PROJECT MANUAL

for

Graham Park Old Highway Shop Exterior Preservation

for

Olmsted County

Architect's Commission Number: OLM2401

August 2, 2024

PREPARED BY

Miller Dunwiddie

millerdunwiddie.com
100 Washington Ave South | Suite 500 | Minneapolis, Minnesota 55401 | 612 337 0000

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DOCUMENT 00 01 15 - CERTIFICATION

PROJECT: **Olmsted County**
Graham Park – Old Highway Shop Exterior Preservation

ARCHITECT'S CERTIFICATION:
(Miller Dunwiddie)

I hereby certify that the specifications for Architectural Work were prepared by me or under my direct supervision and that I am a duly Licensed Architect under the laws of the State of Minnesota.
Date: August 13, 2024

Signature:

Printed Name: Danita D Lemmon License No. 40489

END OF DOCUMENT

SECTION 01 11 00 – SUMMARY OF WORK

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:
1. Description of construction delivered under a single contract.
2. Description Bid Categories.
3. Restrictions that affect construction operations.
4. Use of Buildings, premises and site.

1.2 GENERAL SUMMARY OF WORK AND ADDITIONAL DEFINITIONS

A. Owner: Olmsted County

B. Project Location: Graham Park 1407 3rd Avenue Southeast – Rochester, MN 55904

C. General Scope: Project consists of exterior building envelope restoration and upgrades addressing water infiltration issues and exterior material deterioration. Project scope includes the restoration of exterior stone and brick masonry walls, precast concrete wall caps, and precast concrete window sills, as well as the replacement of all exterior windows and doors.
1. Work Included: Provide labor, materials, articles, equipment, incidentals, items, tools, services, supplies, methods, operations, skills in such quantities as may be necessary to complete Project within intent of Contract Documents.
2. Singular notations shall be considered plural where plural application is reasonably inferable. Mention or indication of extend of work under work division or specification section is done only for convenience of Contractor and shall not be construed as describing all work required under that Division or Section.

D. Bid Documents: Bid documents will be available at Olmsted County's Purchasing website at **https://olmstedcounty.ionwave.net/**

E. Site Visit: Full site visits will only allowed at the pre-bid meeting. If a contractor wants to visit the site they may access the property only where any member of the public may view it.

F. Bids Due: Refer to owners online bidding site for bid date. Bids will only be accepted through the online bidding site.

G. Questions: All questions during the bid period shall be directed to the owner via purchasing website at **https://olmstedcounty.ionwave.net/**

H. Bid Package Details: The Bid Package Details are intended to clarify the scope of work. Each Bid Category includes all provisions of Division 1 Specifications.
1. The Bid Categories are constructed to follow as closely as possible the CSI format of the Contract Documents. However, some Bid Categories may contain more than one specification section and/or parts thereof.
2. Local custom and trade-union jurisdictional settlements do not control the scope-of-work included in each Subcontract. When a potential jurisdictional dispute or similar interruption of construction activities is first identified or threatened, the affected subcontracts shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and its delays.
3. When "L&M" is referenced, it shall mean "Labor and Material", when "L" is referenced, it shall mean "Labor" and when "M" is referenced, it shall mean "Material". Material for this project can be purchased Tax Exempt.
4. The Clarification's listed with some of the Bid Categories are included for the basic

understanding of the Scope of Work within the Bid Category, and is not intended to define the limits of the Work for a complete installation. This shall not relieve any Subcontractor of the requirements within the technical Sections as they are listed.

I. Construction Contract: Construction will be accomplished under a single Prime Contract including General Construction.

J. Construction Limits: Except as specifically indicated or as may be necessary to complete the Work under the Contract, activities of the Contract shall be limited to within the limits designated on Drawings.

K. Schedule: Construction start date and schedule is to be determined. Project schedule must be maintained and is a key element of the scope of work.

L. Safety: Safety requirements are stringent and will be strictly enforced. Safety requirements include high visibility shirts or vests, full use of eye wear, and hard hats. These are to be worn at all times when on site.

A. Smoking and Controlled Substance Restrictions: Use of tobacco products alcoholic beverages, and other controlled substances on Project site is not permitted.

B. Employee Identification: Owner will provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

C. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.

1. Maintain list of approved screened personnel with Owner's representative.

M. Sales Tax: Contractor is responsible for the payment of all sales tax.

1.3 BID CATEGORIES

A. Clarifications below apply to all bid categories:
1. Include all labor and materials for above Sections unless noted otherwise.
2. Responses must include bid bonds.
3. Coordinate all work with other Subcontractors as required.
4. Subcontractor is responsible for the removal of debris to on-site dumpster.
5. Subcontractor is responsible for their own daily cleanup.
6. Include all cutting and patching required to complete the work.
7. Bid Categories can be bid combined but also quote each package separately.

1.4 USE BY OWNER

A. Owner reserves the right to let other contracts in connection with this Project or in connection with existing buildings. This Contractor must afford other contractors reasonable opportunity for the introduction and storage of their materials and execution of their work, and shall properly connect and coordinate the contractor’s work with theirs.

B. Owner reserves the right to jointly occupy the premises with Contractor in performance of Owner’s duties and functions. Owner also reserves the right to: enter into the Project and premises; make installations of materials and equipment at appropriate times as the Work progresses; install equipment, furniture and furnishings when spaces are at appropriate stages of completion. Coordinate work with Owner and cooperate with Owner to minimize undue interferences.

C. If any part, unit, phase, or the entire Project is substantially complete or ready for occupancy, Owner may, upon notice to Contractor, and without prejudice to rights of Owner or Contractors,

enter into and make use of work that is substantially complete.

1.5 MAINTAINING SERVICES AND FUNCTIONS

A. Work at Occupied Facilities: After Owner's occupancy (full or partial) of Project or unit, stage, phase or area, work remaining to be accomplished in the occupied spaces shall be done in cooperation with, and approval by, Owner and scheduled in advance with Owner. In general, work in occupied spaces shall be done when the space is not in use, such as after hours in administrative areas or public spaces when public use hours are over for the day, unless specifically approved by Owner. Where necessary, overtime shall be used if work cannot reasonably be accomplished during normal work periods, at no extra cost to Owner. Perform work in occupied areas in a manner and at such time as will not significantly interfere with, hamper or inconvenience Owner's program or functions.

1.6 OTHER BONDS, PERMITS, FEES

A. Provide and pay for bonds, fees and permits that may be required, including bonds, permits and fees required by municipalities, including connecting fees, to directly accomplish work under this project.

1.7 WARRANTIES

A. In the event of conflict, inconsistency, or difference between a warranty issued by a supplier or contractor and terms of specifications, Owner, if it becomes necessary to enforce terms and provisions of warranty or specifications, may elect to enforce either submitted warranty or specifications.

1.8 ELECTRONIC FILES

A. Upon request, one copy of electronic files in Architect’s current file format, including applicable layers, for each issue (bid packages, construction packages, addenda, etc.) will be provided via e-mail or website posting at Architect’s option to General Contractor at no charge for:
   1. Site utility plan
   2. Structural framing plans

B. Additional documents not listed or additional copies of electronic files are available upon request with advance payment of applicable fee(s) and subject to conditions of use. Contact Architect for schedules of fees and additional details about conditions. Subcontractors and others can obtain copies of electronic files from General Contractor.

C. Electronic files and information therein are instruments of service and works in progress created for this Project and not to be used for other projects, additions to this project or completion of this Project by others.

D. Signed and sealed original hard copy Drawings, Specifications and other documents as defined by General Conditions are Contract Documents. Electronic files are not Contract Documents and may be subject to manipulation beyond Architect’s control. Therefore, Architect cannot verify that electronic files accurately or completely reflect Contract Documents, actual construction or field conditions. Each user of electronic files must determine accuracy, completeness and suitability for its intended use.

E. Electronic files are subject to discrepancies as a result of numerous factors including but not limited to transmission and translation errors resulting from differences in software, hardware and other equipment related problems, disc or server malfunctions, data corruption during transmission through website or email and user error. Neither Architect nor Owner shall be responsible for such discrepancies.

F. Architect makes no representation regarding accuracy, completeness or permanence of electronic files. Changes to Contract Documents may not be incorporated into electronic files including without limitation, Addenda information or revisions made after date indicated on electronic files.

G. By accepting electronic files, user covenants not to sue, and agrees to indemnify and hold harmless Architect and Owner from costs (including attorneys' fees), claims or causes of action be it tort, breach of contract or otherwise that result from the use of electronic files, and waives claims for consequential and/or liquidated damages against Architect and Owner.

H. Architect and Owner provide no warranties, express or implied with respect to electronic files, including but not limited to, Spearin type warranties, warranties of merchantability and/or fitness for a particular purpose.

I. Use of electronic files provided by Architect does not obviate Contractor, subcontractor/installer or supplier from responsibility for proper checking and coordination of dimensions, details, member sizes, quantities and other requirements to facilitate complete and accurate fabrication, installation and completion of Work.

J. Providing electronic files by Architect is not to be construed to be in derogation of reserved or intellectual property rights.

1.9 COPIES OF DRAWINGS AND SPECIFICATIONS

A. Contractor and subcontractors will be responsible for printing their own sets of Drawings and Specifications for bidding purposes and for completion of the work if awarded.

1.10 USE OF PREMISES – SPECIAL CONSIDERATIONS, REQUIREMENTS AND CONSTRAINTS

A. Safety Program: Develop a safety program and provide first aid kits in several accessible locations on site for temporary on-site first aid. Contractor is responsible for safety of persons and property and compliance with applicable statutes, rules, regulations, and orders for work under this Contract.

B. Accomplish work in streets in conformance with Municipality requirements and to a schedule as Municipality may require. Contractor must make arrangements with Municipality.

C. Snow Removal: Remove snow from the building work areas, storage areas, and access routes after each period of snowfall to prevent the accumulation of snow and ice from impeding job progress or creating unsafe conditions.

1. Provide covered walkways at public sidewalks, fire exit as required to maintain public safety, and as may be required by the Municipality. (Refer to Section 01 52 29 for further requirements).

1.11 USE OF PREMISES – BROKEN GLASS

A. Contractor is responsible for glass of the new building and glass in existing adjacent buildings in the vicinity of this Project. Provide protection for glass, except Subcontractors shall protect their own glass.

B. Near completion of Project, Contractor must replace broken, cracked, scratched or otherwise damaged or faulty glass, without additional reimbursement. Replace glass damaged by welding splatter. Cost of replacing glass broken or damaged by Subcontractors shall be paid for by party causing damage.

1.12 USE OF PREMISES - CLEAN CONDITIONS

A. References: Refer to General Conditions for general cleaning requirements, Section 01 77 00 for Project Closeout Clean-up.

B. General: Contractor and subcontractors shall maintain clean conditions in areas of existing buildings and where new construction interfaces with existing buildings. Maintain areas free of accumulations of combustible materials. Provide good housekeeping and regular cleaning to maintain areas clean and free of debris. Provide proper closures between areas under construction including closures and measures to prevent spread of dust or other contamination.

1.13 HAZARDOUS SUBSTANCES AND HARMFUL PHYSICAL AGENTS

A. Where work of this project involves possible hazardous substances or harmful physical agents, exercise extreme care to avoid damage and preserve safety of personnel.

B. Regulations concerning availability of information and employee training in use and handling of "hazardous substances" and "harmful physical agents" are governed by Employee Right-to-Know Act of (1983 unless otherwise revised or updated; or amended by local jurisdictions).

C. Regulations governing handling of asbestos-containing materials and disposal of asbestos-containing debris are:

1. Code of Federal Regulations, Title 29, U.S. Department of Labor - Occupational Safety and Health Administration (OSHA), Section 1910.1001 - Asbestos.
2. Local pollution control agency Rules for Emission Standards for Asbestos.

1.14 GENERAL PROTECTION AND SAFETY

A. References: Refer to General Conditions of the Contract for general requirements.

B. General: In accordance with best construction practices, Contractor is solely and completely responsible for conditions of job site, including safety of persons and property affected directly or indirectly by contractor’s operations during performance of Work. This requirement shall apply continuously 24 hours per day until acceptance of Work by Owner and shall not be limited to normal working hours.

1.15 SAFETY DIRECTOR - FIRE AND ACCIDENT

A. Safety Director: Appoint a responsible employee to act as Safety Director (fire and accident or separate individuals for each) whose duty it shall be to prevent accidents and minimize fire hazards and to enforce safety precautions. Safety Director shall develop procedures and regulations to guide Contractor, subcontractors and workers. With particular respect to existing buildings, facilities, and Owner's staff, Safety Director shall consult with and be guided by directions of Owner.

B. Compliance: Contractor and Subcontractors shall conform to and abide by requirements of Safety Director.

C. Inspection: Safety Director shall periodically inspect spaces of work under this Contract and operations of Contractor and list hazards to be removed or corrected. These shall be reported to Owner, Contractor and responsible subcontractors, who shall promptly remove or correct hazards.

D. Site Meetings: Safety Director shall hold accident and fire prevention meetings at least once a month with representatives of various trades employed to insure employees understand and comply with programs.

1.16 FIRE SAFETY PRECAUTIONS

A. Reference: Refer to General Conditions for general requirements.

B. General: Contractor and Safety Director shall recognize the utmost importance of extraordinary precautions to prevent a fire in or adjacent to functioning and occupied building. Contractor, subcontractors and workers shall exercise extreme care to maintain and exercise fire safety precautions through work. This shall include providing sufficient fire fighting devices, watchmen, standby helpers or other precautions during construction, in use of temporary heat, welding, bracing, sweating, testing or other phases of work.

PART 2 - PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01 11 00

SECTION 01 22 00 – UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 DEFINITIONS

A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification.
   1. Unit Prices are in addition to the base bid work, to be utilized for unforeseen work as directed by the Engineer/Architect or Owner.

1.4 COSTS INCLUDED IN UNIT PRICES

A. Actual cost of product to Contractor or subcontractor, less applicable trade discounts.

B. Delivery to site, unloading, uncrating, protection, and storage.

C. Labor and equipment required under unit price.

D. Applicable overhead, profit, benefits, bond, insurance, taxes, etc., when specified to be included in the unit price. All other miscellaneous costs shall be included in the Base Bid.
   1. Contractor's overhead, profit, general conditions or other mark-ups are to be included in the unit price listed on the bid form; additional mark-up on unit prices will not be allowed.

E. Differences in quantity will result in add or deduct changes to the Total Bid costs and will be adjusted on the basis of the Unit Price listed on the Bid Form.
   1. All unit prices shall have the same price for additional work as deducted work.

