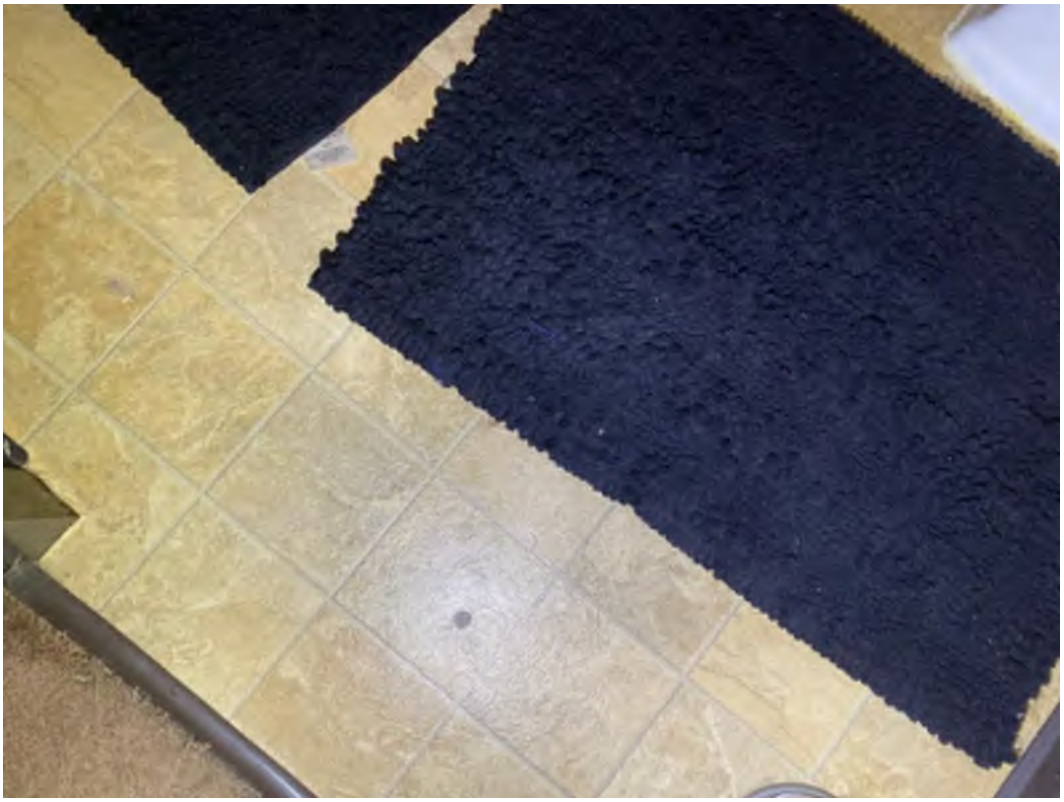


UNIT 706

KITCHEN



BATHROOM



UNIT 707

KITCHEN

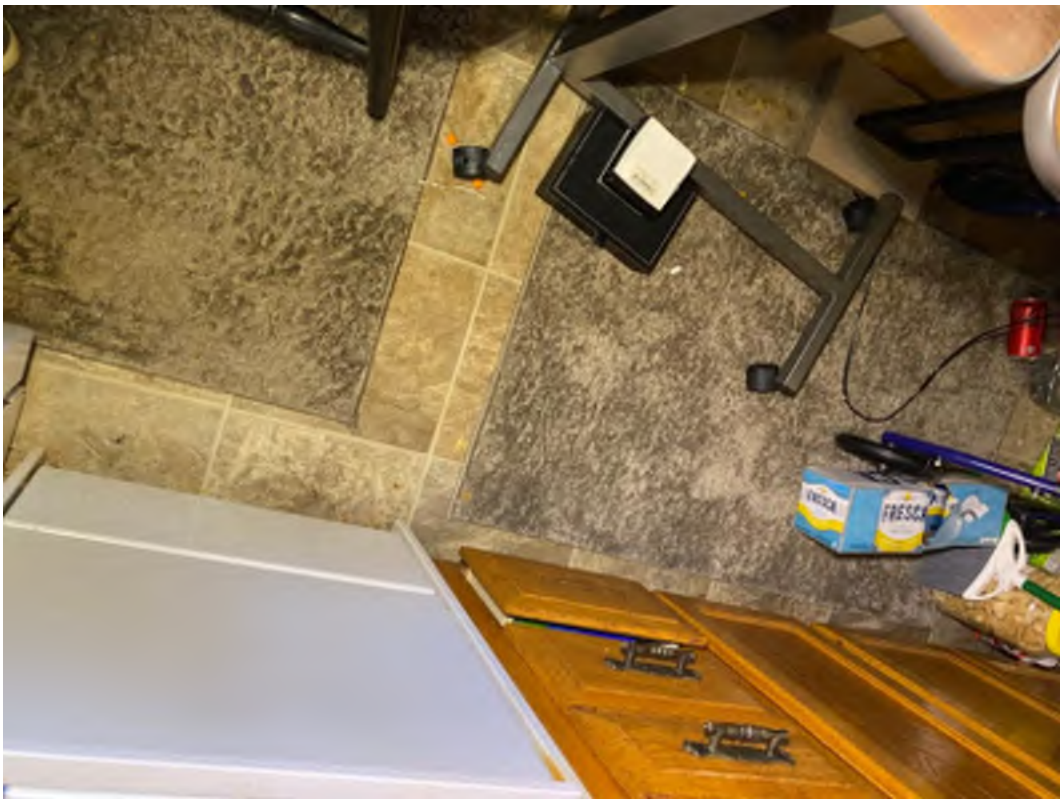


BATHROOM



UNIT 708

KITCHEN

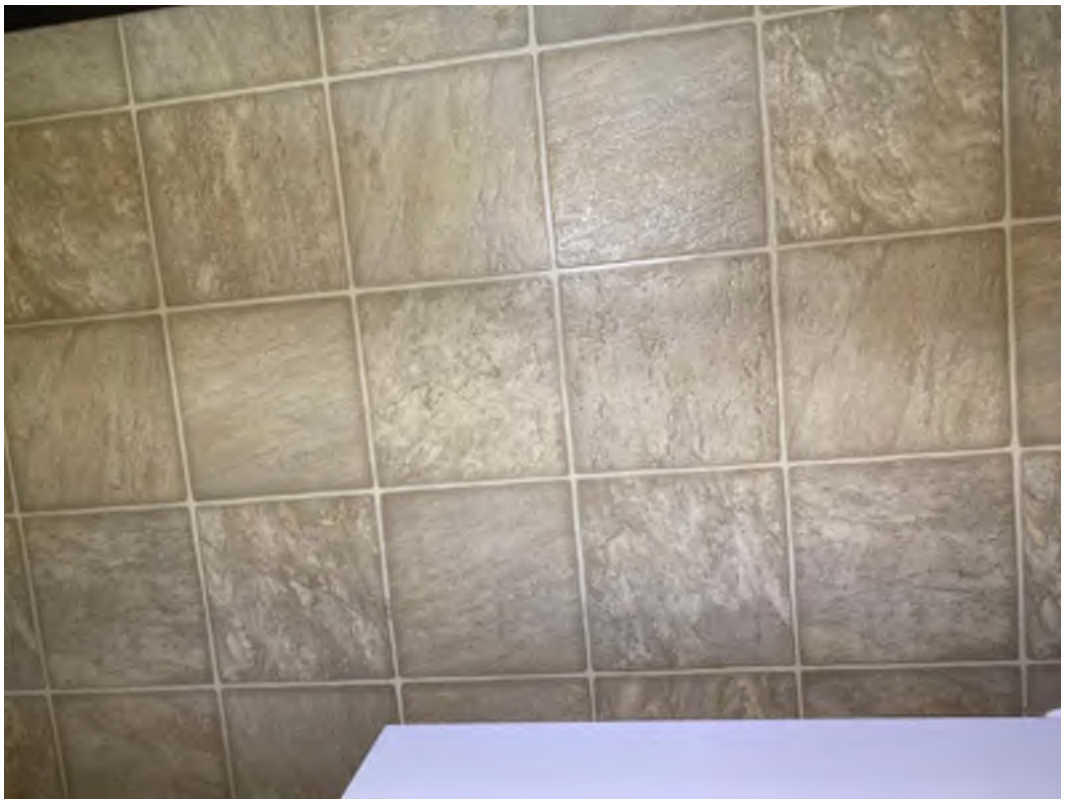


BATHROOM



UNIT 709

KITCHEN



BATHROOM



UNIT 710

KITCHEN



BATHROOM



UNIT 801

KITCHEN



BATHROOM



UNIT 803

KITCHEN



BATHROOM

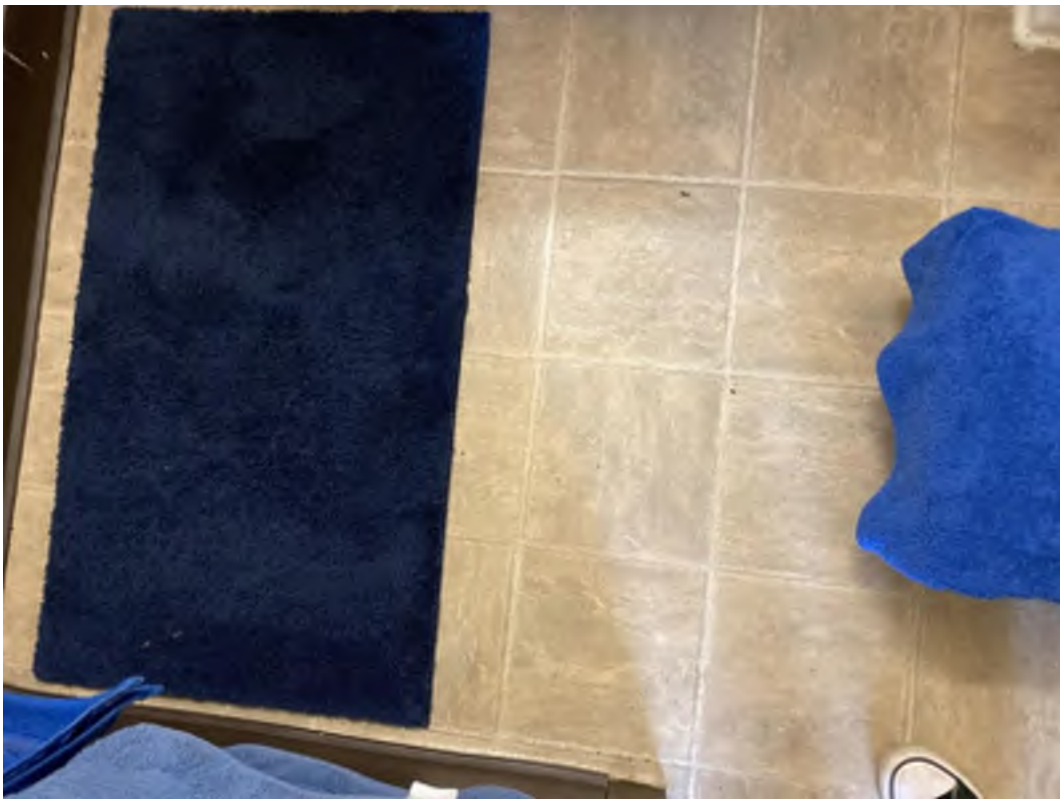


UNIT 804

KITCHEN



BATHROOM



UNIT 805

KITCHEN



BATHROOM

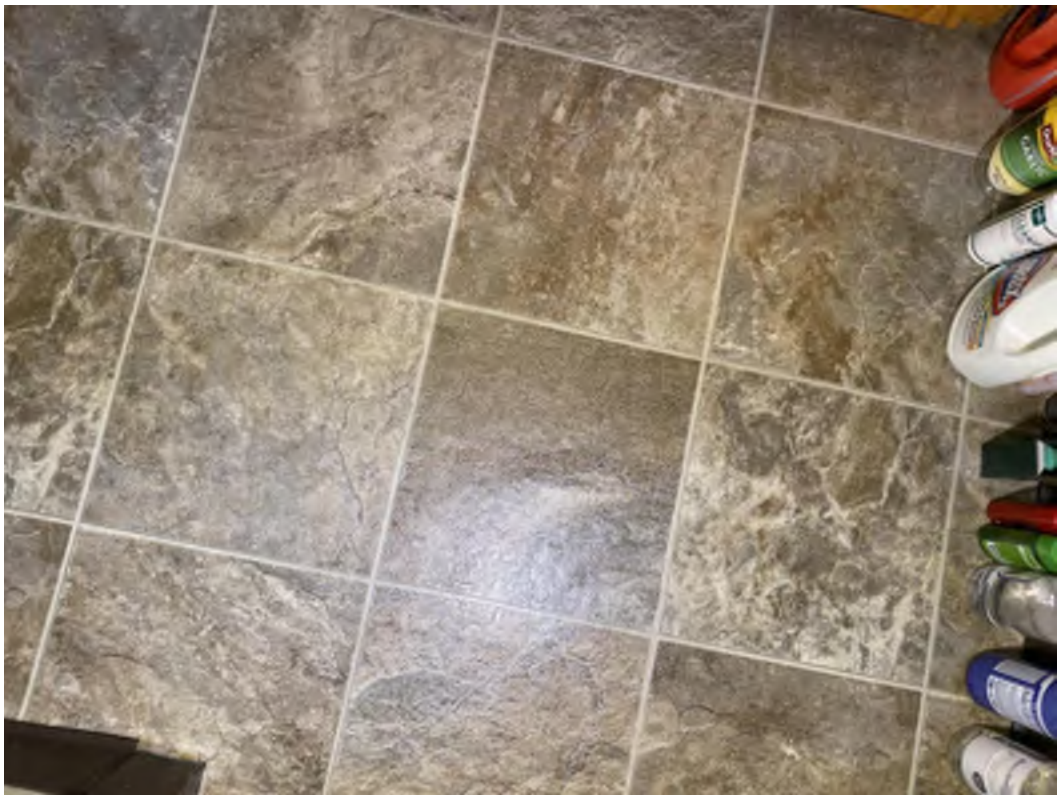


UNIT 807

KITCHEN

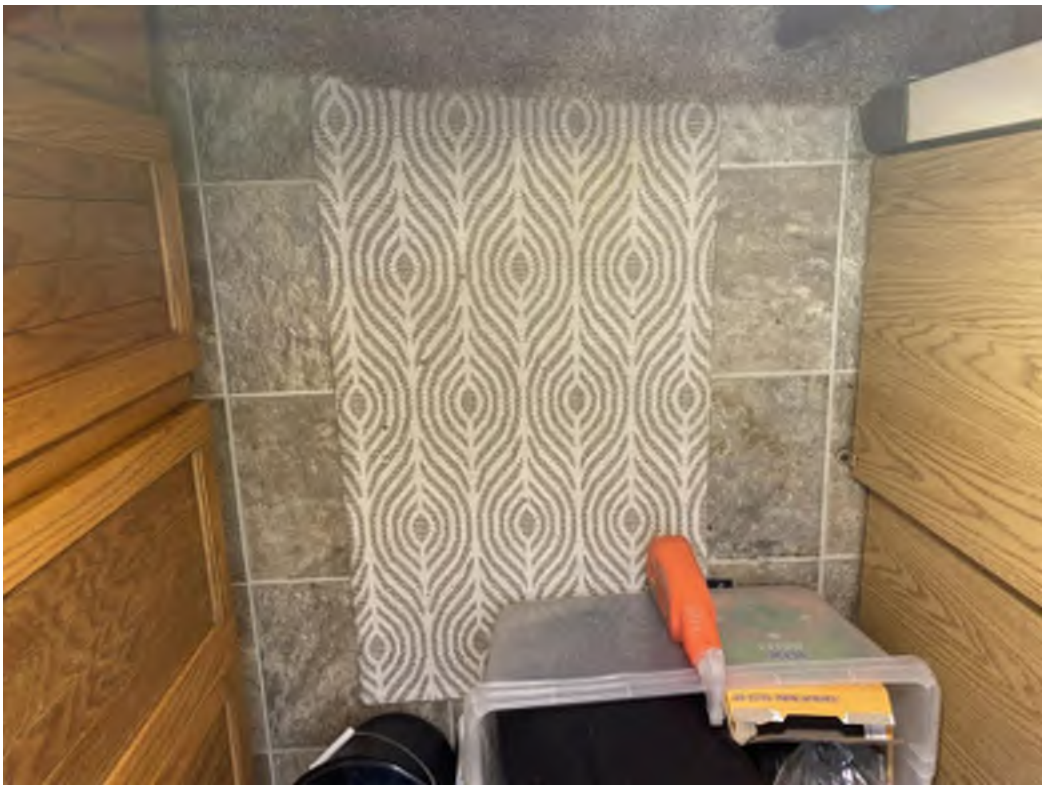


BATHROOM



UNIT 808

KITCHEN



BATHROOM



UNIT 809

KITCHEN



BATHROOM