F. Unit price items of this Section shall be subject to the provisions in the General Conditions, Increased or Decreased Quantities of Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.0 UNIT PRICE DESCRIPTION

A. For the purpose of preparing a bid, the Contractor shall include the cost for work described for the following items on a Unit Price basis to be included in the Total Bid for the estimated quantities listed below:
   1. For the estimated quantities of work as indicated on the Bid Form.

B. Differences in quantity will result in add or deduct changes to the total bid cost and will be adjusted on the basis of the Unit Prices shown on the Bid Form. Unit prices shall have the same price for additional work as for deducted work. Quantities are indicated on the Bid Form.

C. Unit price items of this Section shall be subject to the provisions of General Conditions, Article 7.3 - Unit Prices - Increased or Decreased Quantities of Work.

END OF SECTION 01 22 00

SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
   1. General project coordination procedures.
   2. Conservation.
   3. Coordination Drawings.
   4. Project meetings.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 1 Section "Construction Progress Documentation" for preparing and submitting the Contractor's Construction Schedule.
   2. Division 1 Section "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
   3. Division 1 Section "Closeout Procedures" for coordinating Contract closeout.

1.3 COORDINATION

A. Coordination: Coordinate construction operations included in various Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
   1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.

B. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
   1. Preparation of Contractor's Construction Schedule.
   2. Preparation of the Schedule of Values.
      a. Divided by Labor and Material.
      b. Include a line item in each discipline’s General Conditions for Closeout Documents.
   3. Installation and removal of temporary facilities and controls.
   4. Delivery and processing of submittals.

5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
   1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work.

1.4 SUBMITTALS

A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
   1. Indicate relationship of components shown on separate Shop Drawings.
   2. Indicate required installation sequences.

B. Staff Names: Within 15 days of starting construction operations, submit a list of principal staff assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
   1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone.

1.5 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
   1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner's Representative and Architect of scheduled meeting dates and times.
   2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
   3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner's Representative and Architect, within 3 days of the meeting.

B. Preconstruction Conference: The Architect will schedule a Preconstruction Conference before work at the site begins, within 15 days of Notice to Proceed.
   1. Attendees: Owner's Representative, Architect, and their consultants; special inspector, testing agency, Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
   2. Agenda: Discuss items of significance that could affect progress, including the following:
      a. Tentative construction schedule.
      b. Critical work sequencing.
      c. Designation of responsible personnel.
      d. Procedures for processing field decisions and Change Orders.
      e. Procedures for processing Applications for Payment.
      f. Distribution of the Contract Documents.
      g. Submittal procedures.
      h. Preparation of Record Documents.
      i. Use of the premises.
      j. Responsibility for temporary facilities and controls.
      k. Parking availability.

l. Office, work, and storage areas.
m. Equipment deliveries and priorities.
n. Security.
o. Progress cleaning.
p. Working hours.

3. The Architect will record minutes of this meeting and distribute them to all affected parties.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect and Owner's Representative of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
a. Contract Documents.
b. Options.
c. Related Change Orders.
d. Purchases.
e. Deliveries.
f. Submittals.
g. Review of mockups.
h. Possible conflicts.
i. Compatibility problems.
j. Time schedules.
k. Weather limitations.
l. Manufacturer's written recommendations.
m. Warranty requirements.
n. Compatibility of materials.
o. Acceptability of substrates.
p. Temporary facilities and controls.
q. Space and access limitations.
r. Regulations of authorities having jurisdiction.
s. Testing and inspecting requirements.
t. Required performance results.
u. Protection of construction and personnel.
3. Record significant conference discussions, agreements, and disagreements.
4. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings: Conduct progress meetings at regular intervals. Coordinate dates of meetings with preparation of payment requests.
1. Attendees: In addition to representatives of Ameriprise and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Revise subparagraph and associated subparagraphs below to suit Project.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how

construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

b. Review present and future needs of each entity present, including the following:
   1) Interface requirements.
   2) Sequence of operations.
   3) Status of submittals.
   4) Deliveries.
   5) Off-site fabrication.
   6) Access.
   7) Site utilization.
   8) Temporary facilities and controls.
   9) Work hours.
   10) Hazards and risks.
   11) Progress cleaning.
   12) Quality and work standards.
   13) Change Orders, Change Log.
   14) Documentation of information for payment requests.
   15) Contract Closeout submittals.
   16) Status of Project Record Documents.

4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
   a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

E. Pre Final Inspection Meeting: There shall be a meeting a minimum of 30 days before Final Inspection with Architect, User Representative, Owner’s Representative, and any others the Owner’s Representative deems necessary.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
   1. Contractor's Construction Schedule.
   2. Submittals Schedule.
   3. Daily construction reports.
   4. Special reports.

B. Related Sections include the following:
   1. Division 1 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
   2. Division 1 Section "Submittal Procedures" for submitting schedules and reports.
   3. Division 1 Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 SUBMITTALS

A. Submittals Schedule: Submit three copies of schedule. Arrange the following information in a tabular format:
   1. Scheduled date for first submittal.
   2. Specification Section number and title.
   3. Submittal category (action or informational).
   4. Name of subcontractor.
   5. Description of the Work covered.
   6. Scheduled date for Architect's final release or approval.

B. Contractor's Construction Schedule: Submit two printed copies of initial schedule, one a reproducible print and one a blue- or black-line print, large enough to show entire schedule for entire construction period.

C. Construction Reports: Submit weekly.

D. Special Reports: Submit two copies at time of unusual event.

1.4 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities.

B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
   1. Secure time commitments for performing critical elements of the Work from parties involved.
   2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
   1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Final Completion.
   1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Basic Components: The following basic components are to be included in the Contractor’s Construction Schedule as a minimum:
   1. Time duration required completing each construction activity.
   2. Relationships of the construction activities to one another.
   3. Identification of critical activities.
   4. Identification of long lead-time items.
   5. Disruption of utility services.

C. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
   1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
   2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
   3. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
   4. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's and Owner’s Representative’s administrative procedures necessary for certification of Substantial Completion.

D. 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. Work under More Than One Contract: Include a separate activity for each contract.
   3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.

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. Partial occupancy before Substantial Completion.
   e. Use of premises restrictions.
   f. Provisions for future construction.
   g. Seasonal variations.
   h. Environmental control.

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

F. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.

G. Computer Software: Prepare schedules using a program that has been developed specifically to manage construction schedules.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within 10 days of date established for the Notice to Proceed. Base schedule on the Preliminary Construction Schedule and whatever updating and feedback was 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 3 months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

2.4 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. Approximate count of personnel at Project site.
   3. High and low temperatures and general weather conditions.
   4. Accidents.
   5. Meetings and significant decisions.
   6. Unusual events (refer to special reports).
   7. Stoppages, delays, shortages, and losses.
   8. Meter readings and similar recordings.
   9. Emergency procedures.
   10. Orders and requests of authorities having jurisdiction.
   11. Change Orders received and implemented.
   12. Services connected and disconnected.
   13. Equipment or system tests and startups.
   14. Partial Completions and occupancies.
   15. Substantial Completions authorized.

2.5 SPECIAL REPORTS

A. General: Submit special reports directly to Architect and Owner's Representative within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: 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, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Architect and Owner's Representative in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. 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 Actual Completion percentage for each activity.

B. Distribution: Distribute copies of approved schedule to Architect, Owner's Representative, 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.

END OF SECTION 01 32 00

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

B. Related Sections include the following:
1. Division 1 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.
2. Division 1 Section "Quality Requirements" for submitting test and inspection reports and Delegated-Design Submittals.
3. Division 1 Section "Closeout Procedures" for submitting warranties, Project Record Documents, and operation and maintenance manuals.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Architect's and Owner's Representative's responsive action.

B. Informational Submittals: Written information that does not require Architect's and Owner's Representative's approval. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

A. 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. Coordinate transmittal of different types of submittals for related parts of the Work 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.

B. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.

C. Processing Time: Allow enough time for submittal review, including time for resubmittals.
1. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.

D. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.

2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect and Owner's Representative.
3. Include the following information on label for processing and recording action taken:
   a. Date.
   b. Name and address of Architect.
   c. Name and address of Contractor.
   d. Name and address of subcontractor.
   e. Name and address of supplier.
   f. Name of manufacturer.
   g. Number and title of appropriate Specification Section.
   h. Drawing number and detail references, as appropriate.
   i. Other necessary identification.

E. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.

F. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.
1. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements of the Contract Documents, including minor variations and limitations. Include the same label information as the related submittal.
2. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
3. Transmittal Form: Provide locations on form for the following information:
   a. Project name.
   b. Date.
   c. Destination (To:).
   d. Source (From:).
   e. Names of subcontractor, manufacturer, and supplier.
   f. Category and type of submittal.
   g. Submittal purpose and description.
   h. Submittal and transmittal distribution record.
   i. Remarks.
   j. Signature of transmitter.

G. 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.

H. Use for Construction: Use only final submittals with mark indicating action taken by Architect and Owner's Representative in connection with construction.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.
1. Number of Copies: Submit three copies of each submittal, unless otherwise indicated. Architect will return two copies. Mark up and retain one returned copy as a Project Record Document.

B. 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 printed data are not suitable 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 written recommendations.
      b. Manufacturer's product specifications.
      c. Manufacturer's installation instructions.
      d. Standard color charts.
      e. Manufacturer's catalog cuts.
      f. Wiring diagrams showing factory-installed wiring.
      g. Printed performance curves.
      h. Operational range diagrams.
      i. Mill reports.
      j. Standard product operating and maintenance manuals.
      k. Compliance with recognized trade association standards.
      l. Compliance with recognized testing agency standards.
      m. Application of testing agency labels and seals.
      n. Notation of coordination requirements.

C. 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: Include the following information, as applicable:
      a. Dimensions.
      b. Identification of products.
      c. Fabrication and installation drawings.
      d. Roughing-in and setting diagrams.
      e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
      f. Shop work manufacturing instructions.
      g. Templates and patterns.
      h. Schedules.
      i. Design calculations.
      j. Compliance with specified standards.
      k. Notation of coordination requirements.
      l. Notation of dimensions established by field measurement.
   2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
   3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 40 inches.
   4. Number of Copies: Submit one correctable, translucent, reproducible print and two blue- or black-line print of each submittal. Architect will return the reproducible print.

D. Samples: Prepare physical units of materials or products, including the following:
   1. Comply with requirements in Division 1 Section "Quality Requirements" for mockups.
   2. 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.
   3. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the 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.

4. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side that includes the following:
   a. Generic description of Sample.
   b. Product name or name of manufacturer.
   c. Sample source.
5. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
   a. If variation in color, pattern, texture, or other characteristic is inherent in the product represented by a Sample, submit at least three sets of paired units that show approximate limits of the variations.
6. Number of Samples for Initial Selection: Submit one full set 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.
7. Number of Samples for Verification: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned.
   a. Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
8. 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.
   a. Samples not incorporated into the Work, or otherwise designated as Owner’s property, are the property of Contractor.

E. Product Schedule or List: 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.
   2. Number and name of room or space.
   3. Location within room or space.

F. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation."

G. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
   1. Name, address, and telephone number of entity performing subcontract or supplying products.
   2. Number and title of related Specification Section(s) covered by subcontract.
   3. Drawing number and detail references, as appropriate, covered by subcontract.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.
   1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Architect will not return copies.
   2. Certificates and Certifications: Provide a notarized 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.
   3. Test and Inspection Reports: Comply with requirements in Division 1 Section "Quality Requirements."

B. Contractor's Construction Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation."

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

D. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.

E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project.

G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.

H. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.

I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.

J. Preconstruction Test Reports: Prepare 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.

K. Compatibility Test Reports: Prepare 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 primers and substrate preparation needed for adhesion.

L. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, 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.

M. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. 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.

N. Research/Evaluation Reports: Prepare 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:
   1. Name of evaluation organization.
   2. Date of evaluation.
   3. Time period when report is in effect.
   4. Product and manufacturers' names.

5. Description of product.
6. Test procedures and results.
7. Limitations of use.

O. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements in Division 1 Section "Closeout Procedures."

P. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

Q. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
1. Preparation of substrates.
2. Required substrate tolerances.
3. Sequence of installation or erection.
4. Required installation tolerances.
5. Required adjustments.
6. Recommendations for cleaning and protection.

R. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
1. Name, address, and telephone number of factory-authorized service 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 whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

S. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.

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

D. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION 01 33 00

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SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Testing and inspecting 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-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
   2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
   3. Requirements for Contractor to provide quality-control services required by Architect, Owner’s Representative, or authorities having jurisdiction are not limited by provisions of this Section.

C. Related Sections include the following:
   1. Division 1 Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.
   2. Divisions 2 through 16 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

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

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Architect.

C. Mockups: Full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Mockups establish the standard by which the Work will be judged.

D. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.4 SUBMITTALS

A. Qualification Data: 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.

B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
1. Specification Section number and title.
2. Description of test and inspection.
3. Identification of applicable standards.
4. Identification of test and inspection methods.
5. Number of tests and inspections required.
6. Time schedule or time span for tests and inspections.
7. Entity responsible for performing tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

C. Reports: Prepare and submit certified written reports that include the following:
1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making 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. Ambient conditions at time of sample taking and testing and inspecting.
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.

D. Permits, Licenses, and Certificates: For Owner’s records, 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.

1.5 QUALITY ASSURANCE

A. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

B. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.

C. Preconstruction Testing: Testing agency shall perform preconstruction testing for compliance with specified requirements for performance and test methods.
1. Contractor responsibilities include the following:
a. Provide test specimens and assemblies representative of proposed materials and construction. Provide sizes and configurations of assemblies to adequately demonstrate capability of product to comply with performance requirements.
b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.

c. Fabricate and install test assemblies using installers who will perform the same tasks for Project.
d. When testing is complete, remove assemblies; do not reuse materials on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect and Owner's Representative, 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.

D. 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 in location and of size indicated or, if not indicated, as directed by Architect or Owner's Representative.
2. Notify Architect and Owner's Representative seven days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's and Owner's Representative's approval of mockups before starting work, fabrication, or construction.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove mockups when directed, unless otherwise indicated.

1.6 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 the types of testing and inspecting 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: Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
a. Contractor shall not employ the same entity engaged by Owner, unless agreed to in writing by Owner.
2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Special Tests and Inspections: Owner will engage and pay a testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner.
1. Testing agency will notify Architect, Owner's Representative, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
2. Testing agency will submit a certified written report of each test, inspection, and similar quality-control service to Architect and Owner's Representative, with copy to Contractor and to authorities having jurisdiction.
3. Testing agency will submit a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.

4. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
5. Testing agency will retest and reinspect corrected work.

D. 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.

E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.