UNIT 810

KITCHEN



BATHROOM



UNIT 901

KITCHEN



BATHROOM



UNIT 902

KITCHEN



BATHROOM



UNIT 903

KITCHEN

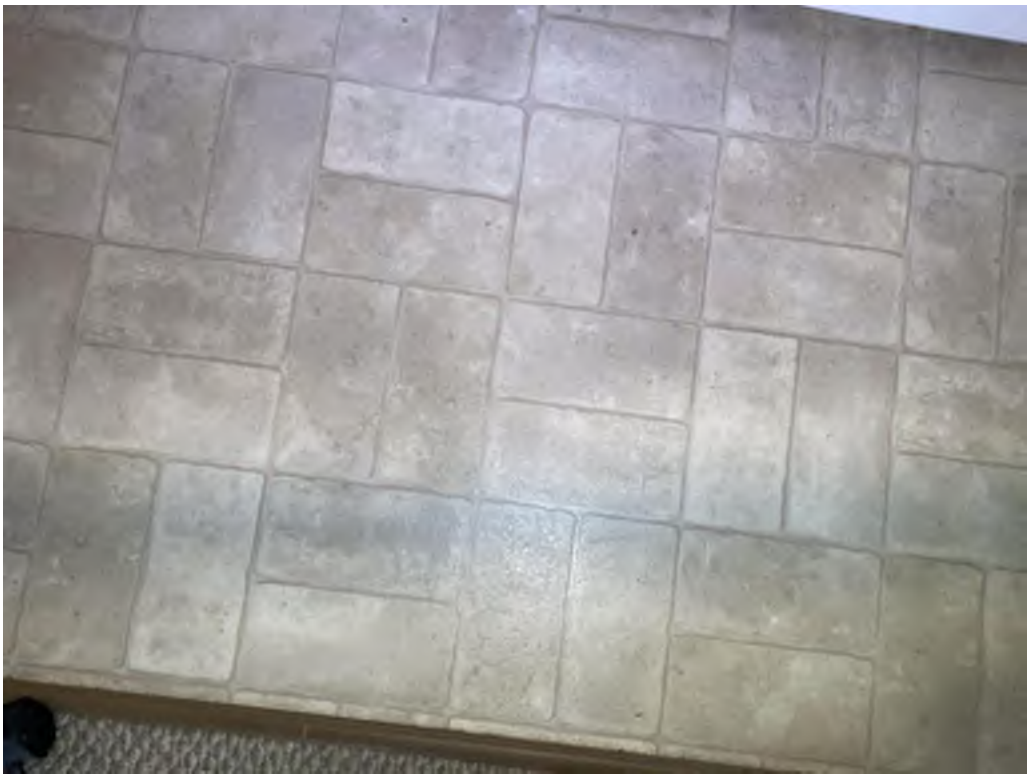


BATHROOM



UNIT 904

KITCHEN



BATHROOM



UNIT 905

KITCHEN



BATHROOM



UNIT 906

KITCHEN



BATHROOM



UNIT 907

KITCHEN

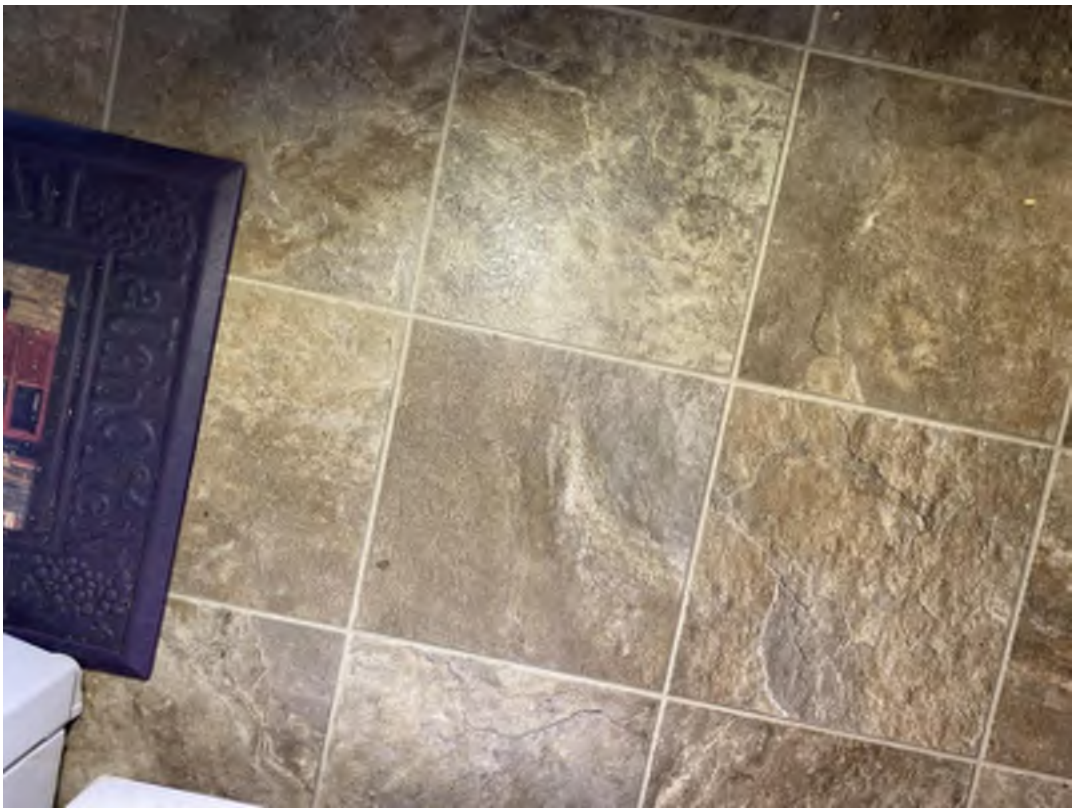


BATHROOM



UNIT 908

KITCHEN



BATHROOM



UNIT 909

KITCHEN

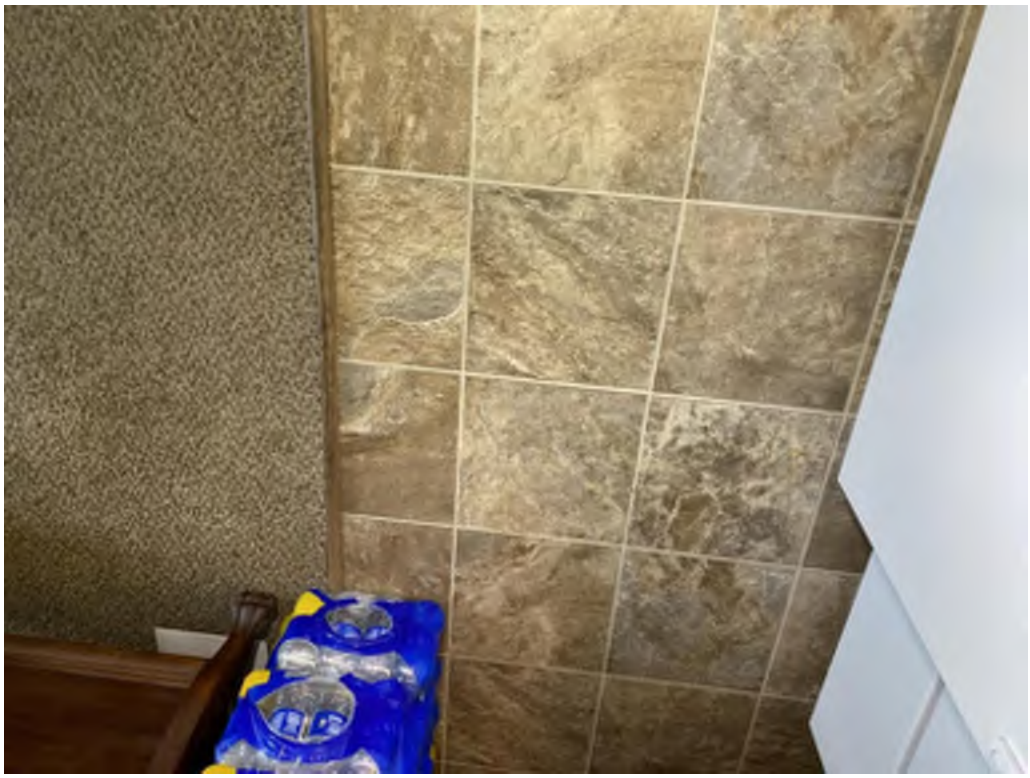


BATHROOM



UNIT 910

KITCHEN



BATHROOM



UNIT 1001

KITCHEN

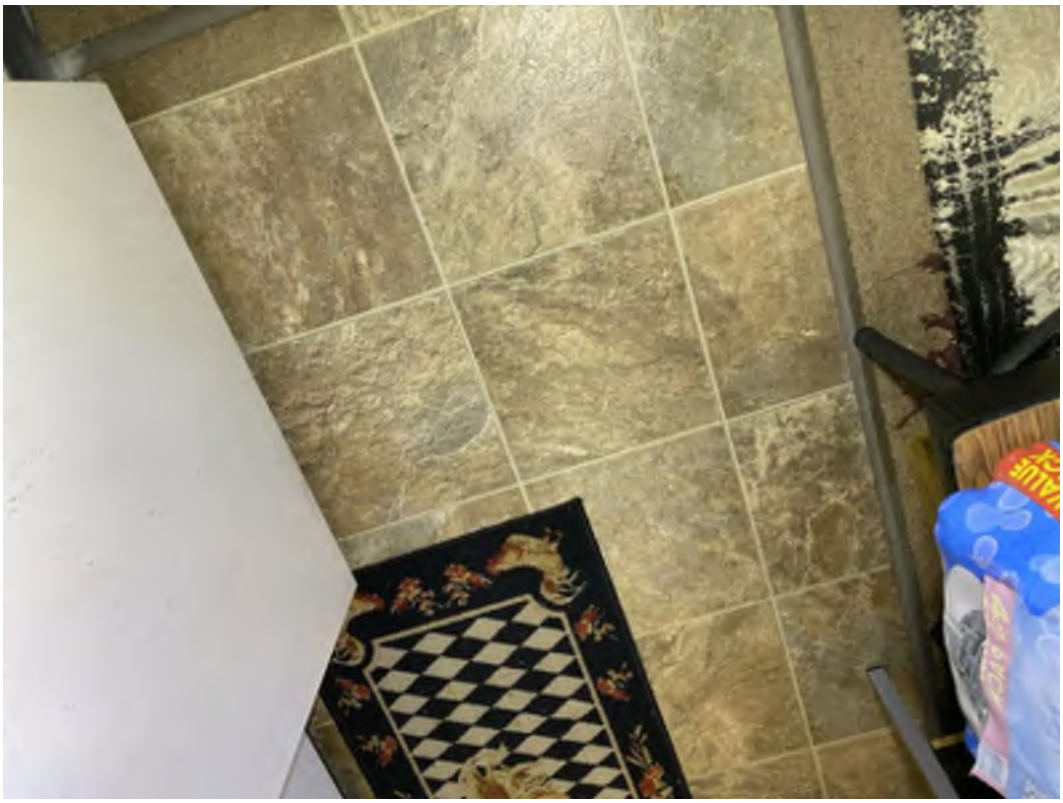


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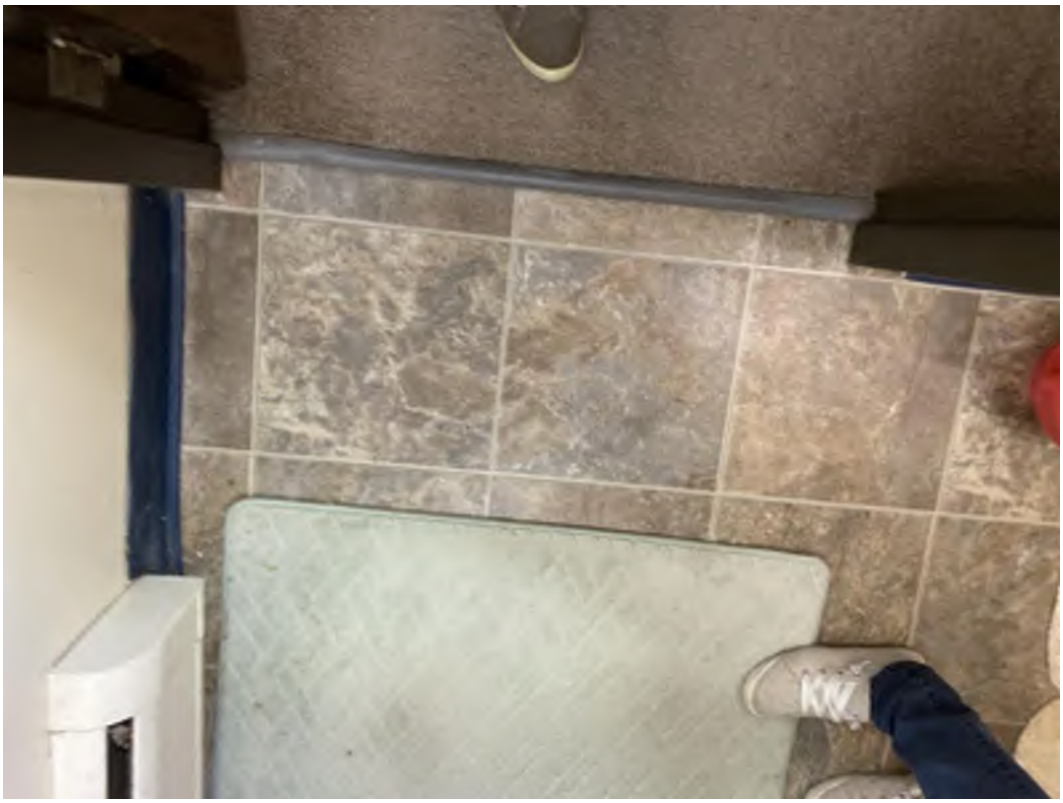


UNIT 1002

KITCHEN

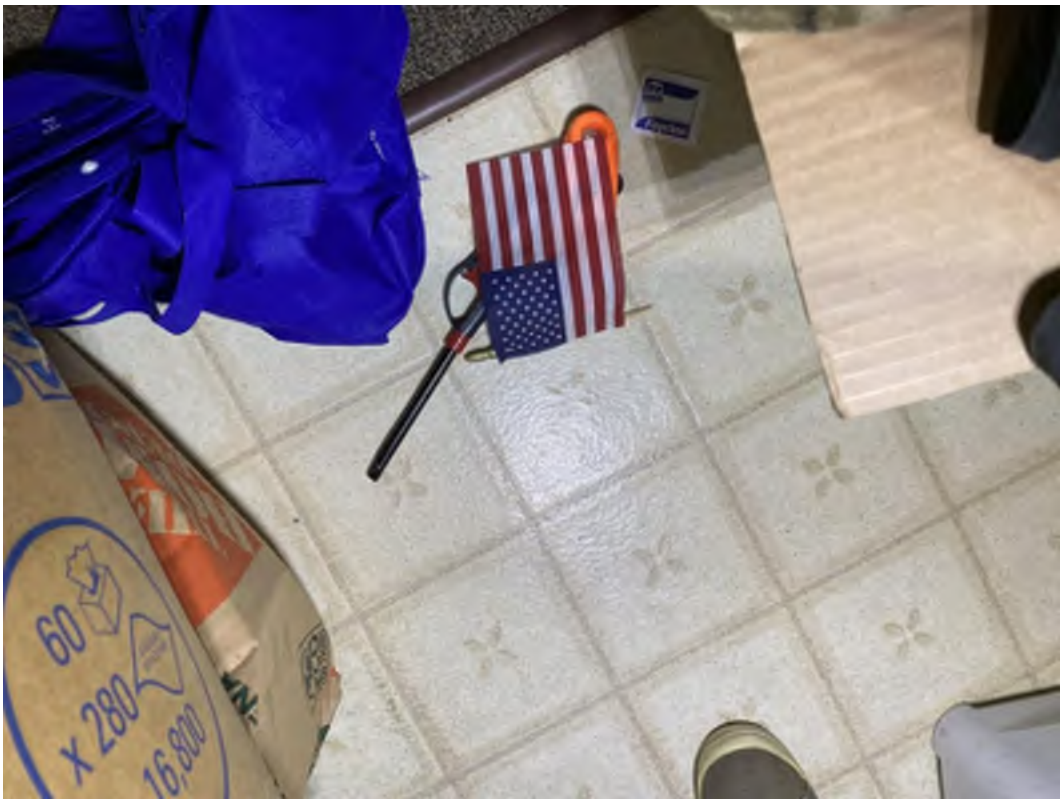


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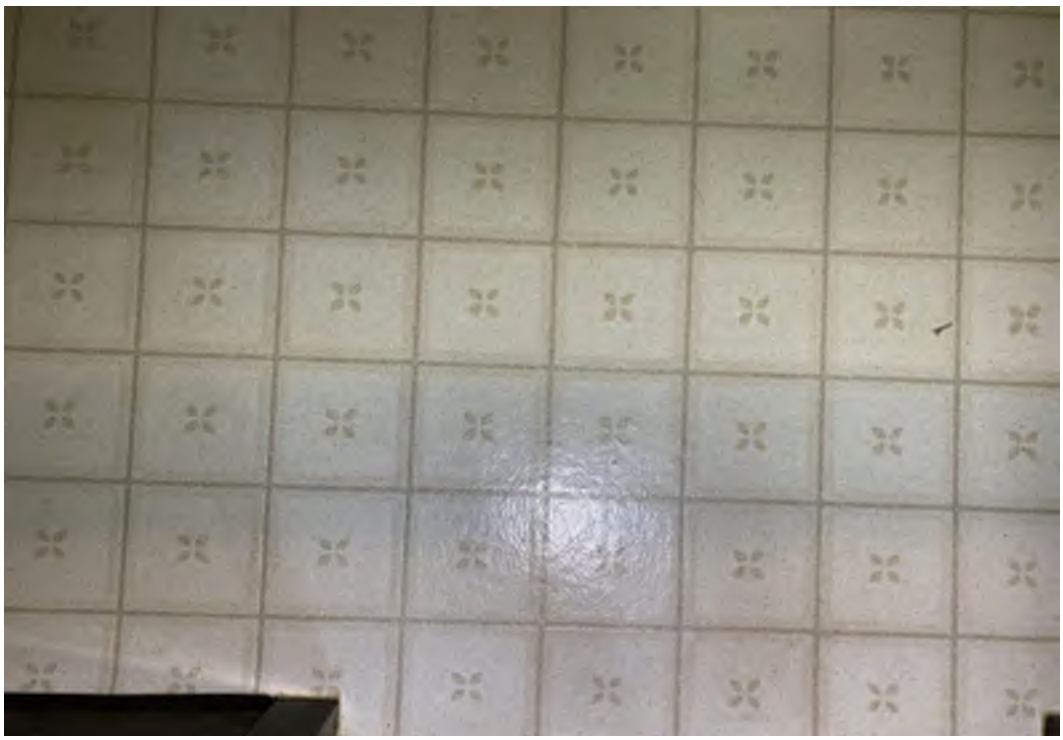


UNIT 1003

KITCHEN



BATHROOM



UNIT 1005

KITCHEN



BATHROOM

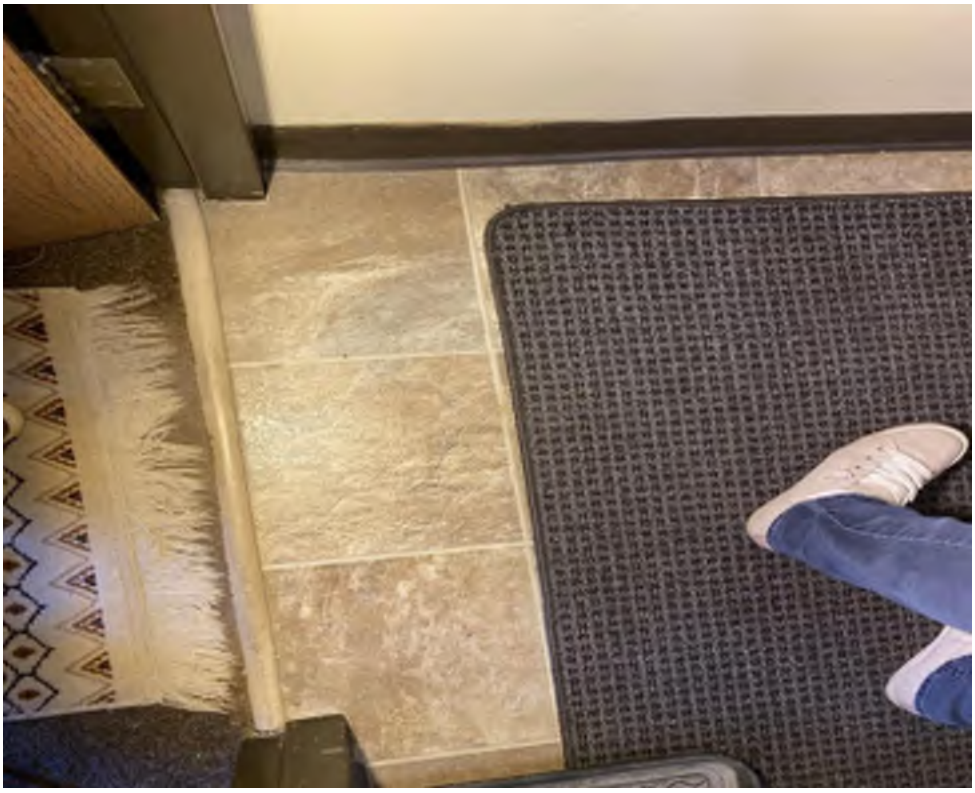


UNIT 1006

KITCHEN

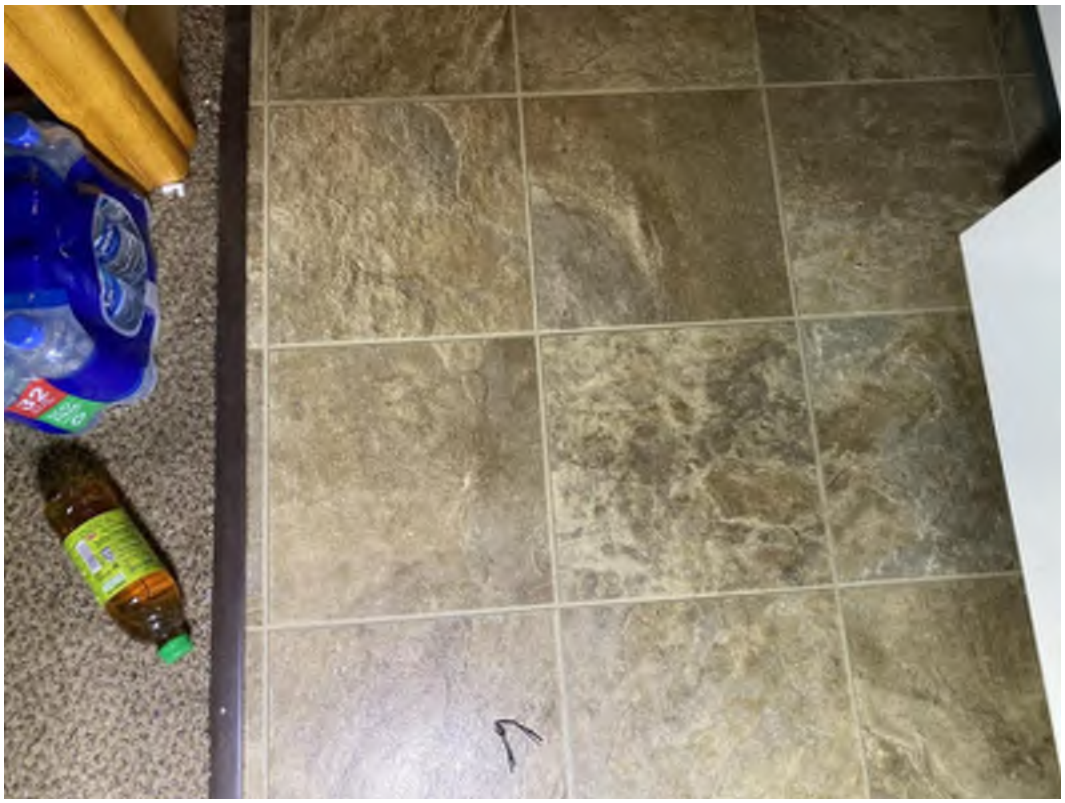


BATHROOM



UNIT 1007

KITCHEN



BATHROOM

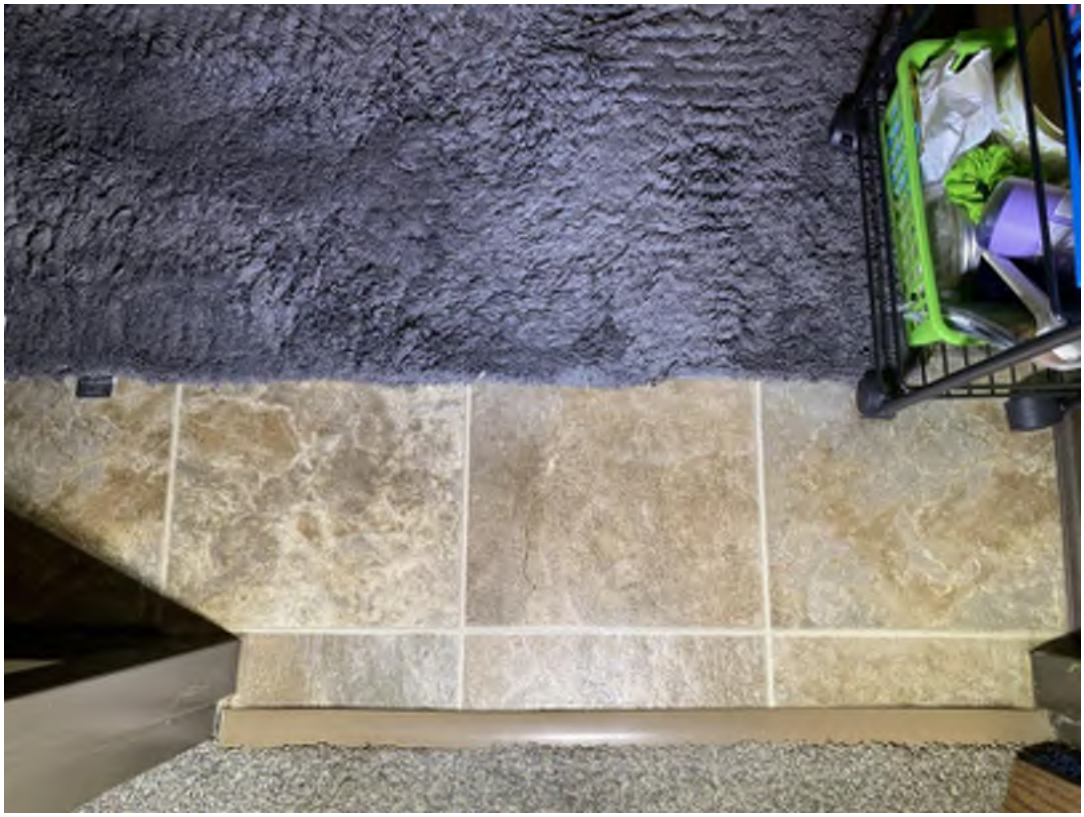


UNIT 1008

KITCHEN



BATHROOM



UNIT 1009

KITCHEN



BATHROOM



UNIT 1010

Appendix F

Work Practice Worksheets

Cleaning a room that has asbestos-containing dust

Example

The following are examples of work that can be performed using the following procedures. If job conditions vary from the examples stop work and notify your supervisor.

A. Clean an office area where asbestos-containing dust may settle on furniture due to periodic disturbance of an exposed ACM.

B. Clean a mechanical room where dust is assumed to contain ACM from thermal systems insulation present in room.

Work Practice

1. Obtain tools, equipment and materials, including dusting materials (cloths, dusters, mops) that are damp or are treated with catatonic or anti-static dust attractant preparations.
2. Routine dusting: Using damp or treated dusting materials, clean surfaces beginning from the top of the room and working towards the floor. Do not dry dust. HEPA vacuum surfaces that are not easily cleaned with dusting materials.
3. Routine vacuuming: Perform routine vacuuming with HEPA vacuums. HEPA vacuum surfaces such as drapes and fabric covered surfaces by starting at the top and working towards floor. HEPA vacuum carpet as last step after all dusting.
4. Routine floor cleaning: Dust mop using damp mops or treated dusting mops. Wash floors using normal mopping procedures. HEPA vacuum carpeting. Do not dry dust. Do not use vacuum a vacuum cleaner without a HEPA filter.
5. Periodic cleaning: Surfaces that are not routinely cleaned are to be cleaned during periodic cleaning using wet methods or HEPA vacuums. Wet wipe smooth hard surfaces (such as blinds) or wash with paper towels or disposable cloths. HEPA vacuum cloth or textured surfaces. Dispose of all dirty cloths and soiled dusting materials while still damp in ACM disposal bags.
6. Perform clean-up and tear-down to complete work.