F. Testing Agency Responsibilities: Cooperate with Architect, Owner's Representative, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect**,** Owner's Representative, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
5. Do not perform any duties of Contractor.

G. Associated Services: Cooperate with agencies 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 inspecting. 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 inspecting 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 inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.7 INSPECTION OF ADJACENT FACILITIES

A. Where demolition, excavation, underpinning, pile driving, or similar work is to be performed adjacent to or in the immediate vicinity of existing structures, the Owner may arrange for the inspection and survey of existing structures prior to the start of construction.

B. The Owner may update the survey, as work progresses, to detect movement, settlement, cracking, damage, or changes of any kind.

C. Records of the pre-construction survey shall note pre-construction defects, measurements, elevations and newly discovered defects or changes.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   1. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."

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 01 40 00

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SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": The term "approved," when used to convey Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by Architect or Owner, requested by Architect or Owner, and similar phrases.

D. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on Drawings or to other paragraphs or schedules in Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.

E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": The term "furnish" means to supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": The term "install" describes operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.

I. "Installer": An installer is the Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

J. "Project site" is the 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.

1.3 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.

C. Conflicting Requirements: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
   1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be 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.

D. Copies of Standards: Each entity engaged in construction on Project must 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 and make them available on request.

E. Abbreviations and Acronyms for Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AA	Aluminum Association, Inc. (The) www.aluminum.org	(202) 862-5100
AABC	Associated Air Balance Council www.aabchq.com	(202) 737-0202
AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
AASHTO	American Association of State Highway and Transportation Officials www.aashto.org	(202) 624-5800
ACI	American Concrete Institute/ACI International www.aci-int.org	(248) 848-3700
ACPA	American Concrete Pipe Association www.concrete-pipe.org	(972) 506-7216
ADC	Air Diffusion Council	(312) 201-0101
AGA	American Gas Association www.aga.org	(202) 824-7000
AI	Asphalt Institute www.asphaltinstitute.org	(606) 288-4960

AIA	American Institute of Architects (The) www.aiaonline.org	(202) 626-7300
AISC	American Institute of Steel Construction, Inc. www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
ALSC	American Lumber Standard Committee	(301) 972-1700
AMCA	Air Movement and Control Association International, Inc. www.amca.org	(847) 394-0150
ANLA	American Nursery & Landscape Association (Formerly: AAN - American Association of Nurserymen) www.anla.org	(202) 789-2900
ANSI	American National Standards Institute www.ansi.org	(212) 642-4900
APA	APA-The Engineered Wood Association www.apawood.org	(253) 565-6600
APA	Architectural Precast Association www.archprecast.org	(941) 454-6989
ARI	Air-Conditioning & Refrigeration Institute www.ari.org	(703) 524-8800
ASCE	American Society of Civil Engineers www.asce.org	(800) 548-2723 (703) 295-6300
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers www.ashrae.org	(800) 527-4723 (404) 636-8400
ASME	ASME International (The American Society of Mechanical Engineers International) www.asme.org	(800) 843-2763
ASSE	American Society of Sanitary Engineering www.asse-plumbing.org	(440) 835-3040
ASTM	American Society for Testing and Materials www.astm.org	(610) 832-9585
AWI	Architectural Woodwork Institute www.awinet.org	(800) 449-8811 (703) 733-0600
AWPA	American Wood-Preservers' Association www.awpa.com	(817) 326-6300
AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353

AWWA	American Water Works Association www.awwa.org	(800) 926-7337 (303) 794-7711
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 661-4261
BIA	Brick Industry Association (The) www.bia.org	(703) 620-0010
CDA	Copper Development Association Inc. www.copper.org	(800) 232-3282 (212) 251-7200
CGA	Compressed Gas Association www.cganet.com	(703) 412-0900
CISPI	Cast Iron Soil Pipe Institute www.cispi.org	(423) 892-0137
CPPA	Corrugated Polyethylene Pipe Association Division of Plastics Pipe Institute www.cppa-info.org	(800) 510-2772 (419) 241-2221
CRI	Carpet and Rug Institute (The) www.carpet-rug.com	(800) 882-8846 (706) 278-3176
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(847) 517-1200
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
DHI	Door and Hardware Institute www.dhi.org	(703) 222-2010
EJMA	Expansion Joint Manufacturers Association, Inc. www.ejma.org	(914) 332-0040
FCI	Fluid Controls Institute www.fluidcontrolsinstitute.org	(216) 241-7333
FGMA	Flat Glass Marketing Association (See GANA)	
FM	Factory Mutual System (See FMG)	
FMG	FM Global (Formerly: FM - Factory Mutual System) www.fmglobal.com	(401) 275-3000
GA	Gypsum Association www.gypsum.org	(202) 289-5440
GANA	Glass Association of North America (Formerly: FGMA - Flat Glass Marketing Association) www.glasswebsite.com/gana	(785) 271-0208

GTA	Glass Tempering Division of Glass Association of North America (See GANA)	
HI	Hydronics Institute Division of Gas Appliance Manufacturers Association www.gamanet.org	(908) 464-8200
HMMA	Hollow Metal Manufacturers Association Division of National Association of Architectural Metal Manufacturers (See NAAMM)	
ICRI	International Concrete Repair Institute www.icri.org	(703) 450-0116
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The) www.ieee.org	(212) 419-7900
IESNA	Illuminating Engineering Society of North America (The) www.iesna.org	(212) 248-5000
IGCC	Insulating Glass Certification Council www.igcc.org	(315) 938-7444
ILI	Indiana Limestone Institute of America, Inc. www.iliai.com	(812) 275-4426
LSGA	Laminated Safety Glass Association (See GANA)	
MFMA	Metal Framing Manufacturers Association	(312) 644-6610
MIA	Marble Institute of America www.marble-institute.com	(614) 228-6194
ML/SFA	Metal Lath/Steel Framing Association (See SSMA)	
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry, Inc. www.mss-hq.com	(703) 281-6613
NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(312) 332-0405
NAIMA	North American Insulation Manufacturers Association (The) www.naima.org	(703) 684-0084
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900
NEBB	National Environmental Balancing Bureau www.nebb.org	(301) 977-3698

NeLMA	Northeastern Lumber Manufacturers' Association www.nelma.org	(207) 829-6901
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NFPA	National Fire Protection Association www.nfpa.org	(800) 344-3555 (617) 770-3000
NFRC	National Fenestration Rating Council www.nfrc.org	(301) 589-6372
NGA	National Glass Association www.glass.org	(703) 442-4890
NLGA	National Lumber Grades Authority www.nlga.org	(604) 524-2393
NRCA	National Roofing Contractors Association www.nrca.net	(800) 323-9545 (847) 299-9070
NRMCA	National Ready Mixed Concrete Association www.nrmca.org	(301) 587-1400
NTMA	National Terrazzo & Mosaic Association (The) www.ntma.com	(800) 323-9736
NWWDA	National Wood Window and Door Association (See WDMA)	(703) 779-1022
PCI	Precast/Prestressed Concrete Institute www.pci.org	(312) 786-0300
RFCI	Resilient Floor Covering Institute	(Contact by mail only)
RIS	Redwood Inspection Service Division of the California Redwood Association www.calredwood.org	(888) 225-7339 (415) 382-0662
RMA	Rubber Manufacturers Association www.rma.org	(800) 220-7620 (202) 682-4800
SDI	Steel Deck Institute www.sdi.org	(847) 462-1930
SDI	Steel Door Institute www.steeldoor.org	(440) 899-0010
SGCC	Safety Glazing Certification Council www.sgcc.org	(315) 938-7444
SIGMA	Sealed Insulating Glass Manufacturers Association www.sigmaonline.org/sigma	(312) 644-6610
SJI	Steel Joist Institute	(843) 626-1995

	www.steeljoist.org	
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980
SSMA	Steel Stud Manufacturers Association (Formerly: ML/SFA - Metal Lath/Steel Framing Association) www.ssma.com	(312) 456-5590
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(800) 837-8303 (412) 281-2331
SWRI	Sealant, Waterproofing & Restoration Institute www.swrionline.org	(816) 472-7974
TCA	Tile Council of America, Inc. www.tileusa.com	(864) 646-8453
UL	Underwriters Laboratories Inc. www.ul.com	(800) 704-4050 (847) 272-8800
USG	United States Gypsum Company A Subsidiary of USG Corporation www.usg.com	(800) 874-4968 (312) 606-4000
WCMA	Window Covering Manufacturers Association (Formerly: AWCMA - American Window Covering Manufacturers Association) www.windowcoverings.org	(212) 661-4261
WDMA	Window & Door Manufacturers Association (Formerly: NWWDA - National Wood Window and Door Association) www.wdma.com	(800) 223-2301 (847) 299-5200
WWPA	Western Wood Products Association www.wwpa.org	(503) 224-3930

F. Abbreviations and Acronyms for Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

EPA	Environmental Protection Agency www.epa.gov	(202) 260-2090
FCC	Federal Communications Commission www.fcc.gov	(202) 418-0190
FED-STD	Federal Standard (See FS)	
FS	Federal Specification (Available from DOD, GSA, and NIBS)	

FTMS	Federal Test Method Standard (See FS)	
OSHA	Occupational Safety & Health Administration (See CFR 29) www.osha.gov	(202) 219-5000

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

SECTION 01 52 29 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
1. Electricity, Lighting
2. Heat, Ventilation
3. Telephone Service
4. Water
5. Sanitary Facilities
6. Protective Barriers
7. Temporary Enclosures
8. Temporary Dust Enclosures
9. Protection of Installed Work
10. Security
11. Construction Cleaning
12. Water Control
13. Field Offices
14. Storage
15. Construction Aids
16. Removal of Temporary Construction
17. Snow Removal
18. Parking
19. Signage
20. Job Site Notices

1.2 RELATED REQUIREMENTS

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

B. Section 01 11 00 - Summary of Work: Work sequence. Contractor use of premises.

C. Section 01 70 00 - Execution and Closeout Procedures: Final cleaning.

1.3 ELECTRICITY, LIGHTING

A. Pay for all costs and make all necessary arrangements with local utility company for providing and distribution of power during the term of building construction under this Contract.
1. Provide portable power source where temporary service is not available.
2. Contractor will pay for energy costs.

B. The following minimum electrical requirements shall govern:
1. Lighting at Non-Public Areas: Provide 15-foot candles throughout the project area for general illumination. Each contractor shall provide any additional light required where the specific tasks are being performed.

2. Lighting at Public Areas: Provide foot-candles equal to existing lighting levels throughout the public areas. Each contractor shall provide any additional light required where the specific tasks are being performed.
   a. When requested by Owner or Architect, provide additional temporary lighting.
3. Receptacles: Provide one (1) 120V 20 AMP circuit per 100 feet from each temporary panel with outlets located so that no extension cord in use need be longer than 100 feet.
4. Power Outlets: Each contractor shall pay all costs and make all arrangements for any heavy duty (208V) power outlets or circuits required to perform the work or operate the tools and equipment.
5. Contractor will be responsible for the continuous operation of existing lighting. Any light circuit failures due to construction will be repaired at the Contractor's expense, including temporary wiring and lights.

C. The following minimum electrical requirements shall govern for new construction:
   1. Temporary Power: Provide adequate distribution equipment, wiring, and outlets to provide single-phase branch circuits for power and lighting.
      a. Provide 20-ampere duplex outlets, single-phase circuits for power tools as required at each active work area.
         1) Provide one (1) 120V 20 AMP circuit from each temporary panel or generator with outlets located so that no extension cord in use need be longer than 100 feet.
      b. Power Outlets: Each contractor shall pay all costs and make all arrangements for any heavy duty (208V) power outlets or circuits required to perform their work or operate their tools and equipment.

D. Temporary Lighting:
   1. The following minimum requirements shall govern:
      a. Lighting for Site: Provide 2-3 foot candles general lighting.
      b. Temporary Lighting within Building: Provide and maintain lighting for construction operations to achieve a minimum lighting level average of 10 foot-candles and minimum lighting level of 2 foot-candles. Each contractor shall provide any additional light required where specific tasks are being performed.
         1) When requested by Owner, provide additional temporary lighting.
   2. Permanent building lighting may be utilized during construction.

1.4 TEMPORARY (CONSTRUCTION) HEAT AND VENTILATION

A. Temporary Heat: As used in this specification, temporary heat shall mean all heat required and provided during construction, whether by temporary heating units and devices, or the permanent heating system and devices, until the Project is occupied or accepted by the Owner. Temporary heat shall comply with all laws, codes, ordinances and regulations.
   1. Basic Temporary Heating and Ventilating: Provide and pay charges for heating, covering, and enclosures to protect Work and materials against damage by dampness and cold, to dry out work, and to facilitate completion.
      a. Fuel, equipment, materials, and methods used shall at all times be adequate for the purpose.
      b. Maintain critical installation temperatures and conditions in work spaces when specified or recommended by material or system manufacturer.
      c. Temporary heat and ventilation are subject to inspections and codes.
   2. Temporary Heating and Ventilating after Enclosure: Within 30 days after building or designated portions thereof have been enclosed as defined herein, provide the following:
      a. Maintain minimum temperatures and ventilation requirements throughout Project as required by Contract Documents.
         1) Contractor shall pay fuel and electricity costs required for operation of heating equipment before date of Substantial Completion.

b. Building or portions thereof will be considered satisfactorily enclosed when the exterior walls and roof system provide a thermal and moisture protection similar to intent of finished Project. Items include, but are not limited to the following conditions:
   1) Exterior walls are fully sheathed and insulated (less face brick and interior drywall).
   2) Exterior windows and doors are installed or openings are sealed with multi-layer reinforcing polyethylene to prevent wind, rain, water, or excessive cold from entering.
   3) Temporary self-closing construction doors and service panels may be installed at appropriate locations.
   4) Roof system is installed and temporarily flashed to provide weather and moisture protection.
   5) Shaft openings, elevator hoistway, stairwells, etc., shall be sealed off to prevent controlled migrating of heat to upper levels.
   6) Minor plumbing and electrical openings in roof and exterior wall shall be sealed to prevent moisture penetration and thermal loss.

3. Use of Permanent Equipment: Use of permanent heating and ventilating systems for temporary heat and ventilation not acceptable, unless Contractor receives written authorization from the Owner. The use of permanent equipment for temporary use will not change or alter the warranty period specified as beginning at the Date of Substantial Completion.
   a. Provide written conformance from heating and ventilating equipment manufacturer certifying that use of equipment for temporary heat and ventilation will not change or alter warranties specified as beginning before date of Substantial Completion.

1.5 TEMPORARY HEAT AND VENTILATION

A. Provide as required to maintain specified conditions for construction operations to protect materials and finishes from damage due to temperature or humidity.

B. Existing heat and ventilation systems may be used.
   1. Protect the existing system from dust and contamination of construction activities.

C. Provide and pay for operation and maintenance of existing system.

D. Provide ventilation of enclosed areas to cure materials, to disperse humidity and to prevent accumulations of dust, fumes, vapors, or gases.

1.6 TELEPHONE SERVICES

A. Provide temporary telephone service as required and coordinated with Owner.

B. Provide separate telephone line for fax service to field office.

1.7 WATER

A. Connect to existing facilities. Contractor is responsible for a means of conveying water from the source to its end use. Contractor will pay for water used.
   1. If connecting to a City of Saint Paul fire hydrant for temporary use, arrangements must be made through the City of Saint Paul Public Works.
      a. Provide enclosure and heat to prevent meter and temporary connections from damage and and freezing.

B. All water shutdowns affecting domestic water or Fire Protection Systems shall be accomplished by the Contractor or subcontractors. All system valves if present will be unlocked and secured by the Owner. Notify the Owner and City of Saint Paul Fire Department.
   1. All requests for shutdown must be made at least (10) days in advance. At time of request, provide total duration of shutdown. No request will be granted without this information.

C. Individual trades shall furnish their own hoses.

1.8 SANITARY FACILITIES

A. Provide and maintain portable sanitary toilets for use by all contractors.

1.9 PROTECTIVE BARRIERS

A. Provide as required to prevent public entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.

B. Provide barricades and covered walkways as required by the Owner or City of Saint Paul for public rights of way and for public access to and through existing buildings.

C. Provide against vehicular traffic, stored materials, dumping, chemically injurious materials and puddling or continuous running water.

D. Provide any barriers in addition to those shown on the documents to control the demolition dust, debris, and to protect vehicles.

E. All excavations are to be fenced.
   1. Use J-Barrier with fencing to provide a minimum 6 foot height.

F. Provide all site fencing as indicated on Drawings.

1.10 PROTECTIVE ENCLOSURES

A. Provide any and all temporary insulated weather tight closures of openings in exterior surfaces to provide acceptable working conditions and protection for materials, to allow for temporary heating, and to prevent entry to unauthorized persons. Provide doors with self-closing hardware and locks.

1.11 TEMPORARY DUST ENCLOSURES

A. For remodeling projects within Metro Square.

B. Construction: Gypsum wallboard over 6 mill polyethylene sheeting on 3-1/2” metal studs. Seal polyethylene sheeting to floor, adjacent walls, and ceiling construction to maintain a continuous dust enclosure.

C. At completion of the project and when directed by the Owner, remove the temporary walls.

D. Walk-off Mats at Construction Entrances:
   1. For use on remodeling projects within Metro Square.
   2. Contractor to provide washable, dust-collecting mats for each construction entrance.
   3. Contractor will be responsible for maintaining and cleaning mat(s) throughout the construction period.
   4. At completion of the project and when directed by the Owner, remove the mats.

1.12 PROTECTION OF INSTALLED WORK

A. Provide temporary protection for installed products and all existing facilities. Control traffic in immediate area to minimize damage.

B. Provide protective coverings at walls, projections, jambs, sills, and soffit of openings. Protect finishes, floors and stairs from traffic, movement of heavy objects, and storage.

C. Prohibit traffic and storage on waterproofed and roofed surfaces.

D. Do not use passenger elevators for construction lifting.

1.13 PROTECTION OF EXISTING UTILITIES

A. Utilities encountered, whether shown on the drawings or not, shall be protected and maintained in service until moved, or abandoned.
   1. Contractor shall exercise care in its excavation around such utilities as may be shown on the drawings or otherwise found, and which are not to be moved, replaced or abandoned, and shall restore any damaged items or work to the same condition (or better) as existed prior to starting work.
   2. Utilities or other service shown to be abandoned shall be maintained in service until new facilities are provided, tested, and ready to use.

1.14 SECURITY

A. Provide security program and facilities to protect Work, and site.
   1. Coordinate with Owner.

1.15 CONSTRUCTION CLEANING

A. Clean up of debris, rubbish, containers, overspray, and other similar items resulting from operations on a daily basis.

B. Contractor shall provide and pay for trash containers and disposal. Failure by the Contractor to clean up properly or to place debris in the containers in a suitable manner will result in one or more of the following actions:
   1. The Owner will clean up the Contractor's debris and backcharge the Contractor for the work involved.
   2. Whatever other action(s) the Owner deems necessary to insure that the Project is kept safe and clean.

1.16 WATER CONTROL

A. Grade site to drain.

B. Maintain excavations free of water.

C. Provide and operate all pumping equipment for all site dewatering operations.

D. Refer to other Sections for ground water dewatering allowances and requirements.

1.17 FIELD OFFICE

A. Provide a field office for the safekeeping of plans, specifications, records, and storage of materials.

1.18 STORAGE

A. Temporary storage may be located in an area so as not to interfere with operations of the Owner or Tenants and not endanger the public. Coordinate temporary storage with the Owner.

B. Contractor may store materials within the construction limits of work areas within loading limits of structure.
   1. NO STORAGE WILL BE PERMITTED IN NON-WORK AREAS.
   2. Store flammable materials only in approved containers in approved locations.

1.19 CONSTRUCTION AIDS

A. Contractor shall provide all construction aids and equipment required by and to facilitate the execution of the Work; scaffolds, staging, ladders, stairs, ramps, runways, platforms, railings, hoists, cranes, chutes and other such facilities and equipment.

B. Construction personnel may use stairs in existing building.

1.20 REMOVAL OF TEMPORARY CONSTRUCTION

A. Remove temporary materials, equipment, services, and construction prior to Substantial Completion inspection.

B. Clean and repair damage caused by installation or use of temporary facilities. Restore existing facilities used during construction and adjacent to construction to specified, or original condition.

1.21 SNOW REMOVAL

A. Remove snow from construction site area. Do not pile snow.

B. Snow must be removed from work area in a timely manner.

1.22 PARKING

A. Parking within the Construction Site shall be coordinated with the Owner.

B. No parking will be permitted in "NO PARKING" zone and this provision must be strictly adhered to.
   1. All construction workers, material suppliers, material handlers, salesmen, product representatives, or other representatives of the contractor are to pay for their own parking in accordance with current posted rates for general parking.
   2. No provisions will be made for monthly passes, volume, or discount rates.

1.23 SIGNAGE

A. No signs, billboards, trailer signs or other advertisements shall be erected on the construction site by the Contractor or the Subcontractor without Owner permission.

B. Each Contractor shall furnish and maintain all necessary temporary signs required for the prosecution of their work such as "DANGER", "HIGH VOLTAGE", etc.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION 01 52 29

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following administrative and procedural requirements: selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; and special warranties.

B. Related Sections include the following:
1. Division 1 Section "References" for applicable industry standards for products specified.
2. Division 1 Section "Closeout Procedures" for submitting warranties for contract closeout.
3. Divisions 2 through 16 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

A. Products: Items purchased 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. Products salvaged or recycled from other projects are not considered new products.

B. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to the Owner.

C. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for the Owner.

1.4 SUBMITTALS

A. Product List: Submit a list, in tabular from, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
2. Form: Tabulate information for each product under the following column headings:
a. Specification Section number and title.
b. Generic name used in the Contract Documents.
c. Proprietary name, model number, and similar designations.
d. Manufacturer's name and address.
e. Supplier's name and address.

f. Installer's name and address.
g. Projected delivery date or time span of delivery period.
h. Identification of items that require early submittal approval for scheduled delivery date.

3. Submittal: Within 15 days after date of Notice to Proceed, submit 3 copies of product list. Include a written explanation for omissions of data and for variations from Contract requirements.
4. Architect's Action: Architect will respond in writing to Contractor within 10 days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement that products comply with the Contract Documents.

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. Comply with manufacturer's written instructions.
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 ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
5. Store products to allow for inspection and measurement of quantity or counting of units.
6. Store materials in a manner that will not endanger Project structure.
7. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
8. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
9. Protect stored products from damage.

1.6 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall 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.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT OPTIONS

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged, and unless otherwise indicated, that 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. The Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
   4. Where products are accompanied by the term "as selected," Architect will make selection.
   5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
   6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.

B. Product Selection Procedures: Procedures for product selection include the following:
   1. Products: Where Specification paragraphs or subparagraphs titled "Products" introduce a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
   2. Manufacturers: Where Specification paragraphs or subparagraphs titled "Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
   3. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product (and manufacturer) that complies with other specified requirements.
      a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, or texture from manufacturer's product line that does not include premium items.
      b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, or texture from manufacturer's product line that includes both standard and premium items.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

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SECTION 01 70 00 - EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
   1. Construction layout.
   2. Field engineering and surveying.
   3. General installation of products.
   4. Progress cleaning.
   5. Starting and adjusting.
   6. Protection of installed construction.
   7. Correction of the Work.

B. Related Sections include the following:
   1. Division 1 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
   2. Division 1 Section "Submittal Procedures" for submitting surveys.
   3. Division 1 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.

1.3 SUBMITTALS

A. Qualification Data: For land surveyor to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.

C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

D. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

1.4 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
   1. Before construction, verify the location and points of connection of utility services.

B. Existing Utilities: 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 and other construction affecting the Work.
   1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
   2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

C. Acceptance of Conditions: 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. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
   2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
   3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
   4. 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 and Owner’s Representative 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. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by The Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
   1. Notify Architect and Owner’s Representative not less than two days in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without Architect's and Owner’s Representative’s written permission.

C. 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.

D. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

E. 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. Include a

detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect and Owner's Representative promptly.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
3. Inform installers of lines and levels to which they must comply.
4. Check the location, level and plumb, of every major element as the Work progresses.
5. Notify Architect and Owner's Representative when deviations from required lines and levels exceed allowable tolerances.
6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect and Owner's Representative.

3.4 FIELD ENGINEERING

A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect and Owner's Representative. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect and Owner's Representative before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.

3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

C. Final Property Survey: Prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.

3.5 INSTALLATION

A. General: 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.

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 the best possible results. 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.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

F. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
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.

G. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. 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 materials more than 7 days during normal weather or 3 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, according to regulations.

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 according to 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. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.
   1. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

H. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

I. 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.

J. 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.

K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 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. Comply with manufacturer's written instructions for temperature and relative humidity.

3.8 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 1 Section "Cutting and Patching."
   1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 70 00

SECTION 01 73 29 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

A. Requirements and limitations for cutting and patching of Work.

1.2 RELATED REQUIREMENTS

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

B. Individual Specification Sections:
   1. Cutting and patching incidental to work of the Section.
   2. Advance notification to other Sections of openings required in work of those Sections.
   3. Limitations on cutting structural members.

1.3 SUBMITTALS

A. Submit written request in advance of cutting or alteration which affects:
   1. Structural integrity of any element of Project.
   2. Integrity of weather-exposed or moisture-resistant element.
   3. Efficiency, maintenance, or safety of any operational element.
   4. Visual qualities of sight-exposed elements.

B. Include in request:
   1. Identification of Project.
   2. Location and description of affected work.
   3. Necessity for cutting or alteration.
   4. Description of proposed work and products to be used.
   5. Alternatives to cutting and patching.
   6. Written permission of affected separate contractor.
   7. Date and time work will be executed.

1.4 QUALITY ASSURANCE

A. Do not cut and patch structural work in a manner that would result in a reduction of load-carrying capacity or of load-deflection ratios.

B. Before cutting and patching the following categories of work, obtain the Design Consultant and Construction Coordinator's approval to proceed with cutting and patching.

C. Do not cut and patch operational elements or safety related components in a manner that would result in a reduction of their capacity to perform in the manner intended.

D. Do not cut and patch work exposed on the building's exterior or in its occupied spaces in a manner that would, in the Design Consultant and Construction Coordinator's opinion, result in lessening the building's aesthetic qualities.

E. Do not cut and patch work in a manner that would result in substantial visual evidence of cut and patch work.

F. Remove and replace work judged by the Architect/Engineer to be cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect and are compatible with existing material.
   1. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 - EXECUTION

3.1 GENERAL

A. Employ skilled and experienced installer to perform cutting and patching.
   1. Submit written request to the Construction Coordinator in advance of cutting or altering elements which affect:
      a. Structural integrity of element.
      b. Integrity of weather-exposed or moisture-resistant elements.
      c. Efficiency, maintenance, or safety of element.
      d. Visual qualities of sight exposed elements.

B. Execute cutting, fitting, and patching including excavation and fill, to complete the Work and to:
   1. Fit the several parts together and to integrate with other work.
   2. Uncover work to install ill-timed work.
   3. Remove and replace defective and non-conforming work.
   4. Remove samples of installed work for testing.
   5. Provide openings in elements of Work for penetrations of mechanical and electrical work.

C. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding with the work.

D. Execute work by methods to avoid damage to other Work and to provide proper surfaces to receive patching and finishing work.

E. Cut masonry and concrete materials using masonry saw or core drill.

F. Restore Work with new products in accordance with requirements of Contract Documents.

G. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

I. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.

J. Identify any hazardous substance or condition exposed during the Work to the Construction Coordinator for a decision or remedy.

3.2 INSPECTION

A. Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

B. After uncovering, inspect conditions affecting performance of Work.

C. Beginning of cutting or patching means acceptance of existing conditions.

3.3 PREPARATION

A. Provide supports to assure structural integrity of surroundings: devices and methods to protect other portions of Project from damage.

B. Provide protection from elements for areas, which may be exposed by uncovering work; maintain excavations free of water.

C. By-pass utility services such as pipe and conduit, before cutting, where such utility services are shown or required to be removed, relocated or abandoned.

D. Provide protection from adverse weather conditions for that part of the project that may be exposed during cutting and patching operations.

3.4 PERFORMANCE

A. Execute work by methods to avoid damage to other work, and provide proper surfaces to receive all patching and finishing.

B. Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

C. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

D. Restore work with new products in accordance with requirements of Contract Documents.

E. Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

F. At penetrations of fire-rated wall, ceiling, or floor construction, completely seal voids with fire-rated material, full thickness of the construction element.

G. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection: for an assembly, refinish entire unit.

H. Maintain water integrity of all facilities, in the work area, at all times during cutting and patching operations.

I. Provide dust barriers/partitions as required to protect existing or new work and building occupants.

3.5 INSTALLATION

A. Cutting: Cut pre-existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible, review proposed methods with the original installer and comply with his recommendations.
   1. In general, where cutting is required, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimal disturbance of adjacent surfaces.

B. Patching: Provide durable seams that are as invisible as possible. Comply with specified tolerances.
   1. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and finishing.
   2. Where removal of walls or partitions extend from one finished area into another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary to achieve uniform color and appearance.