Cleaning up debris

Example

The following are examples of work that can be performed using the following procedures. If job conditions vary from the examples stop work and notify your supervisor.

A. Clean up debris and dust on surfaces after a small area of surfacing ACM has fallen from a ceiling, pipe insulation or other source.

Work Practice

1. Obtain tools, equipment and materials.

2. Remove asbestos-containing debris using the following sequence:
   a) Shut down all ventilation into room.
   b) Start HEPA vacuum before entering the area.
   c) Use the HEPA vacuum to clean a path at least 6 feet (1.83 m) wide from the entry point of the work area to the site of the fallen material.
   d) Remove all small debris with the HEPA vacuum.
   e) Remove any dust or loose debris from the surface of larger pieces of ACM with a HEPA vacuum. Mist surface of pieces with amended water.
   f) Pick up such pieces and place in the bottom of a 6 mil (0.15 mm) polyethylene disposal bag. Place pieces in the bag without dropping and avoiding unnecessary disturbance and release of material. Thoroughly wet debris in bag with amended water as it is collected.
   g) Remove all remaining visible debris with HEPA vacuum.
   h. HEPA vacuum an area 3 feet (0.91 m) beyond the location in which any visible debris was found. HEPA in two directions each at right angles to the other.
   i. Wet wipe any hard surfaces or objects in the area,
   j. Place a 6 mil "Polyethylene Drop Cloth," immediately on top of the HEPA vacuumed area before performing any repair work on site from which fall-out occurred.
   k. HEPA vacuum the site from which material fell removing all loose material which can be removed by the vacuums suction.
   l. Repair or remove remaining material using the appropriate O&M work practice.
   m. HEPA vacuum ladder and/or any tools used and pass out of the work area.
5. Clean and decontaminate objects in the vicinity of debris using the following procedure:
   a. Perform all work of decontaminating objects wherever possible on a plastic drop sheet installed in conformance General Procedure W10 "Polyethylene Drop Cloth."
   b. HEPA vacuum all surfaces of object and immediate area before moving the object.
   c. Pick-up object, if possible, and HEPA vacuum all surfaces.
   d. Hand to off-sheet worker who will wet-clean object, if possible, and place in storage location.
   e. Decontaminate area where object was located by HEPA vacuuming twice, in two perpendicular directions. Wet clean if necessary to remove any debris.
   f. Return object to its original location.
6. Perform clean-up and tear-down steps to complete work.

Cutting or drilling ACM drywall with drywall compound

Example

The following are examples of work that can be performed using the following procedures. If job conditions vary from the examples stop work and notify your supervisor.

The following are examples of work that can be performed using the procedures of this Level B work practice. If job conditions vary from the examples stop work and notify your supervisor.

1. Install new electrical receptacle or ceiling junction box in asbestos-containing drywall using hand tools.
2. Drill holes to attach conduit to asbestos-containing drywall using a drill with a HEPA exhausted collar attachment.
3. Drill holes in asbestos-containing joint compound where drywall is non-asbestos

Work Practice

1. Obtain tools, equipment and materials, including drill or hole saw (as needed) equipped with HEPA filtered dust collection.
2. Complete Worker General Procedure W4 “Secure Work Area”
3. Put down drop sheet and complete Worker General Procedure W10 “Polyethylene Drop Cloth.”
4. If accessible, also install a drop cloth on back side of drywall if hole(s) will penetrate through wall.
5. Place tools, equipment and materials needed onto drop cloth.
6. Mark area to be cut or drilled.
7. Adequately wet area to be cut using garden sprayer with amended water. As alternate methods, holes can be drilled/cut through a wet sponge or shaving cream on both sides.
8. Cut new hole using utility knife, hand tools or power tools with HEPA filtered dust collection. Wet the cutting area using amended water during cutting or drilling.
9. Remove piece of cut drywall and place into disposal bag. If wet sponges were used, place sponges into disposal bag.
10. HEPA vacuum removal area and areas accessible from hole.
11. HEPA vacuum and wet wipe up any accessible dust or debris generated on back side. Wet wipe drop cloth and surfaces adjacent to area where hole was cut or drilled. Remove drop cloth and place into disposal bags.
12. Perform maintenance work and clean-up and tear-down steps on Level B checklist to complete work.

Removing a section of asbestos-containing drywall

Example

The following are examples of work that can be performed using the following procedures. If job conditions vary from the examples stop work and notify your supervisor.

1. Level B: A. Remove small area of asbestos-containing drywall in good condition using nonpowered hand tools. Low dust Level expected.

Work Practice

2. Obtain tools, equipment and materials, including hand tools and pry bars.
3. Complete Worker General Procedure W4 “Secure Work Area”
4. Put down drop sheet and complete Worker General Procedure W10 “Polyethylene Drop Cloth.”
5. Place tools, equipment and materials needed onto drop cloth.
6. Adequately wet entire area of drywall to be removed using garden sprayer with amended water.
7. Cut around perimeter of area to be removed using hand tools. Wet cutting area with amended water during cutting.
8. If drywall remains attached to studs or substrate, use pry bar to pull sheet out enough so edge can be gripped with hands. Mist cavity behind drywall and back side of drywall to be removed with amended water.
9. Pull sheet out so sheet folds at fastener line or sheet is pulled away from fasteners. Adequately wet fold or holes from fasteners.
10. Repeat step above at other attachment points, remove drywall piece, and package for disposal.
11. Remove fasteners from studs or substrate and place into disposal bags. Clean any debris left on studs or substrate using amended water and nylon brush.
12. Pick up any debris and place into disposal bags. HEPA vacuum and wet wipe up any dust generated.
13. Perform maintenance work and clean-up and tear-down steps on Level B checklist to complete work.

Repairing damaged wall or ceiling texture

Example

The following are examples of work that can be performed using the following procedures. If job conditions vary from the examples stop work and notify your supervisor.

A. Repair gouge marks in textured ceiling where a small amount of damaged is present.
B. Repair small area of peeling or delaminated ceiling texture in good condition.

Work Practice

1. Obtain tools, equipment and materials to complete the repair work, including a small stiff-bladed scraper.
2. Inspect work area for visible dust or debris. If present, stop work and notify Asbestos Project Manager.
3. Secure the work area. When asbestos fibers might be released, work areas should be vacated and secured (where feasible) by scheduling, locking doors (from inside the area if possible) or other means. If this is not feasible, access to the work area should be restricted, such as by asbestos barrier tape around the perimeter of the work area. If barrier tape is used to denote a work area, it should be placed 5 to 10 feet (1.5 to 3 meters) outside of any polyethylene protection used in the work area. Install barrier tape by taping or tying it to fixed objects. Do not block access to any emergency exits, and when asbestos fibers might be released, post OSHA required "danger" signs at all entrances to the work area. For such projects, it might be desirable to have a visual barrier installed several feet in front of warning signs to avoid having warning signs readily visible to occupants. A "keep out of construction area" sign should be posted on visual barriers. A visual barrier would be arranged so that a person who goes past the visual barrier will then see required warning signs.
4. Place a “polyethylene drop cloth in the work area and place the needed tools, equipment and materials onto drop cloth.
5. Mist any damaged surfacing using a spray bottle with amended water and allow water to soak in for several minutes.
6. Use a HEPA vacuum to clean the area around the damaged area and remove any loose material by hand or with a scraper. Dispose the collect material in bags as it is removed. Remove material around edges of damaged area until well-adhered material is found, but do not remove beyond area protected by drop cloth. Mist removal area during removal of damaged material.
7. Repair damaged area using non-ACM materials.
8. Clean-up and tear-down work area. Remove lockout tags (if used) & restart any HVAC/electrical system(s) that were shut off. Return tools, equipment and remaining materials to storage area. Notify the Property Manager that work is completed & return documents to APM.

Level A: work may contact ACM but not disturb it. If you encounter damaged ACM, or if the work could damage the ACM, stop work and notify your supervisor.

Level B: is work that may disturb minimal amounts of ACM where the OSHA PEL is not exceeded and release of ACM, dust and debris is confined to the immediate location of the disturbance.

WP-05

Attaching an item to wall or ceiling texture with NO DISTURBANCE

Example

The following is an example of work that can be performed using the procedures outlined below. If job conditions vary from the examples stop work and notify your supervisor.

A. Mounting an item with adhesive to ceiling texture.

Work Practice

1. Obtain tools, equipment and materials.
2. Secure the work area by locking doors (from inside the area if possible) or other means.
3. Place tools, equipment and materials needed in work area.
4. Put bedding of adhesive on the bottom of the item and press against the ceiling.
5. Perform clean-up to complete the work.

Level A: work may contact ACM but not disturb it. If you encounter damaged ACM, or if the work could damage the ACM, stop work and notify your supervisor.

Level B: is work that may disturb minimal amounts of ACM where the OSHA PEL is not exceeded and release of ACM, dust and debris is confined to the immediate location of the disturbance.

WP-06

Repair or replace item on wall or ceiling texture with NO DISTURBANCE to ceiling texture

Example

The following is an example of work that can be performed using the procedures outlined below. If job conditions vary from the examples stop work and notify your supervisor.

A. Replace a diffuser that is completely surrounded by the metal frame of a light fixture recessed in a ceiling finished with ACM acoustical plaster, where the diffuser can be removed without any disturbance of ACM.

Work Practice

1. Obtain tools, equipment, materials and replacement parts to complete the repair work.
2. Inspect work area for visible dust or debris. If present, stop work and notify Asbestos Project Manager.
3. Secure the work area. When asbestos fibers might be released, work areas should be vacated and secured (where feasible) by scheduling, locking doors (from inside the area if possible) or other means.
4. Place tools, equipment and materials needed in work area.
5. Carefully open diffuser without touching the ACM acoustical plaster ceiling. Unhook diffuser from light fixture and remove. Do not touch ACM or rattle light fixture.
6. Perform clean-up and tear-down.

Repair or replace item on wall or ceiling texture with SOME DISTURBANCE to ceiling texture

Example

The following are examples of work that can be performed using the procedures outlined below. If job conditions vary from the examples stop work and notify your supervisor.

A. Attach a battery-powered smoke detector to a suspended acoustical plaster ceiling with two toggle bolts.

B. Attach track lighting to an ACM finished surface where experience has proven a minimal disturbance will occur.

Work Practice

1. Obtain item to be attached to ceiling and related tools.
2. Secure the work area. When asbestos fibers might be released, work areas should be vacated and secured (where feasible) by scheduling, locking doors (from inside the area if possible) or other means. If this is not feasible, access to the work area should be restricted, such as by asbestos barrier tape around the perimeter of the work area. If barrier tape is used to denote a work area, it should be placed 5 to 10 feet (1.5 to 3 meters) outside of any polyethylene protection used in the work area. Install barrier tape by taping or tying it to fixed objects. Do not block access to any emergency exits, and when asbestos fibers might be released, post OSHA required "danger" signs at all entrances to the work area. For such projects, it might be desirable to have a visual barrier installed several feet in front of warning signs to avoid having warning signs readily visible to occupants. A "keep out of construction area" sign should be posted on visual barriers. A visual barrier would be arranged so that a person who goes past the visual barrier will then see required warning signs.
3. Place a “polyethylene drop cloth in the work area and place the needed tools, equipment and materials onto drop cloth.
4. Wet area on ceiling where item will be attached using a sprayer with amended water.
5. Drill holes through ceiling with one of the following procedures:
    a. Drill hole with drill equipped with dust collection collar attached to a HEPA vacuum. Maintain HEPA vacuum in operation during entire process of drilling holes.
    b. Using hand tools and HEPA vacuum near attachment location, or power tools with attached HEPA vacuum, attach item to ceiling. If small holes are being drilled, drill through a wet sponge or shaving cream to control fiber release.
    c. Scrape away surfacing to at least ½" [13 mm] beyond where hole is needed. Keep the hose of an operating HEPA vacuum within 6" [150mm] and below area where scraping is occurring. Adequately wet scraping area and any dust or debris generated. Drill hole through substrate after ACM is removed.
6. Immediately place all debris into ACM disposal bags.
7. Spray holes with a clear penetrating encapsulant to stabilize disturbed edges.
8. Perform clean-up and tear-down to complete work.

Level A: work may contact ACM but not disturb it. If you encounter damaged ACM, or if the work could damage the ACM, stop work and notify your supervisor.

Level B: is work that may disturb minimal amounts of ACM where the OSHA PEL is not exceeded and release of ACM, dust and debris is confined to the immediate location of the disturbance.

WP-08

Repair or replace item on textured wall or ceiling that MAY DISTURB area

Example

The following is an example of work that can be performed using the procedures outline below. If job conditions vary from the examples stop work and notify your supervisor.

A. Removal of a light fixture that is recessed in a ceiling finished with ACM acoustical plaster, where the light fixture has an escutcheon so that it can be unfastened and dropped out.

Work Practice

1. Obtain tools, equipment and materials to complete the repair work.
2. Inspect work area for visible dust or debris. If present, stop work and notify Asbestos Project Manager.
3. Secure the work area. When asbestos fibers might be released, work areas should be vacated and secured (where feasible) by scheduling, locking doors (from inside the area if possible) or other means. If this is not feasible, access to the work area should be restricted, such as by asbestos barrier tape around the perimeter of the work area. Do not block access to any emergency exits, and when asbestos fibers might be released, post OSHA required "danger" signs at all entrances to the work area.
4. Place a “polyethylene drop cloth in the work area and place the needed tools, equipment and materials onto drop cloth.
5. Mist Lightly mist area of ACM acoustical plaster around frame of light fixture using garden sprayer containing amended distilled water and allow water to soak in for several minutes.
6. Completely remove screws holding light fixture in place, while holding fixture so that it does not move.
7. Gradually lower one side of fixture while removing any loose ceiling material with a HEPA vacuum. Lower other side while continuing with HEPA vacuum. Use HEPA vacuum to remove any ceiling material as fixture is lowered from the ceiling. Disconnect wire from fixture and coil above ceiling so that it does not contact the acoustical plaster.
8. Use a HEPA vacuum to clean the area followed with wet wiping all surfaces of the light fixture. Collect any surfacing debris from repair/replacement work using HEPA vacuum.
9. Clean-up work area. Remove lockout tags (if used) & restart any HVAC/electrical system(s) that were shut off. Clean and return tools, equipment and remaining materials to storage area. Notify the Property Manager that work is completed & return documents to APM.

Level A: work may contact ACM but not disturb it. If you encounter damaged ACM, or if the work could damage the ACM, stop work and notify your supervisor.

Level B: is work that may disturb ACM, but where the OSHA PEL is not exceeded and release of ACM, dust and debris is confined to the immediate location of the disturbance.

Install wiring or cables in plenum space where exposed ceiling texture is present.

Example

The following is an example of work that can be performed using the following procedures. If job conditions vary from the examples stop work and notify your supervisor.

A. Installing new plenum rated cables that will lay on top of ceiling, where the ceiling texture is in good condition and well out of reach of the work, and there is no ACM dust and/or debris on top of ceiling.