3. Patch, repair, or rehang existing ceilings as necessary to provide an even plane surface of uniform appearance.

C. Rated Surfaces: Where walls, floors, or other surfaces to be cut and patched have fire-resistance or sound transmission ratings, restore rating in conformance with governing standards.

END OF SECTION 01 73 29

SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:
   1. Salvaging nonhazardous demolition and construction waste.
   2. Recycling nonhazardous demolition and construction waste.
   3. Disposing of nonhazardous demolition and construction waste to a waste to energy facility.
   4. Disposing of nonhazardous demolition and construction waste to a construction and demolition landfill.

B. Coordination: Coordinate the work of this section with the demolition drawings, and the following:
   1. Section 02 41 19 – Selective Demolition

1.3 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.

1.4 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.

1.5 PERFORMANCE REQUIREMENTS

1. Demolition contractor shall submit a Waste Diversion Plan (WDP) to Construction Manager for review and approval. The WDP shall outline the provisions to salvage, recycle, and otherwise divert waste from construction and demolition (C&D) landfill destinations.
2. Each other contractor to submit a Waste Diversion Plan to Construction Manager for review. The WDP shall outline the provisions to salvage, recycle, and otherwise divert waste from C&D landfill destinations.
3. The WDP shall include the following components:
   a. If applicable to contractor's scope of work, the list of targeted materials from demolition and construction waste which may include, but are not limited to:
      1) Cardboard, paper, packaging.
      2) Acoustical ceiling tiles.
      3) Clean dimensional wood, palette wood.
      4) Plywood and oriented strand board.
      5) Wood paneling.
      6) Wood trim.
      7) Rough hardware.
      8) Metal studs.
      9) Metals from ductwork, piping, rebar, other trim.
      10) Glass.
      11) Plastics.
      12) Gypsum board.
      13) Electrical conduit.
      14) Plumbing fixtures.
      15) Lamps.
      16) Ballasts.
      17) Electrical devices.
   b. Waste diversion goals for targeted materials.
   c. Disposal site information. Provide the name of the recycling center, reuse center, incineration facility, or other location for the identified items.
   d. Specify whether materials will be separated or comingled and describe the diversion strategies.
4. The WDP and recycling requirements shall be incorporated into all Subcontractor's contracts.
5. Locations of dumpster or removal bins to be coordinated with the Construction Manager.

1.6 SUBMITTALS

A. Waste Diversion Plan: Submit plan within 14 days of Notice to Proceed date.
   1. Waste diversion goals. Demolition contractor to incorporate the Owner's baseline diversion goals at a minimum.

Material	Diversion goal	Notes
Acoustical ceiling tiles	100%	1
Ceiling suspension system	100%	

Wood doors	50%	
Carpet tile	100%	1
Gypsum wallboard	100%	1
Metals: piping, conduit, copper	100%	
Metals: studs	100%	

Notes:

These items are acceptable at the Olmsted Waste to Energy Facility. Maximum size is 36”x36”.

2. Packaging waste diversion: Salvage or recycle 100 percent of the following uncontaminated packaging materials:
   a. Paper
   b. Cardboard
   c. Boxes
   d. Plastics identified as types 1, 2, and 5.
   e. Polystyrene packaging.
   f. Wood crates.
   g. Plastic pails.

B. End-of-project Waste Report:
   1. Utilize Olmsted County’s supplied report template. Complete one form per targeted material.
   2. Record and document end-of-project totals of materials sent to landfill.
   3. Record and document end-of-project totals of targeted materials meeting the requirements of the WDP.
      a. Record the weight (in tons) of all demolition and construction waste materials sent to each destination:
         1) To a recycling center.
         2) To a waste-to-energy facility.
         3) To owner.
         4) To any other locations.
      b. For targeted materials outlined in the WDP that were not sent to the planned destination, or to the quantities planned, provide a written explanation.
   4. Records of donations: indicate receipt and acceptance of salvageable waste donated to individual organizations. Indicate whether organization is tax exempt.
   5. 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.
   6. Summary of recycling incentives received/utilized including revenues, savings, rebates, and tax credits.
   7. Landfill and incinerator disposal records: indicate receipt and acceptance of waste by landfills and incinerators licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
   8. Re-used materials/equipment. Document the materials that are turned over to the Owner and quantity and/or weight of items.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. Coordinate with Construction Manager prior to demolition starting and recycling.

3.2 SALVAGING DEMOLITION WASTE

A. Salvaged items for reuse in the Work:
   1. Clean items.
   2. Pack or crate items and provide labels indicating elements on containers. Indicate contents, date, quantity, and location where removed.
   3. Store items in a secure location until installation.
   4. Protect from damage during transportation and storage.
   5. Install salvaged items to comply with installation requirements for new materials in equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for intended use.

B. Salvaged items for donation:
   1. Clean items.
   2. Pack or crate items and provide labels indicating elements on containers. Indicate contents, date, quantity, and location where removed.
   3. Store items in a secure location as determined by the Owner.
   4. Protect from damage during transportation and storage.

C. Equipment and fixtures: Separate by type.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. Recycle paper and beverage containers used by onsite workers.

3.4 RECYCLING DEMOLITION WASTE

1. Store all recyclable materials in a dry location.
2. Wood materials: sort and stack members according to size, type, and length. Separate by type.
3. Metals: separate metals by type. Remove and sort out bolts, nuts, washers, and other rough hardware.
4. Gypsum board: stack large clean pieces on wood pallets or in container. Remove edge trim. Remove fasteners.
5. Acoustical ceiling panels and tile: stack large clean pieces on wood pallets.
6. Metal suspension system: sort metal members with other metals.
7. Carpet rolled goods: roll large pieces tightly after removing debris, trash, adhesive, and tack strips. Store clean, dry carpet in a closed container or trailer provided by carpet recycler.
8. Carpet tile: remove debris, trash, and adhesive. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by carpet recycler.

9. Piping and conduit: reduce to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.

3.5 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as 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

END OF SECTION 01 74 19

SECTION 01 74 23 - FINAL CLEANING

PART 1 - GENERAL

1.1 SUMMARY

A. Administrative and procedural requirements for final cleaning prior to Substantial Completion.

B. Final cleaning of project is required for Certificate of Final Completion.

C. Environmental Requirements: Conduct cleaning and waste-disposal operations in compliance with local laws and ordinances. Comply fully with federal and local environmental and anti-pollution regulations.
   1. Do not dispose of volatile wastes, such as mineral spirits, oil, or paint thinner, in storm or sanitary drains.
   2. Burning or burying of debris, rubbish, or other waste material on the premises is not permitted.

1.2 RELATED REQUIREMENTS

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

B. Section 01 52 29 - Construction Facilities and Temporary Controls: Cleaning during construction.

C. Section 01 77 00 - Closeout Procedures: Specific requirements for cleaning.

D. Individual Specifications Sections: Specific cleaning for product or work.

1.3 DESCRIPTION

A. Execute all Final Cleaning prior to inspection for Substantial Completion.

B. Cleaning for Final Completion: After MAC acceptance, immediately clean-up area after correction or completion of work.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS

A. Use materials which will not create hazard to health or property, and which will not damage surfaces.

B. Use cleaning materials and agents recommended by manufacturer or fabricator of surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property, or that might damage finshed surfaces.

PART 3 – EXECUTION

3.1 FINAL CLEANING

A. General: Provide substantial and final cleaning operations when advised. Employ experienced workers and professional cleaners for final cleaning. Clean each surface or unit of Work to condition expected from a commercial building cleaning and maintenance program. Comply with manufacturer's published instructions.

B. Complete following cleaning operations before requesting inspection for Substantial Completion.
   1. Clean Project Site, yard and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste materials, litter and foreign substances. Sweep paved areas.
   2. Remove spills, stains and other foreign deposits. Rake grounds that are neither planted nor paved, to a smooth even-textured surface.
   3. Remove tools, construction equipment, machinery and surplus material from Project Site.
   4. Remove snow and ice to provide safe access to building.
   5. 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.
   6. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics and similar spaces.
   7. Broom clean concrete floors in unoccupied spaces.
   8. Vacuum clean carpet and similar soft surfaces, removing debris and excess nap. Shampoo if required.
   9. Wipe surfaces of mechanical and electrical equipment, and other similar equipment. Remove excess lubrication, paint and mortar droppings and other foreign substances.
   10. Clean light fixtures, lamps, globes and reflectors to function with full efficiency. Replace burned out bulbs, and defective and noisy starters in fluorescent and mercury vapor fixtures.
   11. Leave Project thoroughly clean and ready for occupancy.

C. Remove temporary protection and facilities installed during construction to protect previously completed installations during remainder of construction.

END OF SECTION 01 74 23

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This 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 Sections include the following:

C. Division 1 Section "Execution Requirements" for progress cleaning of Project site.

D. Divisions 2 through 26 Sections for specific closeout and special cleaning requirements for products of those Sections.

E. The administration of the closeout submittals including, but not limited to, Project Record Documents and Operation and Maintenance Manuals shall be an ongoing development throughout the entire project by the Contractor which will be monitored on a regular basis by the Architect and Owner's Representative.

F. Pre Final Inspection Meeting: There shall be a meeting a minimum of 30 days before Final Inspection with Architect, User Representative, Owner's Representative, and any others the Owner's Representative deems necessary.

G. Two months before expiration of the one-year correction period the Architect will conduct a walk through and provide a written summary of findings and recommendations for the Contractor to correct.

1.3 SUBMITTALS

A. The Contractor shall assemble and submit as one package the following before making application for final payment:

1. Executed current Change Log.
2. Consent of Surety.
3. Evidence of Completed Operations Liability insurance coverage during the one-year correction period.
4. Project Record Documents.

B. Final payment will not be made to the Contractor until the record documents and the Maintenance and Operating Manuals are received and approved in writing by the Architect.

C. Complete Utility Meter Report and return to the Owner's Representative, 14 days prior to the activation, termination, or change in payment responsibility of a utility service. The completed form establishes the dates of the Contractor's responsibility to pay for the monthly charges for the utilities during the construction period. Contractor shall complete a separate form for each type of utility service.

1.4 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
   1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
   2. Advise The Owner of pending insurance changeover requirements.
   3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
   4. Obtain and submit releases permitting The Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
   5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
   6. Deliver tools, spare parts, extra materials, and similar items to location designated by The Owner. Label with manufacturer's name and model number where applicable.
   7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
   8. Advise The Owner of changeover in heat and other utilities.
   9. Submit changeover information related to The Owner's occupancy, use, operation, and maintenance.
   10. Complete final cleaning requirements, including touchup painting.
   11. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect and Owner's Representative 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. Reinspection: 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.

1.5 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
   1. Submit a final Application for Payment according to Supplementary Conditions.
   2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
   3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect and Owner's Representative 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. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.6 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three copies 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 and proceeding from lowest floor to highest floor.
   2. Organize items applying to each space by major element, including categories for ceiling, 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. Owner's Representative.
      e. Name of Contractor.
      f. Page number.

1.7 PROJECT RECORD DOCUMENTS

A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's and Owner's Representative's reference during normal working hours.

B. The Contractor shall maintain a set of Contract Documents at the site, on which variations shall be accurately marked on a daily basis. All changes, whether resulting from change orders, Architect's supplementary instructions, Contractor change directives, or other job noted changes, shall be recorded. The Architect will periodically verify that this is being done satisfactorily.

C. Record Drawings: Maintain and submit one set of marked up Contract Drawings and Shop Drawings.
   1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
      a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
      b. Accurately record information in an understandable drawing technique.
      c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
      d. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.
   2. Mark important additional information that was either shown schematically or omitted from original Drawings.
   3. Note Change Order numbers, alternate numbers, and similar identification where applicable.

4. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Print the Owner Project Number and Name, and drawing numbers and titles on the cover sheet.

D. Provide PDF electronic files of scanned or electronically marked-up record prints.

E. Record Specifications: Maintain a clean, undamaged, complete set of the Project Specifications to use as the Project record documents. Submit electronic copies of Project's Specifications, including addenda and contract modifications Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Note related Change Orders and Record Drawings, where applicable.

F. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Save all files electronically in flash drives and file miscellaneous records and identify each, ready for continued use and reference.

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: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
1. The entire project area shall be cleaned immediately prior to final inspection.
2. When punch list work generates dust and debris, an additional cleaning will be needed prior to occupancy.

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 portion of Project:
   a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, 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 neither planted nor 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 tunnels, pipe spaces, crawl spaces, equipment vaults, manholes, and similar spaces.
h. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
i. Leave Project clean and ready for occupancy.

C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.

D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01 77 00

SECTION 02 41 18 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Demolition and removal of selected portions of building or structure.
   2. Salvage of existing items to be reused or recycled.

B. Related Requirements:
   1. Section 01 11 00 "Summary of Work" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
   2. Section 01 73 29 "Cutting and Patching".

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.

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: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.5 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.

B. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Use of elevator and stairs.
5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

C. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Section 01 32 33 "Photographic Documentation." Submit before Work begins.

1.6 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: It is not expected that hazardous materials will be encountered in the Work.
1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
1. Maintain fire-protection facilities in service during selective demolition operations.

1.7 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

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 ASSE 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. 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.

C. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.
   1. Comply with requirements specified in Section 01 32 33 "Photographic Documentation."
   2. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
   3. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
   1. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
   2. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC 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. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
      c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
      d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
      e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
      f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
      g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.3 PROTECTION

A. 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 01 50 00 "Temporary Facilities and Controls."

B. 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.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the 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 adequate ventilation when using cutting torches.
   6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
   7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
   8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
   9. Dispose of demolished items and materials promptly. Comply with requirements in Section 01 74 19 "Construction Waste Management and Disposal."

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.

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 during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: 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.

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.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and recycle or dispose of them according to Section 01 74 19 "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.
   4. Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."

3.7 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 02 41 18

SECTION 02 42 96 - HISTORIC REMOVAL AND DISMANTLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes historic treatment procedures in the form of special types of selective demolition work for designated historic surfaces and the following specific work:
   1. Removal and dismantling of indicated portions of building or structure and debris hauling.
   2. Removal and dismantling of indicated site elements and debris hauling.
   3. Salvage of existing items to be reused or recycled.

B. Coordination: Coordinate the work of this Section with the following:
   1. Section 017419 - Construction Waste Management.
   2. Section 024119 - Selective Demolition.

1.2 DEFINITIONS

A. Dismantle: To disassemble or detach a historic item from a surface, or a nonhistoric item from a historic surface, using gentle methods and equipment to prevent damage to historic items and surfaces; disposing of items unless indicated to be salvaged or reinstalled.
   1. Do not cut materials that can be disassembled by mechanical means, unless otherwise approved by Architect or Owner.

B. Existing to Remain: Existing items that are not to be removed or dismantled, except to the degree indicated for performing required Work.
   1. Drawings may indicate existing items and materials to remain for clarity or to distinguish from new items.
   2. Take measures to protect existing items of construction that are not to be demolished or salvaged from damage resulting from demolition and new construction activities, through Substantial Completion.

C. Remove: To take down or detach a nonhistoric item using methods and equipment to prevent damage to historic items and surfaces; disposing of items unless indicated to be salvaged or reinstalled.
   1. Remove materials and items from existing construction, using methods that comply with specified work results.
   2. Recycle materials in accordance with requirements specified in Section 017419 - Construction Waste Management.
   3. Materials and items that cannot be recycled shall be legally disposed of off-site.

D. Retain: To keep existing items that are not to be removed or dismantled.

E. Salvage: To protect removed or dismantled items and deliver them to Owner ready for reuse.
   1. Salvaging includes materials and elements indicated for reuse or reinstallation in new work, and for salvage by Owner for their storage or future work. Salvaged items may include items indicated to be cleaned and prepared, and materials processed on site.
   2. Carefully detach items from existing construction and deliver them to designated areas for storage, cleaning, and preparation for reuse in new construction. Requirements for salvaged products used in new construction are specified in other applicable Sections.

3. Process materials indicated for reuse on site. Stockpile materials in a designated area. Comply with requirements specified in Section 017419 - Construction Waste Management.

1.3 PRECONSTRUCTION MEETINGS

A. Preconstruction Conference(s): Conduct conference(s) at Project site.
   1. Review minutes of Preliminary Historic Treatment Conference that pertain to removal and dismantling procedures and protection of historic areas and surfaces.
   2. Review list of items indicated to be salvaged.
   3. Verify qualifications of personnel assigned to perform removal and dismantling.
   4. Inspect and discuss condition of each construction type to be removed or dismantled.
   5. Review requirements of other work that depends on condition of substrates exposed by removal and dismantling work.
   6. Review methods and procedures related to removal and dismantling work, including, but not limited to, the following:
      a. Historic removal and dismantling specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
      b. Materials, material application, sequencing, tolerances, and required clearances.
      c. Fire prevention.
      d. Coordination with building occupants.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For historic removal and dismantling specialist and historic removal and dismantling specialist's field supervisors.

B. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by Contractor's removal and dismantling operations.

C. Removal and Dismantling Historic Treatment Program: Submit 30 days before work begins.

D. List of Items Indicated to Be Salvaged: Prepare a list of items indicated on Drawings to be salvaged for Owner's use or for reinstallation. Submit 15 days before preconstruction conference.

E. Inventory of Salvaged Items: After removal or dismantling work is complete, submit a list of items that have been salvaged.
   1. Include item description, item condition, number of items if more than one of a type, and tag number. Include photo of item in original location.
   2. As work proceeds, include on the inventory items that were indicated to be salvaged and items of historic importance discovered during the work. Document reasons, if any, why an item indicated to be salvaged was not salvaged.

1.5 QUALITY ASSURANCE

A. Historic Removal and Dismantling Specialist Qualifications: A qualified historic treatment specialist. General selective demolition experience is insufficient experience for historic removal and dismantling work.

B. Removal and Dismantling Historic Treatment Program: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for each phase of removal and dismantling work, including protection of surrounding and substrate materials and Project site.
   1. Dust and Noise Control: Include locations of proposed temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.
   2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.

C. Regulatory Requirements: Comply with notification regulations of authorities having jurisdiction before beginning removal and dismantling work. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.6 FIELD CONDITIONS

A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.

C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.
      a. In the case of asbestos, stop work in the area of potential hazard, shut off fans and other air handlers ventilating the area, and rope off area until the questionable material is identified. Reassign workers to continue work in unaffected areas. Resume work in the area of concern after safe working conditions are verified.

D. Storage or sale of removed or dismantled items on-site is not permitted unless otherwise indicated.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 HISTORIC REMOVAL AND DISMANTLING EQUIPMENT

A. Removal Equipment: Use only hand-held tools, except as follows or unless otherwise approved by Architect on a case-by-case basis:
   1. Light jackhammers are allowed subject to Architect's approval.
   2. Large air hammers are not permitted.

B. Dismantling Equipment: Use manual, hand-held tools, except as follows or otherwise approved by Architect on a case-by-case basis:
   1. Hand-held power tools and cutting torches are permitted only as submitted in the historic treatment program. They must be adjustable so as to penetrate or cut only the thickness of material being removed.
   2. Pry bars more than 18 inches long and hammers weighing more than 2 lb are not permitted for dismantling work.

3.2 EXAMINATION

A. Preparation for Removal and Dismantling: Examine construction to be removed or dismantled to determine best methods to safely and effectively perform removal and dismantling work. Examine adjacent work to determine what protective measures are necessary. Make explorations, probes, and inquiries as necessary to determine condition of construction to be removed or dismantled and location of utilities and services to remain that may be hidden by construction that is to be removed or dismantled.
   1. Verify that affected utilities are disconnected and capped.
   2. Inventory and record the condition of items to be removed and dismantled for reinstallation or salvage. Enter this information on the submittal of inventory of salvaged items.
   3. Before removal or dismantling of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.
   4. Engineering Survey: Engage a professional engineer to survey 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 as a result of removal and dismantling work.

B. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

C. Perform surveys as the Work progresses to detect hazards resulting from historic removal and dismantling procedures.

3.3 HISTORIC REMOVAL AND DISMANTLING

A. General: Have removal and dismantling work performed by a qualified historic removal and dismantling specialist. Ensure that historic removal and dismantling specialist's field supervisors are present when removal and dismantling work begins and during its progress.

B. Perform work according to the historic treatment program.
   1. Perform removal and dismantling to the limits indicated.
   2. Provide supports or reinforcement for existing construction that becomes temporarily weakened by removal and dismantling work, until the Project Work is completed unless otherwise indicated.
   3. Perform cutting by hand or with small power tools wherever possible. Cut holes and slots neatly to size required, with minimum disturbance of adjacent work.
   4. Do not operate air compressors inside building unless approved by Architect in each case.
   5. Do not drill or cut columns, beams, joints, girders, structural slabs, or other structural supporting elements, without having Contractor's professional engineer's written approval for each location before such work is begun.

6. Dispose of removed and dismantled items off-site unless indicated to be salvaged or reinstalled.

C. Water-Mist Sprinkling: Use water-mist sprinkling and other wet methods to control dust only with adequate, approved procedures and equipment according to the historic treatment program to ensure that such water does not create a hazard or adversely affect other building areas or materials.

D. Unacceptable Equipment: Keep equipment that is not permitted for historic removal or dismantling work away from the vicinity where such work is being performed.

E. Removing and Dismantling Items on or Near Historic Surfaces:
1. Use only dismantling equipment and procedures within 12 inches of historic surface. Do not use pry bars. Protect historic surface from contact with or damage by tools.
2. Unfasten items in the opposite order from which they were installed.
3. Support each item as it becomes loosened to prevent stress and damage to the historic surface.
4. Dismantle anchorages.

F. Masonry Walls:
1. Remove masonry carefully, and erect temporary bracing and supports as needed to prevent collapse of materials being removed.
2. Dismantle top edge and sides before removing wall. Stop removal work and immediately inform Architect if any structural elements above or adjacent to the work show signs of distress or dislocation during any phase of removal work.
3. Remove wall in easily managed pieces.
4. During removal, maintain the stability of the partially remaining wall. Notify Architect of the condition of temporary bracing for wall if work is temporarily stopped during the wall's removal.

G. Anchorages:
1. Remove anchorages associated with removed items.
2. Dismantle anchorages associated with dismantled items.
3. In nonhistoric surfaces, patch holes created by anchorage removal or dismantling according to the requirements for new work.
4. In historic surfaces, patch or repair holes created by anchorage removal or dismantling according to Section that is specific to the historic surface being patched.

END OF SECTION 02 42 96

SECTION 03 01 37 - MAINTENANCE OF HISTORIC CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cleaning of existing historic concrete.
2. Surface repair of existing historic concrete.
3. Repair of existing reinforcing in existing historic concrete.
4. Repair of cracks in existing historic concrete.

B. Related Sections:

1. Section 03 30 00 – Cast-in-Place Concrete.
2. Section 03 33 00 – Architectural Concrete.
3. Section 07 01 90 – Maintenance of Joint Protection.

C. Unit Prices: The work of this Section is affected by Unit Prices. Refer to Section 012000 – Price and Payment Procedures.

1.2 SUBMITTALS

A. Concrete Treatment Plan: Prepare a written plan for treatment of historic concrete, including each phase or process, protection of surrounding materials during operations.

1. Describe in detail materials, methods, equipment, and sequence of operations to be used for each phase of the Work.
2. Detail plan for each component of concrete treatment, including:
   a. Cleaning of existing historic concrete.
   b. Surface repair of existing historic concrete.
   c. Repair of existing reinforcing in existing historic concrete.
   d. Repair of cracks in existing historic concrete.
3. Submit for approval prior to beginning work.

B. Product Data: For each type of product. Include material descriptions, chemical composition, physical properties, test data, and mixing, preparation, and application instructions.

C. Concrete Repair Product Data: For each type of product indicated and used in the Work. Include recommendations for application and use. Include test data substantiating that products comply with requirements.

D. Qualification Data: For each of the following to demonstrate capabilities, experience, and qualifications specified under Quality Assurance Article. Include lists of completed projects with project names and addresses, names and addresses of architects and owners.

1. Concrete repair specialist.
2. Concrete cleaning product manufacturer.
3. Concrete cleaning specialist (installer).

E. Trial Mixes and Field Samples: Develop and produce custom trial mixes and samples as follows:

1. Repair Concrete Mix: Develop repair concrete mixes as required to meet both performance requirements and appearance matching of cleaned concrete.
    a. Produce multiple trial mixes based on laboratory petrographic analysis, and as required to develop and refine the mix proportion for approval.
2. Produce multiple shop fabricated samples of trial mixes placed next to the existing concrete to determine the best match for approval by Architect and Owner.
    a. Produce minimum six samples, and as required to produce an approved sample.
    b. Sample Size: Approximately 12 inches by 12 inches.
    c. Provide samples with surface treatments to match existing historic concrete, including board form finish, and exposed aggregates. Perform surface treatments on repair samples in a manner to simulate job conditions.
3. Crack Repair Concrete Mix: Develop crack repair concrete mixes as required to meet both performance requirements and appearance matching of cleaned concrete.
    a. Produce multiple trial mixes and field samples as required to develop and refine the mix proportion for approval.

1.3 QUALITY ASSURANCE

A. Historic Preservation Standards: Comply with recommended practices and procedures in National Park Service, Technical Preservation Services, Preservation Briefs:
    1. 15: Preservation of Historic Concrete (https://www.nps.gov/tps/how-to-preserve/briefs/15-concrete.htm).

B. Project Reports: Petrographic analysis of existing historic concrete has been performed for the Owner for this Project, [**Title**].

C. Concrete Repair Specialist: A firm or individual with a minimum 5 years' experience performing work similar in material, design, and extent to that indicated for this Project, with a record of successful in-service performance.
    1. An entity that employs installers and supervisors who are trained and approved by manufacturer to install products specified.

D. Concrete Cleaning Product Manufacturer: Minimum 10 years' experience manufacturing products for historic concrete, and with installed products that have a record of successful in-service performance.
    1. Engage the services of concrete cleaning manufacturer's technical representative to examine the building and conditions of existing concrete indicated to be cleaned; and provide specific product and procedural recommendations for each condition indicated.

E. Concrete Cleaning Specialist (Installer): A firm specifically approved in writing by cleaning product manufacturer to apply products for this Project, with a minimum five years' experience, and a record of successful in-service performance.

F. Mockup, Cleaning: Prepare mockup test patches of concrete cleaning. Comply with the following:
    1. Produce mockup to demonstrate aesthetic effects and coordinate mockups of new concrete repair to match existing.
    2. Test Area: Approximately 12 square inches for each condition.
        a. Select an inconspicuous location as directed or approved by Architect.
        b. Test products and methods for possible adverse reactions. Do not use products and methods known to have deleterious effect.

c. Allow a waiting period of not less than seven days after completion of samples to permit a study of sample panels for aesthetic effects and negative reactions.

3. Approved test patch mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

G. Mockups, Repair: Construct a mockup assembly of historic concrete repair at the project site for review and approval by Architect and Owner's Representative. Comply with the following:

1. Produce mockup to demonstrate aesthetic effects, matching of historic adjacent concrete, and installation workmanship.

2. Approved mockups will be used to establish the standard of quality by which the Work will be judged.

3. Mockup Size and Location: Indicated on Drawings.

4. Approved mockup may remain as part of the Work. Maintain mockups throughout construction in an undisturbed condition through Substantial Completion.

H. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit masonry restoration and cleaning work to be performed according to manufacturers' written instructions and specified requirements.

1. Clean concrete surfaces only when air temperature is 40 deg F and above and is predicted to remain so for at least 7 days after completion of cleaning.

I. Preinstallation Conferences: Conduct conferences at Project site.

1. Attendees: Include Installers, representatives of manufacturers and fabricators. Notify Architect and Owner of meeting schedules.

2. Agenda: Review procedures, field samples, and mockups.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's written instructions for minimum and maximum temperature requirements and other conditions for storage.

B. Store cementitious materials off the ground, under cover, and in a dry location.

C. Store aggregates covered and in a dry location; maintain grading and other required characteristics and prevent contamination.

PART 2 - PRODUCTS

2.1 SYSTEMS DESCRIPTION

A. Concrete Repair General Performance Requirements: Provide work in locations indicated as required to produce sound, clean finished surfaces on existing prepared historic concrete substrates, including removal of unsound concrete, and establishing profiles suitable to receive new finishes.

1. Methods: Select methods that optimize work results, make surfaces suitable for new finishes indicated, and do not damage or weaken the existing concrete, cause micro-cracking, nor expose or loosen reinforcing.

a. Perform non-destructive testing methods.

2. Determine Substrate Conditions: Determine condition of existing slab, including surface porosity throughout; identify deteriorated areas requiring repair; locations, types and condition of joints; and locations and conditions of existing cracks.

3. Verify Material Requirements: Determine properties and application requirements of finishes indicated.

B. Containment and Safe Disposal: Take measures and use proper equipment to ensure controlled containment and safe disposal of concrete dust and other hazardous effects generated during operations.