Work Practice

1. Obtain tools, equipment and materials to complete the repair work.
2. Inspect work area for visible dust or debris. If present, stop work and notify Asbestos Project Manager.
3. Secure the work area. When asbestos fibers might be released, work areas should be vacated and secured (where feasible) by scheduling, locking doors (from inside the area if possible) or other means. If this is not feasible, access to the work area should be restricted, such as by asbestos barrier tape around the perimeter of the work area. If barrier tape is used to denote a work area, it should be placed 5 to 10 feet (1.5 to 3 meters) outside of any polyethylene protection used in the work area. Install barrier tape by taping or tying it to fixed objects. Do not block access to any emergency exits, and when asbestos fibers might be released, post OSHA required "danger" signs at all entrances to the work area.
4. Place tools, equipment and materials needed in work area.
5. Obtain access through ceiling using appropriate O & M work practice.
6. Observe top of ceiling in direction that cables are to be run. Determine conditions at the next location where access above the ceiling is required to determine the level of work practice required for entry. If there is any ACM debris or dust on top of ceiling tiles use level B work procedures, and locate the next ceiling access so that all parts of the ceiling top can be cleaned.
7. Open enough ceiling tiles that the cables can be passed by hand from opening to opening.
8. Install cable(s) by passing leading end of cable(s) from opening to opening. **DO NOT TOSS CABLES OR ANY OTHER OBJECT ABOVE THE CEILING.** Run wiring as required. Do not contact exposed ACM surfacing and minimize disturbance of ceiling system and other components above ceiling while running wiring.
9. Perform clean-up and tear-down.

Install wiring or cables in plenum space that MAY DISTURB ceiling texture.

Example

The following is an example of work that can be performed using the following procedures. If job conditions vary from the examples stop work and notify your supervisor.

A. Installing cables that will lay on top of ceiling, where there is a small amount of dust or debris from ACM surfacing treatment or other ACM material on top of the ceiling or if the ACM surfacing material is close enough to the work that it could be disturbed.

WORK PRACTICE:

1. Obtain tools, equipment and materials to complete the work.
2. Inspect work area for visible dust or debris.
3. Secure the work area. When asbestos fibers might be released, work areas should be vacated and secured (where feasible) by scheduling, locking doors (from inside the area if possible) or other means. If this is not feasible, access to the work area should be restricted, such as by asbestos barrier tape around the perimeter of the work area. If barrier tape is used to denote a work area, it should be placed 5 to 10 feet (1.5 to 3 meters) outside of any polyethylene protection used in the work area. Install barrier tape by taping or tying it to fixed objects and do not block access to any emergency exits.
4. Prepare work area with drop cloth. Set up multiple work areas if needed with a continuous drop cloth under area where cabling is to be run. Secure continuous drop cloth in place to minimize slipping hazards. Install a second drop cloth at each ceiling opening on top of the continuous drop cloth. Secure drop cloths in place to minimize slipping hazards.
5. Place tools, equipment and materials needed onto drop cloth.
6. Obtain access through ceiling using appropriate O & M work practice.
7. HEPA vacuum top side of ceiling within reach from access area.
8. Observe top of ceiling in direction that cables are to be run. Determine conditions at the next location where access above the ceiling is required to determine the level of work practice required for entry. If there is any ACM debris or dust on top of ceiling tiles use level B work procedures, and locate the next ceiling access so that all parts of the ceiling top can be cleaned.
9. Remove any ACM debris in the path to be followed by cables. If there is any ACM debris remove with a HEPA vacuum. Spray a lock back encapsulant on ceiling tile tops wherever debris is removed.
10. Open enough ceiling tiles that the cables can be passed by hand from opening to opening.
11. Install cable(s) by passing leading end of cable(s) from opening to opening. **DO NOT TOSS CABLES OR ANY OTHER OBJECT ABOVE THE CEILING.**
12. Run wiring as required by passing the cable from opening to opening. Do not drag cable across ceiling. Do not drag cables from floor up into ceiling plenum. Do not contact exposed ACM surfacing above ceiling. Minimize disturbance of ceiling system and other components above ceiling while running wiring.
13. Perform clean-up and tear-down to complete work.

Clean room with wall or ceiling texture

Example

The following are examples of work that can be performed using the following procedures. If job conditions vary from the examples stop work and notify your supervisor.

A. Routine cleaning in room with spray-applied acoustical plaster on walls or ceilings where there is no visible dust or debris.

B. Routine cleaning in mechanical room with exposed fireproofing in good condition where there is no visible dust or debris.

Work Practice

1. Collect tools, equipment and materials.
2. Clean area using standard cleaning methods. Avoid contact with any ACM materials that could be damaged during cleaning.
3. Do not clean up asbestos debris. If asbestos debris is found in a space, stop cleaning work in that space and notify your supervisor.
4. The following precautions should be observed when working around the ACM:
   a. Do not bump ACM with vacuum cleaners, broom handles, mop handles or similar objects. Do not exhaust vacuum cleaners toward ACM.
   b. Do not brush ACM surfaces with a broom or similar objects to remove cobwebs or other items attached to ACM.

Level A: work may contact ACM but not disturb it. If you encounter damaged ACM, or if the work could damage the ACM, stop work and notify your supervisor.

Level B: is work that may disturb minimal amounts of ACM where the OSHA PEL is not exceeded and release of ACM, dust and debris is confined to the immediate location of the disturbance.

Painting PREVIOUSLY PAINTED wall or ceiling texture

Example

The following is an example of work that can be performed using the following procedures. If job conditions vary from the examples stop work and notify your supervisor.

A. Repaint previously painted asbestos-containing acoustical plaster in good condition. No preparation of the surface is required.

Work Practice

1. Obtain tools, equipment and materials to complete the repair work, including a small stiff-bladed scraper.
2. Inspect work area for visible dust or debris. If present, stop work and notify Asbestos Project Manager.
3. Secure the work area. When asbestos fibers might be released, work areas should be vacated and secured (where feasible) by scheduling, locking doors (from inside the area if possible) or other means. If this is not feasible, access to the work area should be restricted, such as by asbestos barrier tape around the perimeter of the work area. If barrier tape is used to denote a work area, it should be placed 5 to 10 feet (1.5 to 3 meters) outside of any polyethylene protection used in the work area. Install barrier tape by taping or tying it to fixed objects. Do not block access to any emergency exits. For such projects, it might be desirable to have a visual barrier installed several feet in front of warning signs to avoid having warning signs readily visible to occupants. A "keep out of construction area" sign should be posted on visual barriers. A visual barrier would be arranged so that a person who goes past the visual barrier will then see required warning signs.
4. Prepare work area with drop cloth.
5. Place tools, equipment and materials needed on drop cloth.
6. Paint ceiling using sprayer or rollers. If rollers are used, try to contact each area of the ceiling only once to avoid damage to ACM.
7. When painting is completed, clean up any loose debris using wet wiping and/or HEPA vacuuming, and roll up drop cloth. Dispose of paint rollers as ACM.
8. Perform clean-up and tear-down.

Level A: work may contact ACM but not disturb it. If you encounter damaged ACM, or if the work could damage the ACM, stop work and notify your supervisor.

Level B: is work that may disturb minimal amounts of ACM where the OSHA PEL is not exceeded and release of ACM, dust and debris is confined to the immediate location of the disturbance.

Painting wall or ceiling texture
NOT PREVIOUSLY painted

Example

The following is an example of work that can be performed using the following procedures. If job conditions vary from the examples stop work and notify your supervisor.

A. Paint asbestos-containing textured ceiling texture that has not been previously painted.

Work Practice

1. Obtain tools, equipment and materials to complete the repair work, including a small stiff-bladed scraper.
2. Inspect work area for visible dust or debris. If present, stop work and notify Asbestos Project Manager.
3. Secure the work area. When asbestos fibers might be released, work areas should be vacated and secured (where feasible) by scheduling, locking doors (from inside the area if possible) or other means. If this is not feasible, access to the work area should be restricted, such as by asbestos barrier tape around the perimeter of the work area. If barrier tape is used to denote a work area, it should be placed 5 to 10 feet (1.5 to 3 meters) outside of any polyethylene protection used in the work area. Install barrier tape by taping or tying it to fixed objects. Do not block access to any emergency exits, and when asbestos fibers might be released, post OSHA required "danger" signs at all entrances to the work area. For such projects, it might be desirable to have a visual barrier installed several feet in front of warning signs to avoid having warning signs readily visible to occupants. A "keep out of construction area" sign should be posted on visual barriers. A visual barrier would be arranged so that a person who goes past the visual barrier will then see required warning signs.
4. Put down polyethylene drop sheet/s.
5. Place tools, equipment and materials needed onto drop cloth.
6. Paint ceiling using sprayer or rollers. If rollers are used, try to contact each area of the ceiling only once to avoid damage to ACM.
7. When painting is completed, clean up any loose debris using wet-wiping and/or HEPA vacuuming and roll up drop cloth. Dispose of paint rollers as ACM.
8. Perform clean-up and tear-down.

Level A: work may contact ACM but not disturb it. If you encounter damaged ACM, or if the work could damage the ACM, stop work and notify your supervisor.

Level B: is work that may disturb minimal amounts of ACM where the OSHA PEL is not exceeded and release of ACM, dust and debris is confined to the immediate location of the disturbance.

WP-14

Installing flooring or carpet over asbestos flooring

Example

The following are examples of work that can be performed using the following procedures. If job conditions vary from the examples stop work and notify your supervisor.

A. New carpet being installed over well-adhered resilient asbestos floor tile or vinyl sheet flooring with ACM backing in good condition.

Work Practice

1. Obtain tools, equipment and materials, including a wall scraper 2-3" (50-75 mm) wide stiff blade w/short handle and a HEPA vacuum.
2. Place tools, equipment and materials needed in work area.
3. Secure the work area. When asbestos fibers might be released, work areas should be vacated and secured (where feasible) by scheduling, locking doors (from inside the area if possible) or other means. If this is not feasible, access to the work area should be restricted, such as by asbestos barrier tape around the perimeter of the work area. If barrier tape is used to denote a work area, it should be placed 5 to 10 feet (1.5 to 3 meters) outside of any polyethylene protection used in the work area. Install barrier tape by taping or tying it to fixed objects. Do not block access to any emergency exits, and when asbestos fibers might be released, post OSHA required "danger" signs at all entrances to the work area. For such projects, it might be desirable to have a visual barrier installed several feet in front of warning signs to avoid having warning signs readily visible to occupants. A "keep out of construction area" sign should be posted on visual barriers. A visual barrier would be arranged so that a person who goes past the visual barrier will then see required warning signs.
4. Strip wax/finish from existing floor using O&M work practice R5 “Wet Strip Wax from Resilient Asbestos Flooring.
5. Level off any minor high spots on floor using scraper. Promptly remove any scrapings with a HEPA vacuum. Do not sand or grind flooring.
6. Fill any low areas using manufacturers recommended underlayment or Leveling compound.
7. Vacuum floor using a vacuum equipped with a HEPA filter and metal floor attachment (no brush).
8. Use Work Practice M22 if HEPA vacuum needs maintenance, or if bag or filter needs to be replaced.
9. Wet-wipe and/or wash down all equipment used scrape floor during the work.
10. Install new flooring or carpet as recommended by manufacturer.
11. Perform clean-up and tear-down on Level A checklist to complete work

Wet Stripping Wax from Asbestos Flooring

Example

The following are examples of work that can be performed using the following procedures. If job conditions vary from the examples stop work and notify your supervisor.

A. Stripping floor wax or finish coat from resilient asbestos flooring that is well adhered and in good condition

Work Practice

1. Obtain tools, equipment and materials: "Caution - Wet Floor" signs, floor stripping machine, stripping pads (least abrasive pad possible), buckets with water for rinsing, mops (for stripping, rinsing and polishing), chemical stripper - recommended amount for area to be stripped, floor wax or finish, and walk-off mats.
2. Place tools, equipment and materials needed in work area. Place walk-off mats where required to prevent tracking of stripping solution to other areas. Position "Caution - Wet Floor" signs.
3. After proper mixing of stripping chemical, adequately wet floor by mop applying liberal amounts of the solution. Allow chemical to soak for amount of time recommended by manufacturer. If areas become dry, reapply solution to keep floor adequately wet.
5. After wax or finish has softened, strip flooring using least abrasive pad and low speed setting (300 RPM maximum). Keep floor adequately wet during machine operation. Do not overstrip. Stop stripping when the old wax or finish is removed. Work small areas at a time.
6. Remove dirty stripping solution with wet vacuum or "strip" mop.
7. With "rinse" mop, apply liberal amount of clean water to area stripped and remove water with wet vacuum or mop. Repeat rinse procedures.
8. If some spots of wax or finish remain, restrip those areas.
9. If new flooring will be installed over the stripped floor, do not apply wax or finish. When applying new wax or finish, do so according to manufacturer's recommendations.
10. Perform clean-up and tear-down to complete work.

Buffing asbestos flooring

Example

The following are examples of work that can be performed using the following procedures. If job conditions vary from the examples stop work and notify your supervisor.

A. Dry or spray buff the polish on resilient asbestos flooring to remove minor surface imperfections and restore gloss.

Work Practice

1. Obtain tools, equipment and materials: "Caution - Wet Floor" signs, floor buffing machine, buffing pads (least abrasive - tan, red, or equivalent), buckets with mop wringer, mops (for damp or spot mopping), chemical cleaner, hand-held scraper and spray buffing compound, appropriately diluted, compatible polish and restorer chemical.
2. Place tools, equipment and materials needed in work area. Position "Caution-Wet Floor" signs.
3. Pick up any large loose debris and place into disposal bags. Using scraper and water, remove all foreign matter from the finished surface (gum, tar, stickers, etc.).
4. Spot or damp mop to remove stains and spills. Mix chemical cleaner or restorer with water and apply according to manufacturers recommendations. Spot or damp mop to remove stains and spills. If dry buffing will be performed, apply restorer chemical as required
6. Allow floor to dry thoroughly.
7. Spray or dry buff as appropriate:
   a. To spray-buff, spray small area with spray-buff solution and buff using manufacturer's recommended pad or brush at recommended RPM. Repeat procedure until entire area is spray-buffed.
   b. To dry buff, buff or dry burnish with manufacturer's recommended pad or brush at recommended RPM.
8. Perform applicable steps to complete work.

Cleaning asbestos flooring

Example

The following are examples of work that can be performed using the following procedures. If job conditions vary from the examples stop work and notify your supervisor.

A. Clean or scrub resilient asbestos flooring with adequate coats of floor polish on flooring before buffing or application of additional polish.

1. Obtain tools, equipment and materials: "Caution - Wet Floor" signs, floor scrubbing machine, pads (least abrasive), buckets with mop wringer, scraper 2-3" (50-75 mm) wide stiff blade, mops (for scrubbing, rinsing), measuring device for mixing chemical cleaner, walk-off mats, and chemical cleaner.
2. Place tools, equipment and materials needed in work area. Place walk-off mats to prevent tracking of scrubbing solution to other areas. Position "Caution - Wet Floor" signs.
3. Install polyethylene sheet on adjoining floors for protection from any spilled cleaning solution.
4. Mix scrubbing chemical with water as recommended by manufacturer and apply liberal amount (do not flood) using mop. Allow to soak for amount of time recommended by manufacturer. Keep floor adequately wet by reapplying cleaning solution if drying occurs. Work small areas at a time.
5. Using floor scrubbing machine, manufacturer's recommended pads and operating speed, clean floor to remove embedded dirt and surface marks.
6. Remove spent scrubbing solution with wet vacuum or mop.
8. Rinse area using clean mop and clean rinse water. Remove water with wet vacuum or mop. Damp mop area to clean up any remaining water or streaks.