2.2 FORMWORK AND MOLDS

A. General: Provide special formwork as required to recreate ornamental concrete features and surface finishes, including relief, texture, pattern, and detail. Match approved mockups, including board form finishes.

B. Forms and Liners: High-quality, rigid formwork that does not bulge or leak, and that incorporates architectural detail into the work without the use of grinders, trowels, or other surfacing techniques.

2.3 CONCRETE CLEANING MATERIALS

A. General: Select and provide cleaning materials and methods recommended by restoration specialist, and approved by Architect thorough specified sampling and Mockup procedures.

1. Concrete Cleaning Includes:
   a. Initial cleaning to coordinate mockups for concrete repairs.
   b. Removal of existing stains and discoloration, including water-related stains, orange discoloration, calcified build-up, mineral build-up, and paints.
   c. Graffiti removal.
2. Provide the gentlest means of cleaning possible to safely clean historic concrete without damage or deleterious effects. Do not use aggressive treatments, such as sandblasting, that may damage existing historic architectural concrete.
3. Provide products as required for each condition.

B. Chemical Cleaning Products: Select and provide products specifically recommended by cleaning material manufacturer, and approved by Architect, for applications and conditions of this Project.

1. Acceptable Manufacturers: One of the following:
   a. PROSOCO.
   b. Envirosafe Manufacturing Corp.
   c. Approved equal, complying with specified requirements.
2. Comply with regulatory requirements of authorities having jurisdiction, including VOC and HAPS content, and waste management and disposal.

C. Water: Potable.

D. Hot Water: Water heated to a temperature of 140 to 160 deg F.

E. Dilute chemical cleaners with water to produce solutions not exceeding concentration recommended by chemical-cleaner manufacturer.

2.4 CONCRETE REPAIR MATERIALS AND MIXES

A. General: Produce custom mix design based on trial mixes and field sampling. Select and provide materials, including fine and coarse aggregates, cement, and water, of types and in proportions based on petrographic laboratory analysis.

1. Do not use modifiers, supplementary cementitious materials, and admixtures, unless otherwise approved in writing by Architect.

B. Mixing: Mix products, in clean containers, according to manufacturer's written instructions.

1. Do not add water, thinners, or additives unless recommended by manufacturer.

2. When practical, use manufacturer's premeasured packages to ensure that materials are mixed in proper proportions. When premeasured packages are not used, measure ingredients using graduated measuring containers; do not estimate quantities or use shovel or trowel as unit of measure.

3. Do not mix more materials than can be used within time limits recommended by manufacturer. Discard materials that have begun to set.

2.5 REINFORCING TREATMENT MATERIALS

A. Corrosion-Inhibiting Treatment: Waterborne solution of alkaline corrosion-inhibiting chemicals for concrete-surface application that penetrates concrete by diffusion and forms a protective film on steel reinforcement.

1. Acceptable Manufacturers: One of the following:

a. Cortec Corp.

b. Euclid Chemical Co.

c. Evonik Degussa Corp.

d. Fox Industries.

e. Sika Corp.

f. Sto Corp.

2.6 CRACK REPAIR MATERIALS

A. Injection Grout: Prepackaged, custom-mixed, natural cement based, high performance, injection grout designed to fill cracks and voids, stabilize and repair historic masonry and concrete.

1. Acceptable Products: One of the following:

a. Edison Coatings, Rosendale, Injection Grout 11G Series.

b. U.S. Heritage Group, IG10 Injection Repair Mortar.

c. Approved equal, complying with specified requirements.

2. Mixes: Custom developed and color-matched to meet historic rehabilitation work for this Project, based on trial field sampling and selections by Architect.

PART 3 - EXECUTION

3.1 CLEANING OF EXISTING HISTORIC CONCRETE

A. General: Perform concrete cleaning using methods and materials according to approved preliminary measures, including Concrete Treatment Plan, preliminary samples, and Quality Assurance Mockups.

1. Cleaning Appearance Standard: Cleaned surfaces shall have a uniform appearance as viewed from 20 feet away by Architect.

2. Perform cleaning treatment for each condition concrete material condition and location indicated. Use only those cleaning methods indicated for each condition.

3. Spray Equipment: Use spray equipment, equipped with pressure gages, that provides controlled application at volume and pressure indicated, measured at nozzle.
    a. Do not use high-pressure spray methods, unless approved by Architect.
    b. Adjust pressure and volume to ensure that cleaning methods do not damage surfaces, including joints.
    c. For heated water-spray application, use equipment capable of maintaining temperature between 140 and 160 deg F at flow rates indicated.
    d. For steam application, use steam generator capable of delivering live steam at nozzle.
4. Brushes: Do not use brushes, such as wire brushes that are not resistant to chemical cleaners being used.

B. Preliminary Cleaning: Before beginning general cleaning perform preliminary cleaning as required to remove extraneous substances that are resistant to planned cleaning methods, including visible plant growth, rigid materials, and paint.
1. Do not scratch or chip concrete surface.

C. Paint Removal: Apply paint removal materials, such as alkaline paste, and solvent paste, according to its manufacturer's written instructions, using approved methods.
1. Do not allow paint removers to remain on surface for periods longer than those indicated or recommended in writing by manufacturer.

D. Concrete Cleaning: Execute cleaning using approved methods, such as pressure spray washing and soaking, with cold or hot water; steam, detergent, or chemical cleaning as required to produce specified work results.
1. Determine the direction and sequence of cleaning, as required to ensure that dirty residues and rinse water do not wash over dry, cleaned surfaces. Proceed with cleaning in an orderly manner.
2. Perform cleaning indicated in a manner that results in uniform coverage of concrete surfaces, including corners, moldings, niches, and interstices, to produce an even effect without streaking or damaging concrete surfaces.
    a. Protect and maintain walls below area being cleaned to prevent runoff streaking.
3. Remove stains, mold, mildew, and algae.
4. Chemical Cleaning: Comply with manufacturer's written instructions

E. Provide rinsing and repeat of cleaning procedures as required to produce cleaning effect established by mockup; however, do not repeat cleaning more than once, unless approved in writing by Architect.

F. Perform additional general cleaning of areas that are noticeably different when viewed from 20 feet away, as required to produce surfaces that blend smoothly into surrounding architectural concrete.

G. After cleaning is complete, remove protection no longer required, including tape and adhesive marks.

3.2 SURFACE REPAIR OF EXISTING HISTORIC CONCRETE

A. General: Provide formed repairs; do not patch.

B. Concrete Surface Preparation for Repair Work: Perform removal work carefully. Limit removal of existing materials, while still providing an appropriate substrate for repairs.

1. Saw Cutting: Saw-cut perimeter of areas indicated for removal to a depth of at least 1/2 inch. Make cuts perpendicular to concrete surfaces and no deeper than cover on reinforcement.
2. Remove deteriorated and delaminated concrete by breaking up and dislodging from reinforcement.
    a. Use non-aggressive materials and methods such as smaller electric chipping hammers of less than 15 pounds, or water-spray and hand tools.
3. Clean exposed areas to receive new materials using non-aggressive methods such as adjustable pneumatic air discharge, applied only within the repair area.

C. Installation of Formwork:

1. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
2. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
3. Place form liners accurately to provide finished surface texture indicated. Provide solid backing and attach securely to prevent deflection and maintain stability of liners during concreting. Prevent form liners from sagging and stretching in hot weather. Seal joints of form liners and form-liner accessories to prevent mortar leaks. Coat form liner with form-release agent.

D. Concrete Placement: Deposit concrete continuously to avoid segregation.

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

E. Curing: Begin curing concrete repair immediately after removing forms and applying as-cast formed finishes to concrete. Cure according to methods that will not mottle, discolor, or stain concrete, by one or a combination of the following:

1. Moisture curing.
2. Moisture-retaining-cover curing.

3.3 REPAIR OF EXISTING REINFORCING IN EXISTING HISTORIC CONCRETE

A. Reinforcing Treatment: Remove loose and flaking rust from reinforcing bars abrasive blast cleaning, needle scaling, or wire brushing until only tightly adhered light rust remains.

1. Provide corrosion-inhibiting treatment
2. as required to prepare exposed clean reinforcing, as required to
3. Field cuts and chipped paint shall be covered with epoxy paint prior to

B. Corrosion-Inhibiting Treatment: Apply by brush, roller, or airless spray in two coats at manufacturer's recommended application or saturation rate. Remove film of excess treatment by high-pressure washing before patching treated concrete.

1. Apply to locations and extents indicated on Drawings.

3.4 REPAIR OF CRACKS

A. Crack Treatment: Comply with injection grout manufacturer’s written installation instructions, and the following:

1. Execute work to comply with crack repair details indicated on Drawings.

2. Clean areas to receive capping adhesive of oil, dirt, and other substances that would interfere with bond, and clean cracks with oil-free compressed air or low-pressure water to remove loose particles.
3. Rinse the area to be injected with clean water and a bristle brush to remove loose particles.
4. Neutralize salt deposits (efflorescence) with distilled water.
5. Sound off and chisel out delaminated material.
6. Dampen with clean water until glistening with no standing water.
7. Set appropriate injection ports.
8. Cap the cracks and seal the injection ports with approved repair mortar for each location indicated.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage cleaning product manufacturer's factory-authorized service representatives for consultation, inspection, and on-site assistance when requested by Architect. Arrange for not less two Project site visits, to observing progress and quality of the work.

3.6 FINAL CLEANING

A. Clean adjacent surfaces of spillage and debris. Use detergent and soft brushes or cloths.

B. Remove debris from drainage areas.

C. Remove masking materials, leaving no residues that could trap dirt.

3.7 PROTECTION

A. Protect finished corners, edges, and surfaces of concrete repair from damage using appropriate guards and barricades.

B. Protect concrete repair from staining, laitance, and contamination during remainder of construction period.

END OF SECTION 03 01 37

SECTION 04 01 00 - MAINTENANCE OF MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes maintenance of unit masonry consisting of stone and brick masonry restoration and cleaning as follows:
   1. Preliminary cleaning, including removing plant growth.
   2. Cleaning exposed brick and stone unit masonry surfaces.
   3. Unused anchor removal.
   4. Repairing brick and stone unit masonry, including replacing brick and stone units.
   5. Painting steel uncovered during the work.
   6. Reanchoring brick and stone veneers.
   7. Repointing brick and stone joints with mortar and sealant.
   8. Final Cleaning.

B. Coordination: Coordinate the work of this Section with the following:
   1. Section 01 22 00 - Unit Prices.
   2. Section 02 42 96 - Historic Removal and Dismantling.
   3. Section 04 20 00 - Unit Masonry.

1.2 DEFINITIONS

A. Very Low-Pressure Spray: Under 100 psi.

B. Low-Pressure Spray: 100 to 200 psi; 4 to 6 gpm.

C. Medium-Pressure Spray: 200 to 800 psi; 4 to 6 gpm.

D. High-Pressure Spray: 800 to 1200 psi; 4 to 6 gpm.

E. Saturation Coefficient: Ratio of the weight of water absorbed during immersion in cold water to weight absorbed during immersion in boiling water; used as an indication of resistance of masonry units to freezing and thawing.

1.3 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Contractor shall engage a qualified testing agency to perform preconstruction testing on masonry units as follows.
   1. Existing Brick: Test each type of existing masonry unit indicated for replacement, according to testing methods in ASTM C 67 for compressive strength, 24-hour cold-water absorption, 5-hour boil absorption, saturation coefficient, and initial rate of absorption (suction). Carefully remove two of each existing brick and stone units from locations designated by Architect. Take testing samples from these units.
   2. Existing Mortar: Test according to ASTM C 1324, modified as agreed by testing service and Architect for Project requirements, to determine proportional composition of original ingredients, sizes and colors of aggregates, and approximate strength. Use X-ray diffraction, infrared spectroscopy, and differential thermal analysis as necessary to supplement microscopical methods. Carefully remove existing mortar from within joints at two locations for each brick and stone mortar joints, as designated by Architect.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.

B. Samples for Initial Selection: For the following:
   1. Pointing Mortar: Submit sets of mortar for pointing in the form of sample mortar strips, 6 inches long by existing joint width, set in aluminum or plastic channels.
      a. Have each set contain a close color range of at least three Samples of different mixes of colored sands and cements that produce a mortar matching the cleaned masonry when cured and dry.
      b. Submit with precise measurements on ingredients, proportions, gradations, and sources of colored sands from which each Sample was made.
   2. Patching Compound: Submit sets of patching compound Samples in the form of plugs (patches in drilled holes) in sample units of masonry representative of the range of masonry colors on the building.
      a. Have each set contain a close color range of at least three Samples of different mixes of patching compound that matches the variations in existing masonry when cured and dry.
   3. Include similar Samples of accessories involving color selection.

C. Samples: Submit, for verification purposes, prior to mock-up erection, samples of the following:
   1. Each new exposed masonry material to be used for replacing existing materials. Include in each set of samples the full range of colors, colors and textures to be expected in completed work.
      a. For bricks provide straps or panels containing not less than 4 units.
      b. For stone provide samples not less than 12 x 12 inches in size.
   2. Each type of sand used for pointing mortar; minimum 1 lb of each in plastic screw-top jars.
      a. For blended sands, provide Samples of each component and blend.
      b. Identify sources, both supplier and quarry, of each type of sand.
   3. Each type, color, and texture of pointing mortar in the form of sample mortar strips, 6 inches long by existing joint width, set in aluminum or plastic channels.
      a. Include with each Sample a list of ingredients with proportions of each. Identify sources, both supplier and quarry, of each type of sand and brand names of cementitious materials and pigments if any.
   4. Each type of masonry patching compound in the form of briquettes, at least 3 inches long by 1-1/2 inches wide. Document each Sample with manufacturer and stock number or other information necessary to order additional material.
   5. Each type of chemical cleaning material.
   6. Each type of adhesive.
   7. Each type of anchor.
   8. Sealant Materials: See Section 079200 - Joint Sealants.
   9. Accessories: Each type of anchor, accessory, and miscellaneous support.

D. Quality-Control Program.

E. Restoration Program.

F. Cleaning Program.

1.5 QUALITY ASSURANCE

A. Historic Preservation Standards: Comply with recommended practices and procedures in National Park Service, Technical Preservation Services, Preservation Briefs:
   1. No. 1 “Assessing Cleaning and Water-Repellent Treatments for Historic Masonry Buildings.”
   2. No. 2 “Repointing Mortar Joints in Historic Masonry Building.”

B. Restoration Specialist Qualifications: Engage an experienced, preapproved masonry restoration and cleaning firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance. Experience installing standard unit masonry is not sufficient experience for masonry restoration work.
   1. Field Supervision: Restoration specialist firms shall maintain experienced full-time supervisors on Project site during times that masonry restoration and cleaning work is in progress. Supervisors shall not be changed during Project except for causes beyond the control of restoration specialist firm.
   2. Restoration Worker Qualifications: Persons who are experienced and specialize in restoration work of types they will be performing. When masonry units are being patched, assign at least one worker among those performing patching work who is trained and certified by manufacturer of patching compound to apply its products.