Removing carpet over asbestos flooring STRONGLY ADHERED

Example

The following are examples of work that can be performed using the following procedures. If job conditions vary from the examples stop work and notify your supervisor.

A. Remove carpet adhered to good condition resilient asbestos flooring where mastic and/or a small number full tiles may be pulled up, or flooring might be pulled up without separation of backing and wear layer. Resilient flooring mastic may or may not contain asbestos.

Work Practice

1. Obtain tools, equipment and materials: scraper 2-3" (50-75 mm) wide stiff blade, and metal straightedge for use when cutting carpet.
2. Secure the work area. When asbestos fibers might be released, work areas should be vacated and secured (where feasible) by scheduling, locking doors (from inside the area if possible) or other means. If this is not feasible, access to the work area should be restricted, such as by asbestos barrier tape around the perimeter of the work area. If barrier tape is used to denote a work area, it should be placed 5 to 10 feet (1.5 to 3 meters) outside of any polyethylene protection used in the work area. Install barrier tape by taping or tying it to fixed objects. Do not block access to any emergency exits, and when asbestos fibers might be released, post OSHA required "danger" signs at all entrances to the work area. For such projects, it might be desirable to have a visual barrier installed several feet in front of warning signs to avoid having warning signs readily visible to occupants. A "keep out of construction area" sign should be posted on visual barriers. A visual barrier would be arranged so that a person who goes past the visual barrier will then see required warning signs.
3. Place tools, equipment and materials needed into work area.
4. Find a seam or corner wherever carpet removal can begin. If no seams or corners exist, a cut will need to be made around the piece to be removed. Wet the areas that need to be cut using amended water. Cut carpet using utility knife with a new blade.
5. Pry up corner or seam of carpet using scraper. Pull back a section large enough (approximately one square foot [0.1 m^2]) to hang onto while removing carpet. Adequately wet flooring and adhesive exposed.
6. Pull carpeting back slowly and spray amended water on flooring and adhesive as they are exposed. Remove carpet in pieces no larger than approximately 200 square feet (18.6 m^2).
7. If carpet and adhesive are non-ACM, roll up carpet and dispose of as non-ACM waste. If portions of asbestos-containing flooring remain attached to carpet backing, dispose of carpet as ACM. Loose vinyl asbestos flooring shall be disposed of in disposal bags or containers.
8. HEPA vacuum surface of flooring after carpet is removed. If residual asbestos containing adhesive or residual felt backing needs to be removed, follow wet scraping procedures in work practice R1 or R2, respectively. Allow substrate to dry before installing new flooring.
9. Perform clean-up and tear-down.

Removing carpet WEAKLY ADHERED

Example

The following are examples of work that can be performed using the following procedures. If job conditions vary from the examples stop work and notify your supervisor.

A. Remove carpet that is non-adhered or weakly adhered to resilient asbestos flooring.

Work Practice

1. Obtain tools, equipment and materials, including a metal straightedge for use when cutting carpet and Scraper 2-3" (50-75 mm) wide stiff blade
2. Place tools, equipment and materials needed in work area.
3. Find a seam or corner where carpet removal can begin. If no seams or corners exist, make a cut around the piece to be removed. Cut carpet using utility knife with a new blade.
4. Pry up corner or seam of carpet using scraper. Pull back a section large enough (approximately one square foot [0.1 m^2]) to hang onto while removing carpet. HEPA vacuum exposed flooring and back of carpet.
5. Pull carpeting back slowly and HEPA vacuum exposed flooring & back of carpet. Remove carpet in pieces no larger than 200 square feet (18.6 m^2).
6. If carpet and adhesive are non-ACM, roll up carpet and dispose of as non-ACM waste. If portions of asbestos-containing flooring remain attached to carpet backing, dispose of carpet as ACM or in accordance with applicable regulations.
7. HEPA vacuum surface of flooring after carpet is removed. Allow substrate to dry before installing new flooring.
9. Perform clean-up and tear-down steps to complete work.

Appendix G

FORMS

Form FWS 3-2430 Asbestos Inspection Form

Form FWS 3-2431 Awareness Training

Form FWS 3-2432 Contractor Notification for Asbestos

Asbestos Inspection Form
(Form 3-2430)
Semiannual Inspection

DATE: BLDG NAME:

ROOM: INSPECTOR:

The most recent accredited AHERA inspection is used as a basis for this survey:

Asbestos Materials	Unchanged	Contact Damage	Water Damage

Comments:

Action Taken:

Action Approved By: Date:

Asbestos Awareness Training Record
(Form 3-2431)

For: :

(employee name)

Location

Duty

All maintenance, custodial, and other employees who may come into contact with ACM or PACM during their normal work assignment must have a minimum of 2 hours of asbestos awareness training BEFORE they begin working in the area where there is potential contact. This is an annual training requirement.

Awareness training should include such topics as:

- Background information on asbestos,
- Health effects of asbestos,
- Worker protection programs,
- Locations of ACM and PACM at the facility,
- Recognition of ACM and PACM damage and deterioration,
- The O&M plan for the facility, and
- Property response to fiber release episodes.

Initial Training Date	Course Title
Annual Refresher Training Dates	Course Title

Contractor Notification Form for Asbestos
(Form 3-2432)

Company Name: _____

Company Office/Title: _____

Planned Activity: _____

As an Empire Apartments contractor, you must be aware of the location of asbestos in the building and agree not to contact or damage these materials. If work cannot be accomplished without damaging asbestos, you must notify the Project Leader/Facility Manager prior to the project so that other plans can be made.

I have reviewed and understand the Asbestos Operations and Maintenance Plan for Empire Apartments. My company will perform its work in accordance with this plan and all applicable standards.

Signature: _____
(Contractor)

Signature: _____
(Project Leader or Facility Manager)

Date: _____

PRE-RENOVATION ASBESTOS SAMPLING

Empire Apartments | Waterline Replacement

54 4th Avenue North, St. Cloud, MN 56303



Submitted to:
St. Cloud HRA

Submitted by:
Environmental Health Testing Services

License Asbestos Contractor: ACL-173

EHTS Project: 014-18-M

Submittal Date: March 25, 2026

EHTS Environmental Health Testing Services

March 25, 2026

Mr. Paul Soenneker
St. Cloud Housing and Redevelopment Authority
1225 West St. Germain Street
St. Cloud, Minnesota 56301

Telephone: 320-252-0880 (Office), 320-202-3147 (Direct)
E-mail: psoenneker@stcloudhra.com

RE: Asbestos Sampling for Waterline Replacement Project
54 4th Avenue North, St. Cloud, MN 56303
EHTS Project No.: 014-18-M

Dear Mr. Soenneker:

Per your authorization, asbestos sampling was conducted for the above-referenced property. The purpose of this survey was to identify asbestos-containing materials required to be removed and/or properly managed in preparation for a waterline replacement project.

Please refer to the attached report for the scope, methods, and conclusions of our survey.

We appreciate the opportunity to provide our professional services to you for this project. If you have any questions regarding this or the attached report, I may be contacted at 952.297-5169.

Sincerely,

ENVIRONMENTAL HEALTH TESTING SERVICES

Kristine Stahl

Kristine F. Stahl
Environmental Consultant

C O N T E N T S

Summary 1

Site Description 1

Scope of Services 1

Survey 1

Sampling Methodology *1*

Results Summary *1*

Discussion of Variability *2*

Conclusion 2

Asbestos Building Inspector Certification 2

A T T A C H M E N T S

A. FIGURES – Site Location Map & Property Layout Sketch

B. Table 1: Inventory of Suspect Asbestos-Containing Materials

C. Variation in Asbestos Sampling Results

D. MDH Inspector Certification and Laboratory Certificates

E. Analytical Laboratory Reports (Asbestos Analysis)

Summary

Asbestos sampling was conducted on February 25, 2026, for the preparation of the waterline replacement project at Empire Apartments, 54 4th Avenue North, St. Cloud, Minnesota (Site). Bulk sampling for this project included pipe wrap materials from areas planned for disturbance, including the 1st-floor shop/maintenance room, the 1st-floor office, the 2nd-floor hallway, unit 201, unit 202, and the boiler room.

The asbestos sampling results for the pipe elbow/fitting materials were mixed. This survey detected asbestos-containing materials (ACMs), materials with an asbestos content of greater than 1% asbestos, in a pipe elbow/fitting wrap sample collected from the north wall access panel of the 1st-floor office, while pipe elbow/fitting wrap samples collected from the boiler room, the shop/maintenance room, and the 2nd-floor hallway indicated no asbestos present. These mixed results are consistent with previous pipe elbow/fitting sampling results conducted at Empire Apartments in October 2021 and February 2022, where analytical results of pipe elbow/fitting materials collected from the 1st floor community room reported 2% asbestos, while pipe elbow/fitting materials collected from unit 901 indicated no asbestos present.

With some pipe elbow/fitting materials being identified as ACM, while others tested negative for asbestos, suspected pipe elbow/fitting materials should be considered ACM unless laboratory analysis indicates otherwise.

Site Description

Empire Apartments, located at 54 4th Avenue North, St. Cloud, Minnesota, is a 1971-constructed ten-story apartment building with an asphalt parking lot. The structure includes 89 apartment units: 1 two-bedroom unit and 88 one-bedroom units. Common areas within the building include an office, a community room, a community kitchen, two stairways, two restrooms, a lobby, a meeting room, a mechanical room, a riser room, two elevators, a shop/mechanical room, and an eleventh-floor boiler room. A Site location map and a building layout sketch are shown in Figures 1, 2, and 3, respectively (Attachment A).

Scope of Services

The sampling for this project was conducted to identify asbestos-containing materials (ACMs) with an asbestos content greater than 1% from areas planned for disturbance during waterline replacement at the subject site.

Survey

Sampling Methodology

The Site was surveyed for asbestos-containing materials (ACM) on February 25, 2026, Kristine Stahl, Certified Asbestos Inspector #AI8690 (MDH Inspector Certifications and Laboratory Certificate, Attachment D), in accordance with the Minnesota Department of Health Asbestos Abatement Rules (MR Chapter 4620), and the Pre-Renovation and Demolition Rule (Minn. R. 7035.0805) Bulk sampling was performed in general accordance with the sampling protocols established in the Code of Federal Regulations (40 CFR § 763, Subpart E.)

Bulk sampling included pipe wrap materials from areas planned for disturbance, including the 1st-floor shop/maintenance room, the 1st-floor office, the 2nd-floor hallway, unit 201, unit 202, and the boiler room. The bulk samples collected for laboratory analysis were submitted to CA Analytical, an accredited NVLAP laboratory, for testing via polarized light microscopy (EPA 600/R-93/116 Method).

Results Summary

Laboratory analytical results of the bulk samples collected for this project indicate asbestos (an asbestos content of more than one percent (1%)) in the pipe elbow/filling material collected from the 1st floor office, along the north wall access panel surveyed for this project. All remaining bulk samples submitted for asbestos analysis reported no detection of asbestos. A summary of the materials collected with locations, field descriptions, laboratory descriptions, and analytical results is summarized in Table 1 in Attachment B, and the laboratory analytical report is included in Attachment E.

Although the pipe elbow/fitting sample collected from the shop/maintenance room showed no asbestos, the laboratory has recommended Transmission Electron Microscopy (TEM) analysis. This recommendation reflects limitations of the initial analytical method, typically Polarized Light Microscopy (PLM), which may not detect very fine asbestos fibers or low concentrations in complex or non-homogeneous materials. While asbestos was not definitively identified in the initial analysis, the presence of very small or trace fibers cannot be conclusively ruled out. TEM is a more sensitive analytical technique capable of detecting and identifying asbestos at much lower concentrations and smaller fiber sizes.

Discussion of Variability

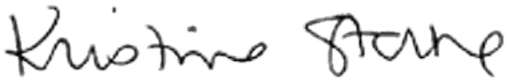
Analytical results of pipe elbow/fitting materials include both Asbestos-Containing Material (ACM) (greater than 1% asbestos) and Non-Asbestos-Containing Material (non-ACM). These results indicate that the pipe elbow/fitting wrap is not uniform throughout the building, which can be attributed to factors such as phased installation, localized repairs, heterogeneous materials, and limitations in visual identification (see Attachment C, *Variation in Asbestos Sampling Results*).

Conclusion

To ensure safety, it is recommended that unsampled or visually similar materials be presumed to contain asbestos-containing materials (ACM) unless tested.

Asbestos Building Inspector Certification

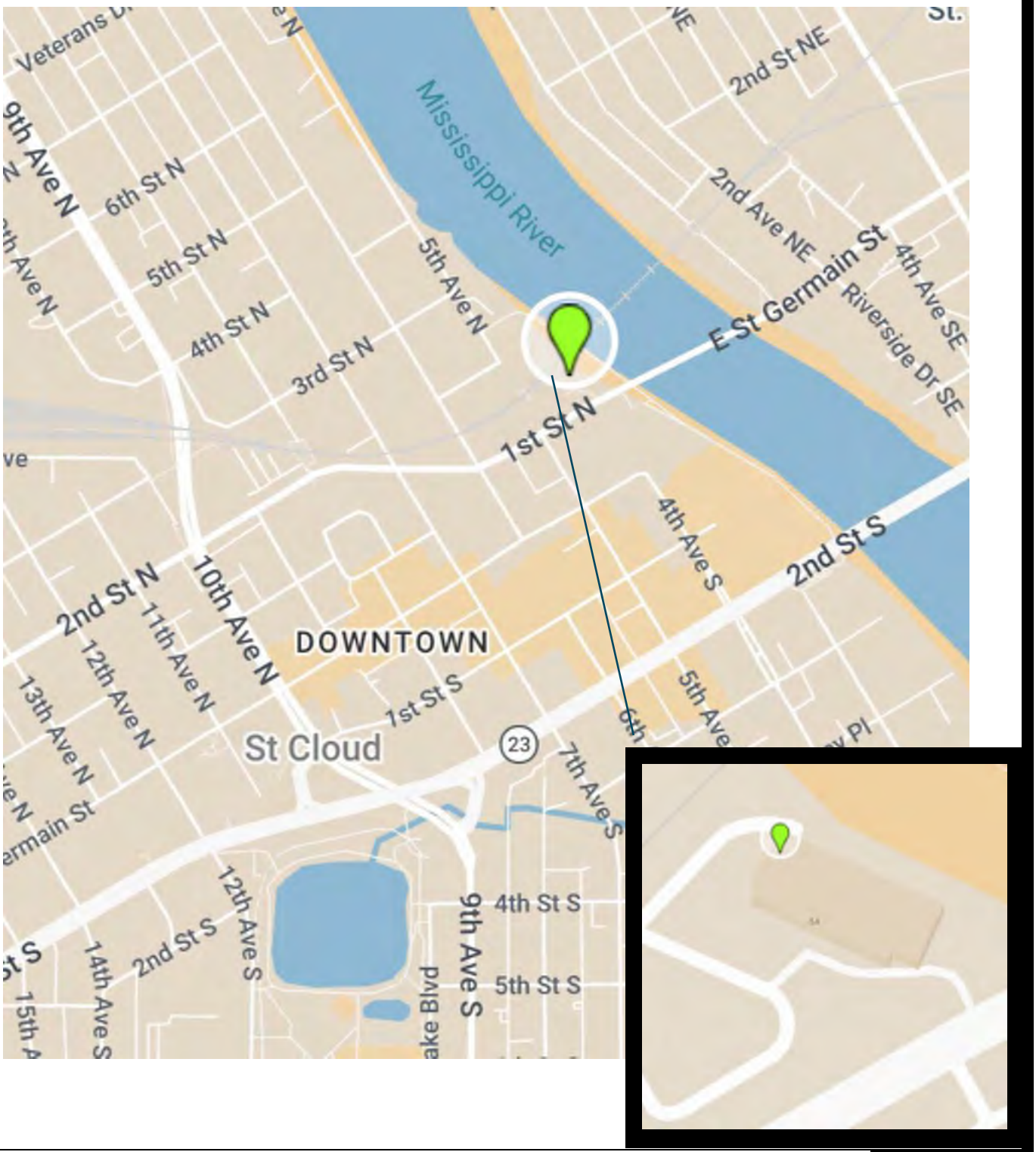
I, the undersigned, do hereby certify that I am an accredited Asbestos Building Inspector in the State of Minnesota. I certify that this inspection and sampling were conducted in accordance with applicable state and federal requirements.



Kristine F. Stahl
Asbestos MN-Licensed Asbestos Inspector
Certified Asbestos Inspector #ASB-2322

ATTACHMENT A

Figures: Site Location Map & Property Layout Sketch

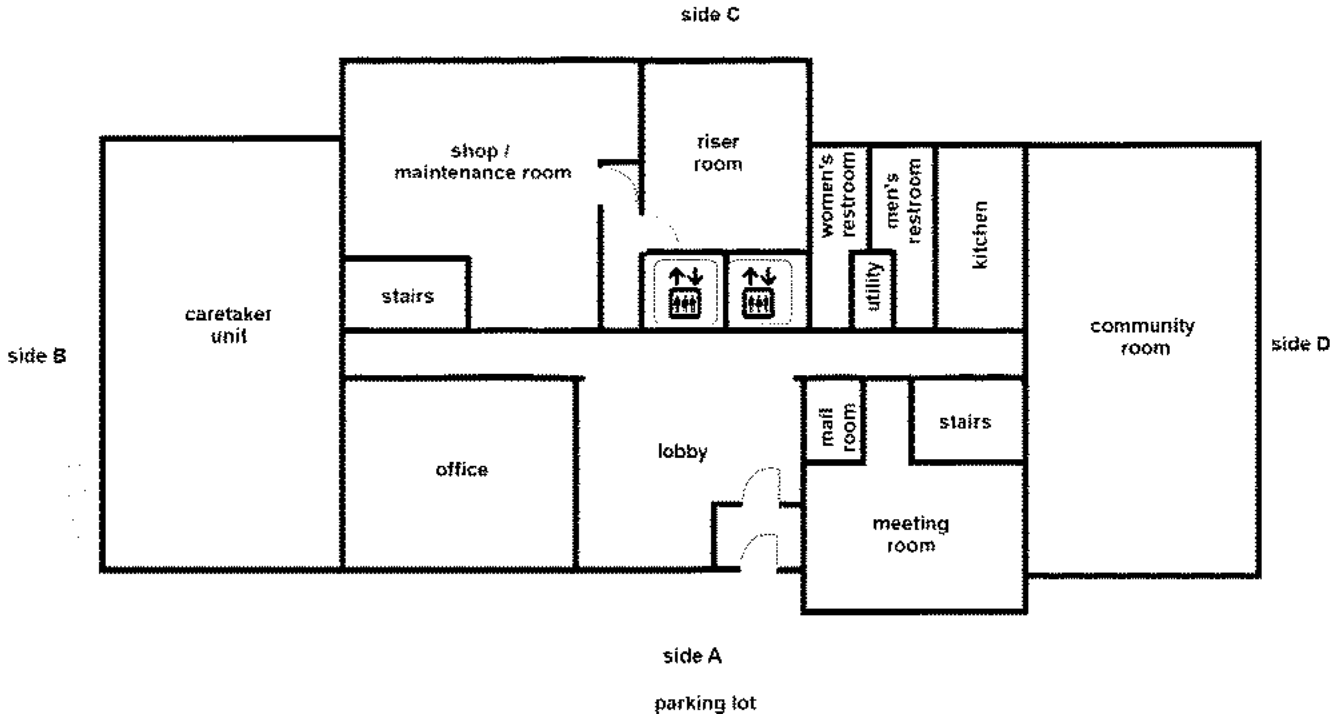


SITE LOCATION MAP

Empire Apartments

54 4th Avenue North, St. Cloud, MN 56303

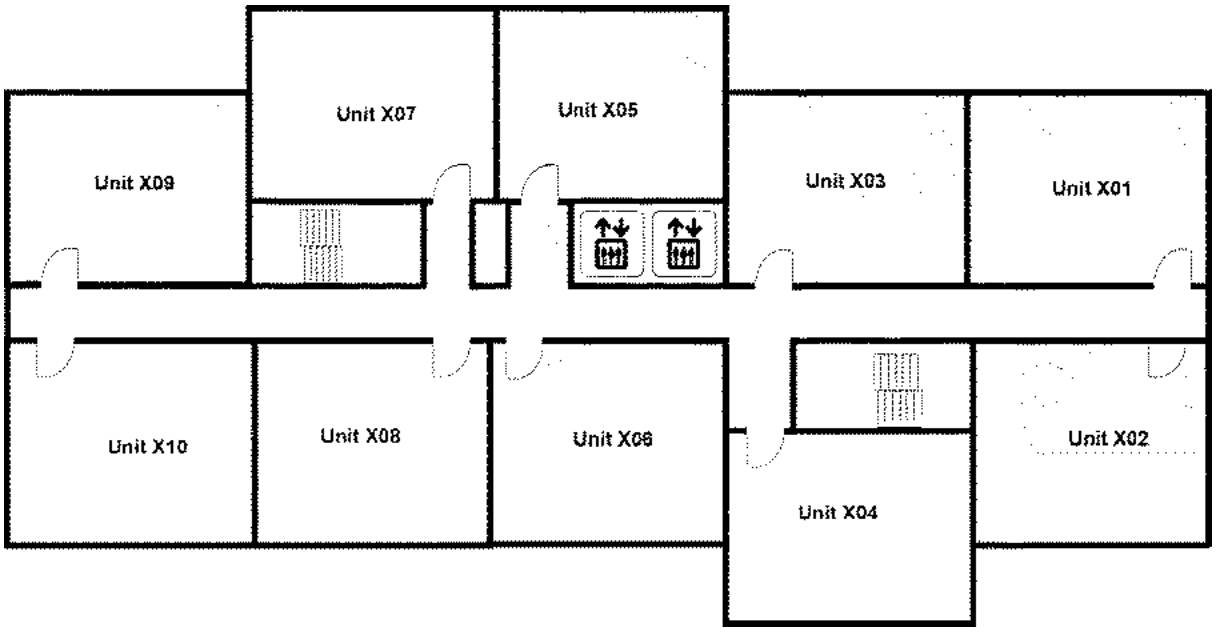
Figure 1



Blue lines denote approximate pipe locations.
The survey involved sectioning the room into four areas; NW, NE, Center and South.

BUILDING LAYOUT
Empire Apartments
54 4th Avenue North, St. Cloud, MN 56303

Figure **2**



Blue lines denote approximate pipe locations.
The survey involved sectioning the room into four areas; NW, NE, Center and South.

BUILDING LAYOUT
Empire Apartments
54 4th Avenue North, St. Cloud, MN 56303

Figure
3

ATTACHMENT B

Table 1: Inventory of Suspect Asbestos-Containing Materials

TABLE 1

Inventory Of Suspect Asbestos-Containing Materials Surveyed

Empire Apartments | 54 4th Avenue North, St. Cloud, MN 56303

Sample #	Room / Area	Field Material Description	Analysts' Physical Description of Subsample	Asbestos Content
1S226-01	1st floor shop/maintenance room	Tan pipe wrap with silver and underlying fiberglass	Pipe Wrap with Fiberglass/ white sealant	N.D.
1S226-01	1st floor shop/maintenance room	Tan pipe wrap with silver and underlying fiberglass	tan mastic with foil and paper	N.D.
1S226-01	1st floor shop/maintenance room	Tan pipe wrap with silver and underlying fiberglass	yellow insulation	N.D.
1S226-02	1st floor shop/maintenance room, SW near door	White powdery elbow material	Elbow Material/ off-white insulation	N.D.
1S226-02	1st floor shop/maintenance room, SW near door	White powdery elbow material	white woven covering with debris	N.D.
1S226-03	1st floor shop/maintenance room, NW portion	White pipe-wrap with underlying fiberglass	Pipe Wrap with Fiberglass/ white sealant	N.D.
1S226-03	1st floor shop/maintenance room, NW portion	White pipe-wrap with underlying fiberglass	yellow insulation	N.D.
1O226-01	1st floor -Office north wall access panel	Tan pip wrap with silver underlying, underlying fiberglass	Pipe Wrap with Fiberglass/ tan mastic with foil and paper	N.D.
1O226-01	1st floor -Office north wall access panel	Tan pip wrap with silver underlying, underlying fiberglass	yellow insulation	N.D.
1O226-02	1st floor - Office north wall access panel	White elbow wrap	Elbow Wrap/ off-white insulation with debris	2%
1O226-02	1st floor - Office north wall access panel	White elbow wrap	white woven covering with debris	N.D.
2H226-01	2nd floor hall – north side, east wall	Gray elbow wrap with fabric and cementitious material	Elbow Wrap with Fabric and Cementitious Material/ off-white insulation	N.D.
2H226-01	2nd floor hall – north side, east wall	Gray elbow wrap with fabric and cementitious material	white woven covering with debris	N.D.
201BA226-01	Unit 201, bathroom, north wall	White pipe wrap with silver, underlying fiberglass	Pipe Wrap with Fiberglass/ tan mastic with foil and paper	N.D.
201BA226-01	Unit 201, bathroom, north wall	White pipe wrap with silver, underlying fiberglass	yellow insulation	N.D.
201KT226-01	Unit 201, kitchen, north wall	Tan pipe wrap underlying fiberglass	Pipe Wrap with Fiberglass/ tan mastic with foil and paper	N.D.

TABLE 1

Inventory Of Suspect Asbestos-Containing Materials Surveyed

Empire Apartments | 54 4th Avenue North, St. Cloud, MN 56303

Sample #	Room / Area	Field Material Description	Analysts' Physical Description of Subsample	Asbestos Content
201KT226-01	Unit 201, kitchen, north wall	Tan pipe wrap underlying fiberglass	yellow insulation	N.D.
201KT226-01	Unit 201, kitchen, north wall	Tan pipe wrap underlying fiberglass	Pipe Wrap/ off-white insulation	N.D.
201KT226-01	Unit 201, kitchen, north wall	Tan pipe wrap underlying fiberglass	white woven covering with debris	N.D.
202BA226-01	Unit 202, bathroom, north wall	White pipe wrap with silver, underlying fiberglass & tan fabric	Pipe Wrap with Fiberglass/ off-white sealant	N.D.
202BA226-01	Unit 202, bathroom, north wall	White pipe wrap with silver, underlying fiberglass & tan fabric	tan mastic with foil and paper	N.D.
202BA226-01	Unit 202, bathroom, north wall	White pipe wrap with silver, underlying fiberglass & tan fabric	yellow insulation	N.D.
202BA226-01	Unit 202, bathroom, north wall	White pipe wrap with silver, underlying fiberglass & tan fabric	white woven covering	N.D.
11B226-01	Boiler room water supply line	White endcap pipe wrap material	Pipe Wrap/ white sealant	N.D.
11B226-01	Boiler room water supply line	White endcap pipe wrap material	yellow insulation	N.D.
11B226-02	Boiler room water supply line	Grey elbow wrap -	Elbow Wrap/ gray surfaced white sealant	N.D.
11B226-02	Boiler room water supply line	Grey elbow wrap -	white woven covering	N.D.
11B226-02	Boiler room water supply line	Grey elbow wrap -	off-white insulation	N.D.
11B226-03	Boiler room water supply line	Gray elbow wrap	Elbow Wrap/ gray surfaced white sealant	N.D.
11B226-03	Boiler room water supply line	Gray elbow wrap	white woven covering	N.D.
11B226-03	Boiler room water supply line	Gray elbow wrap	off-white insulation	N.D.
11B226-04	Boiler room water supply line	Tan pipe wrap with silver underlying fiberglass	Pipe Wrap with Fiberglass/ gray surfaced white sealant	N.D.
11B226-04	Boiler room water supply line	Tan pipe wrap with silver underlying fiberglass	tan mastic with foil and paper	N.D.
11B226-04	Boiler room water supply line	Tan pipe wrap with silver underlying fiberglass	tan insulation	N.D.

N.D. = none detected

ATTACHMENT C

Variation in Asbestos Sampling Results

Variation in Asbestos Sampling Results

Multiple Installation Periods

Large apartment buildings are often constructed or renovated in phases. Earlier installations, particularly those from before the 1980s, typically used asbestos-containing insulation. In contrast, later repairs or upgrades may have utilized non-asbestos materials following changes in regulations. As a result, different elbow sections in the building may contain materials from different eras, leading to inconsistent lab results.

Repairs and Maintenance Activities

Pipe insulation, particularly at elbows, is often disturbed and replaced during plumbing repairs, leak remediation, and system upgrades. Insulation replacement is typically done in a localized manner, referred to as spot repairs, rather than replacing it throughout the entire system. As a result, original asbestos-containing material (ACM) insulation may still be present alongside newer, asbestos-free patch materials.

Material Differences at Elbows vs. Straight Runs

Pipe elbows are usually insulated differently from straight pipe sections. For elbows, pre-formed wraps, mudded fittings, or cloth wraps are commonly used. In contrast, straight runs typically utilize uniform pipe insulation, such as air-cell or fiberglass. As a result, even within the same pipe system, various insulation products may be present, with some containing asbestos and others not.

Visual Similarity of Materials

Asbestos and non-asbestos insulation materials can closely resemble each other in color, texture, and form. Result: Materials that appear similar in the field may yield different lab results, underscoring the need for sampling.

Sampling Variability and Heterogeneous Materials

Some insulation systems, particularly elbow "mud" or wrap, consist of non-uniform mixtures. The asbestos content can vary even within the same fitting. Consequently, one sample may test negative while another nearby sample tests positive. As a result, laboratory results can reflect localized composition differences.

ATTACHMENT D

MDH Inspector Certification and Laboratory Certificates

Asbestos Contractor License

Minnesota Department of Health

St Paul, MN

Environmental Health Testing Services Company
2950 Aquila Avenue South
Saint Louis Park, MN 55426

Responsible Individual: Kristine Stahl

This license is valid from March 30, 2026 to March 30, 2027

Pursuant to Minnesota Statutes, section 144.99, this license may be suspended or revoked for failure to conduct asbestos-related work in compliance with applicable regulations.

Asbestos-related work must be conducted according to Minnesota Statutes, sections 326.70 to 326.81 and Minnesota Rules, parts 4620.000 to 4620.3724.

License Number: ACL-173

Dr. Brooke Cunningham
Commissioner

DEPARTMENT OF HEALTH

DEPARTMENT OF HEALTH

Asbestos Inspector Certification

Minnesota Department of Health

Number ASB-2322
Kristine Stahl
2950 Aquila Avenue South
Saint Louis Park, MN 55426

Issue Date:
January 29, 2026

Expiration Date:
January 20, 2027

United States Department of Commerce
National Institute of Standards and Technology

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 200349-0

Crisp Analytical Laboratory

Carrollton, TX

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

Asbestos Fiber Analysis

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

2024-10-01 through 2025-09-30

Effective Dates

For the National Voluntary Laboratory Accreditation Program

National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

Crisp Analytical Laboratory
1929 Old Denton Road
Carrollton, TX 75007
C. T. Rasmussen
Phone: 972-242-2754
Email: calabsdallas@calabsinc.com
http://www.calabsinc.com

ASBESTOS FIBER ANALYSIS — NVLAP LAB CODE 200349-0

Bulk Asbestos Analysis

Code	*Description*
18/A01	EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples
18/A03	EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

Airborne Asbestos Analysis

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

For the National Voluntary Laboratory Accreditation Program

ATTACHMENT E

Analytical Laboratory Reports (Asbestos Analysis)

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Materials Characterization - Bulk Asbestos Analysis

Laboratory Analysis Report - Polarized Light

Environmental Health Testing Services

2950 Aquila Ave South
St Louis Park, MN 55426

Customer Project: 014-18-M, Empire Apartments, 54 4th Av
Reference #: CAL26031723AS Date: 03/05/26

Analysis and Method

Summary of polarized light microscopy (PLM / Stereomicroscopy bulk asbestos analysis) using the methods described in 40CFR Part 763 Appendix E to Subpart E (Interim and EPA 600 / R-93 / 116 (Improved). The sample is first viewed with the aid of a stereomicroscope. Numerous liquid slide preparations are created for analysis under the polarized microscope where identifications and quantifications are preformed. Calibrated liquid refractive oils are used as liquid mouting medium. These oils are used for identification (dispersion staining). A calibrated visual estimation is reported, should any asbestiform mineral be present. Other techniques such as acid washing are used in conjugation with refractive oils for detection of smaller quantities of asbestos. All asbestos percentages are based on calibrated visual estimation traceable to NIST standards for regulated asbestos. Traceability to measurement and calibration is achieved by using known amounts and types of asbestos from standards where analyst and laboratory accuracy are measured. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 0.50% (well above the laboratory definition of trace).

Discussion

Vermiculite containing samples may contain trace amounts of actinolite/tremolite. When not detected by PLM, these samples should be analyzed using TEM methods and / or water separation techniques. Suspected actinolite/vermiculite presence will be indicated through the sample comment section of this report.

Fibrous talc containing samples may contain a regulated asbestos fiber known as anthophyllite. Under certain conditions the same fiber may actually contain both talc and anthophyllite (a phenomenon called intergrowth). Again, TEM detection methods are recommended. CA Labs PLM report comments will denote suspected amounts of asbestiform anthophyllite with talc, where further analysis is recommended.

Some samples (floor tiles, surfacings, etc.) may contain fibers too small to be detectable by PLM analysis and should be analyzed by TEM bulk protocols.

A "trace asbestos" will be reported if the analyst observes far less than 1% asbestos. CA Labs defines "trace asbestos" as a few fibers detected by the analyst in several preparations and will indicate as such under these circumstances.

Since allowable variation in quantification of samples close to 1% is high, <1% may be reported. Such results are ideal for point counting, and the technique is mandatory for friable samples (NESHAP, Nov. 1990 and clarification letter 8 May 1991) under 1% percent asbestos or "trace asbestos". **In order to make all initial PLM reports issued from CA Labs NESHAP compliant, all <1% asbestos results (except floor tiles) will be point counted at no additional charge.**

Qualifications

CA Labs is accredited by the National Voluntary Accreditation Program (NVLAP) for selected test methods for airborne fiber analysis (TEM), and for bulk asbestos fiber analysis (PLM). CA Labs is also accredited by AIHA LAP, LLC. in the PLM asbestos field of testing for Industrial Hygiene. All analysts have completed college courses or hold a degree in a natural science (geology, biology, or environmental science). Recognition by a state professional board in one these disciplines is preferred, but not required. Extensive in-house training programs are used to augment the educational background of the analyst. The Laboratory Director and Quality Manager have received supplemental McCrone Research training for asbestos identification. Analysis performed at Crisp Analytical Labs, LLC 1929 Old Denton Road Carrollton, TX 75006

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

CA Labs
Dedicated to Quality

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Carrollton, TX 75006
Phone 972-242-2754
Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Overview of Project Sample Material Containing Asbestos

Customer Project: 014-18-M, Empire Apartments, 54 4th Avenue North **CA Labs Project #:** CAL26031723AS

Laboratory Sample ID	Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types
20768	1O226-02	*1O226-02-1*	***Elbow Wrap/*** *off-white insulation with debris*	***2% Chrysotile***	***off-white insulation with debris***

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

Glossary of abbreviations (non-asbestos fibers and non-fibrous minerals):

ca - carbonate
gypsum - gypsum
bi - binder
or - organic
ma - matrix
mi - mica
ve - vermiculite
ot - other
pe - perlite
qu - quartz
fg - fiberglass
mw - mineral wool
wo - wollastinite
ta - talc
sy - synthetic
ce - cellulose
br - brucite
ka - kaolin (clay)
pa - palygorskite (clay)

This report relates to the items tested as received. This report is not to be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, AIHA LAP, LLC, or any other agency of the federal government. This report may not be reproduced except in full without written permission from CA Labs. These results are submitted pursuant to CA Labs' current terms and sale, condition of sale, including the company's standard warranty and limitations of liability provisions and no responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, CA Labs will store the samples for a period of ninety (90) days before discarding. A shipping or handling fee may be assessed for the return of any samples.

CA Labs
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CA Labs, L.L.C.
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Phone 225-751-5632
Fax 225-751-5634

Polarized Light Asbestiform Materials Characterization

Customer Info: **Attn:**

Environmental Health Testing Services
2950 Aquila Ave South
St Louis Park, MN 55426

Phone # 952-297-5169
Fax #

Customer Project:
014-18-M, Empire Apartments, 54 4th Avenue North

Turnaround Time:
2 Days

CA Labs Project #:
CAL26031723AS

Date: 3/5/2026
Samples Rec'd: 3/4/26 1:30PM
Date Of Sampling: 2/25/2026
Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
20764	1S226-01		*1S226-01-1*	***Pipe Wrap with Fiberglass/ white sealant***	*y*	***None Detected***		100% qu,bi
20764			*1S226-01-2*	*tan mastic with foil and paper*	*n*	***None Detected***	30% ce	70% gy,bi,ot
20764			*1S226-01-3*	*yellow insulation*	*y*	***None Detected***	100% fg	
20765	1S226-02	***10***	*1S226-02-1*	***Elbow Material/*** *off-white insulation*	*y*	***None Detected***	3% ta	97% qu,ca
20765			*1S226-02-2*	*white woven covering with debris*	*n*	***None Detected***	98% ce 2% ta	
20766	1S226-03		*1S226-03-1*	***Pipe Wrap with Fiberglass/ white sealant***	*y*	***None Detected***	2% ta	98% qu,bi
20766			*1S226-03-2*	*yellow insulation*	*y*	***None Detected***	100% fg	

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Robert Olivarez
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

CA Labs
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Polarized Light Asbestiform Materials Characterization

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2950 Aquila Ave South
St Louis Park, MN 55426

Phone # 952-297-5169
Fax #

Customer Project:
014-18-M, Empire Apartments, 54 4th Avenue North

Turnaround Time:
2 Days

CA Labs Project #:
CAL26031723AS

Date: 3/5/2026
Samples Rec'd: 3/4/26 1:30PM
Date Of Sampling: 2/25/2026
Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
20767	1O226-01		*1O226-01-1*	***Pipe Wrap with Fiberglass/*** *tan mastic with foil and paper*	*n*	***None Detected***	30% ce	70% gy,bi,ot
20767			*1O226-01-2*	*yellow insulation*	*y*	***None Detected***	100% fg	
20768	1O226-02		*1O226-02-1*	***Elbow Wrap/*** *off-white insulation with debris*	*n*	***2% Chrysotile***	3% ta 3% fg	92% qu,ca
20768			*1O226-02-2*	*white woven covering with debris*	*n*	***None Detected***	98% ce 2% ta	
20769	2H226-01		*2H226-01-1*	***Elbow Wrap with Fabric and Cementitious Material/*** *off-white insulation*	*y*	***None Detected***	3% ta	97% qu,ca
20769			*2H226-01-2*	*white woven covering with debris*	*n*	***None Detected***	98% ce 2% ta	
20770	201BA226-01		*201BA226-01-1*	***Pipe Wrap with Fiberglass/*** *tan mastic with foil and paper*	*n*	***None Detected***	30% ce	70% gy,bi,ot

Dallas NVLAP Lab Code 200349-0 TEM/PLM *TDSHS 30-0235*

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Robert Olivarez
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

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Polarized Light Asbestiform Materials Characterization

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Phone # 952-297-5169
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Customer Project:
014-18-M, Empire Apartments, 54 4th Avenue North

Turnaround Time:
2 Days

CA Labs Project #:
CAL26031723AS

Date: 3/5/2026
Samples Rec'd: 3/4/26 1:30PM
Date Of Sampling: 2/25/2026
Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
20770			*201BA226-01-2*	*yellow insulation*	*y*	***None Detected***	100% fg	
20771	201KT226-01A		*201KT226-01A-1*	***Pipe Wrap with Fiberglass/*** *tan mastic with foil and paper*	*n*	***None Detected***	30% ce	70% gy,bi,ot
20771			*201KT226-01A-2*	*yellow insulation*	*y*	***None Detected***	100% fg	
20772	201KT226-01B		*201KT226-01B-1*	***Pipe Wrap/*** *off-white insulation*	*y*	***None Detected***	3% ta	97% qu,ca
20772			*201KT226-01B-2*	*white woven covering with debris*	*n*	***None Detected***	98% ce 2% ta	
20773	2022BA226-01		*2022BA226-01-1*	***Pipe Wrap with Fiberglass/*** *off-white sealant*	*y*	***None Detected***		100% qu,bi
20773			*2022BA226-01-2*	*tan mastic with foil and paper*	*n*	***None Detected***	30% ce	70% gy,bi,ot

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

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Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
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Polarized Light Asbestiform Materials Characterization

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Turnaround Time:
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CAL26031723AS

Date: 3/5/2026
Samples Rec'd: 3/4/26 1:30PM
Date Of Sampling: 2/25/2026
Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
20773			*2022BA226-01-3*	*yellow insulation*	*y*	***None Detected***	100% fg	
20773			*2022BA226-01-4*	*white woven covering*	*y*	***None Detected***	100% ce	
20774	11B226-01		*11B226-01-1*	***Pipe Wrap/*** *white sealant*	*y*	***None Detected***	2% ta	98% qu,bi
20774			*11B226-01-2*	*yellow insulation*	*y*	***None Detected***	100% fg	
20775	11B226-02		*11B226-02-1*	***Elbow Wrap/*** *gray surfaced white sealant*	*n*	***None Detected***		100% qu,bi
20775			*11B226-02-2*	*white woven covering*	*y*	***None Detected***	100% ce	
20775			*11B226-02-3*	*off-white insulation*	*y*	***None Detected***	3% ta	97% qu,ca

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Robert Olivarez
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Polarized Light Asbestiform Materials Characterization

Customer Info: **Attn:**
Environmental Health Testing Services
2950 Aquila Ave South
St Louis Park, MN 55426

Phone # 952-297-5169
Fax #

Customer Project:
014-18-M, Empire Apartments, 54 4th Avenue North

Turnaround Time:
2 Days

CA Labs Project #:
CAL26031723AS

Date: 3/5/2026
Samples Rec'd: 3/4/26 1:30PM
Date Of Sampling: 2/25/2026
Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
20776	11B226-03		*11B22 6-03-1*	***Elbow Wrap/*** *gray surfaced white sealant*	*n*	***None Detected***		100% qu,bi
20776			*11B22 6-03-2*	*white woven covering*	*y*	***None Detected***	100% ce	
20776			*11B22 6-03-3*	*off-white insulation*	*y*	***None Detected***	3% ta	97% qu,ca
20777	11B226-04		*11B22 6-04-1*	***Pipe Wrap with Fiberglass/*** *gray surfaced white sealant*	*n*	***None Detected***		100% qu,bi
20777			*11B22 6-04-2*	*tan mastic with foil and paper*	*n*	***None Detected***	30% ce	70% gy,bi,ot
20777			*11B22 6-04-3*	*tan insulation*	*y*	***None Detected***	100% fg	

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
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CA Labs

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1929 Old Denton Rd.
Carrollton, TX 75006

Phone: 972-242-2754
Fax: 972-242-2798
Mobile: 469-222-6967

Asbestos Chain of Custody

AL 26031723

Company: Environmental Health Testing Services
Address: 2950 Aquila Avenue South, Saint Louis Park, MN 55426
Phone#: 952-297-5169
E-mail: kris@EHTserivces.com

EHTS Project No.: 014-18-M Date of collection: 2/25/2026 Collected by: K. Stahl
Project Name & Site Address: Empire Apartments, 54 4th Avenue North, St. Cloud, MN 56303
State of Collection: MN
Send Results Via: ☒ E-mail ☐ Verbal

Bulk Analysis		
PLM EPA 600/R-93/116	☒	
Point Count – (NESHAPS)	☒	Please provide PLM point-count analysis for any samples resulting in the detection of 1% or less asbestos

Turn Around Time	3 HR (4 HR TEM) ☐	6 HR (8 HR TEM) ☐	12 HR ☐	24 HR ☐
	2 Days ☒	3 Days ☐	5 Days ☒	

Sample #	Material	Sample Location
1S226-01	Tan pipe wrap with silver and underlying fiberglass	1st floor shop/maintenance room
1S226-02	White powdery elbow material	1st floor shop/maintenance room, SW near door
1S226-03	White pipe-wrap with underlying fiberglass	1st floor shop/maintenance room, NW portion
1O226-01	Tan pip wrap with silver underlying, underlying fiberglass	1st floor -Office north wall access panel
1O226-02	White elbow wrap	1st floor - Office north wall access panel
2H226-01	Gray elbow wrap with fabric and cementitious material	2nd floor hall – north side, east wall
201BA226-01	White pipe wrap with silver, underlying fiberglass	Unit 201, bathroom, north wall
201KT226-01	Tan pipe wrap underlying fiberglass	Unit 201, kitchen, north wall
201KT226-01	Tan fabric pipe wrap	Unit 201, kitchen, behind north wall
202BA226-01	White pipe wrap with silver, underlying fiberglass & tan fabric	Unit 202, bathroom, north wall
11B226-01	White endcap pipe wrap material	Boiler room water supply line
11B226-02	Grey elbow wrap -	Boiler room water supply line
11B226-03	Gray elbow wrap	Boiler room water supply line
11B226-04	Tan pipe wrap with silver underlying fiberglass	Boiler room water supply line

Relinquished by	Date	Time	Received by	Date	Time
Kris Stahl	2-25-26	1940		~~3-2~~	1:30 PM
				~~3-5-26~~ 3-4-26	

~~AG 3-5-26~~
AG 3-4-26