C. Chemical-Cleaner Manufacturer Qualifications: A firm regularly engaged in producing masonry cleaners that have been used for similar applications with successful results, and with factory-trained representatives who are available for consultation and Project-site inspection and assistance at no additional cost.

D. Source Limitations: Obtain each type of material for masonry restoration (face brick, stone, cement, sand, etc.) from one source with resources to provide materials of consistent quality in appearance and physical properties.

E. Quality-Control Program: Prepare a written quality-control program for this Project to systematically demonstrate the ability of personnel to properly follow methods and use materials and tools without damaging masonry. Include provisions for supervising performance and preventing damage due to worker fatigue.

F. Restoration Program: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for each phase of restoration work including protection of surrounding materials and Project site.
   1. Include methods for keeping pointing mortar damp during curing period.
   2. If materials and methods other than those indicated are proposed for any phase of restoration work, add to the Quality-Control Program a written description of such materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project and worker's ability to use such materials and methods properly.

G. Cleaning Program: Prepare a written cleaning program that describes cleaning process in detail, including materials, methods, and equipment to be used, protection of surrounding materials, and control of runoff during operations.
   1. If materials and methods other than those indicated are proposed for any phase of restoration work, add to the Quality-Control Program a written description of such materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project and worker's ability to use such materials and methods properly.

H. Cleaning and Repair Appearance Standard: Cleaned and repaired surfaces shall have a uniform appearance as viewed from 10 feet away by Architect. Perform additional paint and stain removal, general cleaning, and spot cleaning of small areas that are noticeably different, so that surface blends smoothly into surrounding areas.

I. Mockups: Prepare mockups of restoration and cleaning to demonstrate aesthetic effects and set quality standards for materials and execution and for fabrication and installation.
   1. Cleaning: Clean an area approximately 25 sq. ft. for each type of masonry and surface condition.
      a. Clean masonry by beginning with the gentlest methods and cleaning materials, and proceed systematically with stronger methods and materials only as required by the conditions and only as approved by the Architect.
      b. Test cleaners and methods on samples of adjacent materials for possible adverse reactions. Do not use cleaners and methods known to have deleterious effect.
      c. Allow a waiting period of not less than seven days after completion of sample cleaning to permit a study of sample panels for negative reactions.
   2. Masonry Repair: Prepare sample areas for each type of masonry material indicated to have repair work performed. If not otherwise indicated, size each mockup not smaller than 2 adjacent whole units or approximately 48 inches in least dimension. Erect sample areas in existing walls unless otherwise indicated, to demonstrate quality of materials, workmanship, and blending with existing work. Include the following as a minimum:
      a. Replacement:
         1) Four brick units replaced.
         2) Two stone masonry units replaced.
      b. Reanchoring Veneers: Install three masonry repair anchors in mockup wall assembly of each anchor type required.
   3. Stone Repair: Prepare sample areas for each type of stone indicated to have repair work performed. If not otherwise indicated, size each mockup not smaller than 2 adjacent whole units or approximately 48 inches in least dimension. Erect sample areas in existing walls unless otherwise indicated, to demonstrate quality of materials, workmanship, and blending with existing work. Include the following as a minimum:
      a. Crack Injection: Apply crack injection in 2 separate areas as directed.
      b. Patching: Three small holes or chips as directed.
   4. Repointing: Rake out joints in 2 separate areas, each approximately 36 inches high by 48 inches wide for each type of repointing required and repoint one of the areas.
   5. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

J. Preinstallation Conference: Conduct conference at Project site.
   1. Review methods and procedures related to masonry restoration and cleaning including, but not limited to, the following:
      a. Construction schedule. Verify availability of materials, Restoration Specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
      b. Materials, material application, sequencing, tolerances, and required clearances.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver masonry units to Project site strapped together in suitable packs or pallets or in heavy-duty cartons.

B. Deliver other materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.

C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

D. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.

E. Store sand where grading and other required characteristics can be maintained and contamination avoided.

1.7 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit masonry restoration and cleaning work to be performed according to manufacturers' written instructions and specified requirements.

B. Repair masonry units and repoint mortar joints only when air temperature is between 40 and 90 deg F and is predicted to remain so for at least 7 days after completion of the Work unless otherwise indicated.

C. Cold-Weather Requirements: Comply with the following procedures for masonry repair and mortar-joint pointing unless otherwise indicated:
1. When air temperature is below 40 deg F, heat mortar ingredients, masonry repair materials, and existing masonry walls to produce temperatures between 40 and 120 deg F.
2. When mean daily air temperature is below 40 deg F, provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 7 days after repair and pointing.

D. Hot-Weather Requirements: Protect masonry repair and mortar-joint pointing when temperature and humidity conditions produce excessive evaporation of water from mortar and repair materials. Provide artificial shade and wind breaks and use cooled materials as required to minimize evaporation. Do not apply mortar to substrates with temperatures of 90 deg F and above unless otherwise indicated.

E. For manufactured repair materials, perform work within the environmental limits set by each manufacturer.

F. Clean masonry surfaces only when air temperature is 40 deg F and above and is predicted to remain so for at least 7 days after completion of cleaning.

1.8 COORDINATION

A. Coordinate masonry restoration and cleaning with public circulation patterns at Project site. Some work is near public circulation patterns. Public circulation patterns cannot be closed off entirely, and in places can be only temporarily redirected around small areas of work. Plan and execute the Work accordingly.

1.9 SEQUENCING AND SCHEDULING

A. Order replacement materials at earliest possible date to avoid delaying completion of the Work.

B. Order sand and gray portland cement for pointing mortar immediately after approval of mockups. Take delivery of and store at Project site a sufficient quantity to complete Project.

C. Perform masonry restoration work in the following sequence:
   1. Remove plant and biological growth.
      a. Inspect for open mortar joints and repair before cleaning to prevent the intrusion of water and other cleaning materials into the wall.
   2. Clean masonry surfaces.
   3. Rake out mortar from joints surrounding masonry to be replaced and from joints adjacent to masonry repairs along joints.
   4. Repair masonry, including replacing existing masonry with new masonry materials.
   5. Rake out mortar from joints to be repointed.
   6. Point mortar and sealant joints.
   7. After repairs and repointing have been completed and cured, perform a final cleaning to remove residues from this work.

D. As scaffolding is removed, patch anchor holes used to attach scaffolding. Patch holes in masonry units to comply with "Masonry Unit Patching" Article. Patch holes in mortar joints to comply with "Repointing Masonry" Article.

PART 2 - PRODUCTS

2.1 BRICK MASONRY MATERIALS

A. Face Brick: Provide face brick, including specially molded, ground, cut, or sawed shapes where required to complete masonry restoration work.
   1. Provide units with colors, color variation within units, surface texture, size, and shape to match existing brickwork and with physical properties within 10 percent of those determined from preconstruction testing of selected existing units.
   2. Special Shapes:
      a. Provide specially molded, 100 percent solid shapes for applications where core holes or "frogs" could be exposed to view or weather when in final position and where shapes produced by sawing would result in sawed surfaces being exposed to view.
      b. Provide specially ground units, shaped to match patterns, for arches and where indicated.
      c. Mechanical chopping or breaking brick, or bonding pieces of brick together by adhesive, are not acceptable procedures for fabricating special shapes.
   3. Date Identification: Emboss in the clay body on an interior surface of each unit in easily read 1/2-inch-high characters, "MADE 20XX." Manufacturer's name may also be embossed.

B. Salvaged Brick: Salvaged brick from other locations may be used if it is solid and sound and matches the existing brick in all aspects including dimension, color, and texture as determined by Architect. Clean off residual mortar.

2.2 STONE MATERIALS

A. Stone: Provide natural building stone of variety, color, texture, grain, veining, finish, size, and shape to match existing stone and with physical properties within 10 percent of those determined from preconstruction testing of selected existing stone.
   1. For existing stone that exhibits a range of colors, texture, grain, veining, finishes, sizes, or shapes, provide stone that proportionally matches that range rather than stone that matches an individual color, texture, grain, veining, finish, size, or shape within that range.
   2. Subject to compliance with requirements, provide stone from the original quarry, if possible.

B. Quarrying New Stone: Have quarry clearly label the direction of bedding planes when rough stone is quarried, to facilitate cutting stones so that natural bedding planes will be as required in "Cutting New Stone" Paragraph.

C. Cutting New Stone: Regardless of how existing stone was cut and set, cut each new stone so that, when it is set in final position, natural bedding planes are essentially horizontal.

D. Date Identification: Stamp with permanent ink on an interior surface of each new stone in easily read 1/2-inch-high characters, "MADE 20XX."

E. Salvaged Stone: Salvage existing stone as indicated for reinstallation on the Drawings. Clean off residual mortar.

2.3 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type II, white or gray, or both, where required for color matching of exposed mortar.
1. Provide cement containing not more than 0.60 percent total alkali when tested according to ASTM C 114.

B. Hydrated Lime: ASTM C 207, Type S.

C. Quicklime: ASTM C 5, pulverized lime.

D. Mortar Sand: ASTM C 144 unless otherwise indicated.
1. Color: Provide natural sand or ground marble, granite, or other sound stone of color necessary to produce required mortar color.
2. For pointing mortar, provide sand with rounded edges.
3. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.

E. Mortar Pigments: Natural and synthetic iron oxides, compounded for mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortars.

F. Water: Potable.

2.4 MANUFACTURED REPAIR MATERIALS

A. Stone Patching Compound: Factory-mixed cementitious product that is custom manufactured for patching stone.
1. Acceptable Products:
a. Edison Coatings, Inc.; Custom System 45.
b. Cathedral Stone Products, Inc.; JAHN Restoration Mortar Systems.
c. Conproco; Matrix.
2. Use formulation that is vapor- and water permeable (equal to or more than the stone), exhibits low shrinkage, has lower modulus of elasticity than the stone units being repaired, and develops high bond strength to all types of stone.
3. Use formulation having working qualities and retardation control to permit forming and sculpturing where necessary.
4. Formulate patching compound in colors, textures, and grain to match stone being patched. Provide sufficient number of colors to enable matching each piece of stone.

B. Cementitious Crack Filler: An ultrafine superplasticized grout that can be injected into cracks, is suitable for application to wet or dry cracks, exhibits low shrinkage, and develops high bond strength to all types of stone.

1. Acceptable Products:
   a. Edison Coatings, Inc.; Pump-X 53-Series.
   b. Cathedral Stone Products, Inc.; JAHN Restoration Mortar Systems.
   c. Conproco; Matrix.

C. Stone-to-Stone Adhesive: 2-part polyester or epoxy-resin stone adhesive with a 15- to 45-minute cure at 70 deg F, recommended by adhesive manufacturer for type of stone repair indicated, and matching stone color.
1. Acceptable Products:
   a. Two-Part Polyester or Epoxy-Resin Stone Adhesive:
      1) Edison Coatings, Inc.; Flexi-Weld 520T.

2.5 CLEANING MATERIALS AND EQUIPMENT

A. Water: Potable.

B. Hot Water: Water heated to a temperature of 140 to 160 deg F.

C. Job-Mixed Detergent Solution: Solution prepared by mixing 2 cups of tetrasodium polyphosphate, 1/2 cup of laundry detergent, and 20 quarts of hot water for every 5 gal. of solution required.

D. Job-Mixed Mold, Mildew, and Algae Remover: Solution prepared by mixing 2 cups of tetrasodium polyphosphate, 5 quarts of 5 percent sodium hypochlorite (bleach), and 15 quarts of hot water for every 5 gal. of solution required.

E. Nonacidic Gel Cleaner: Manufacturer's standard gel formulation, with pH between 6 and 9, that contains detergents with chelating agents and is specifically formulated for cleaning masonry surfaces.
1. Acceptable Products: One of the following:
   a. Price Research, Ltd.; Price Marble Cleaner-Gel.
   b. PROSOCO; Sure Klean 942 Limestone and Marble Cleaner.

F. Nonacidic Liquid Cleaner: Manufacturer's standard mildly alkaline liquid cleaner formulated for removing mold, mildew, and other organic soiling from ordinary building materials, including polished stone, brick, aluminum, plastics, and wood.
1. Acceptable Products: One of the following:
   a. Dominion Restoration Products, Inc.; Bio-Cleanse.
   b. Dumond Chemicals, Inc.; Safe n' Easy Architectural Cleaner/Restorer.
   c. Price Research, Ltd.; Price Non-Acid Masonry Cleaner.
   d. PROSOCO; Enviro Klean ReVive.

G. One-Part Limestone Cleaner: Manufacturer's standard one-part acidic formulation for cleaning limestone.
1. Acceptable Products: One of the following:
   a. ABR Products, Inc.; X-190 Limestone & Concrete Cleaner.
   b. Hydroclean, Hydrochemical Techniques, Inc.; Hydroclean Limestone and Marble Cleaner and Brightener (HT-907).
   c. Price Research, Ltd.; Price Limestone Restorer.
   d. PROSOCO; Sure Klean Limestone Restorer.

H. Two-Part Limestone Cleaner: Manufacturer's standard system consisting of potassium or sodium hydroxide based, alkaline prewash cleaner and acidic afterwash cleaner that does not contain hydrofluoric acid.
1. Acceptable Products: One of the following:

a. ABR Products, Inc.; 500 Limestone Prewash Cleaner followed by 500 Limestone Afterwash.
b. Diedrich Technologies Inc.; Diedrich 707X Limestone Cleaner Pre-Rinse or Diedrich 808X Black Encrustation Remover - Super Strong followed by 707N Limestone Neutralizer After-Rinse.
c. Hydroclean, Hydrochemical Techniques, Inc.; Hydroclean Limestone and Marble Precleaner (HT-704) and Hydroclean Limestone and Marble Cleaner and Brightener (HT-907).
d. Price Research, Ltd.; Price Limestone Pre-Wash followed by Limestone After-Wash System.
e. PROSOCO; Enviro Klean BioKlean followed by Sure Klean Limestone & Masonry Afterwash or Sure Klean 766 Limestone Prewash followed by SureKlean Limestone & Masonry Afterwash.

I. Brushes: Fiber bristle only.

J. Spray Equipment: Provide equipment for controlling spray application of water and chemical cleaners, if any, at rates indicated for pressure, measured at spray tip, and for volume.
1. For spray application of chemical cleaners provide low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with cone-shaped spray-tip.
2. For spray application of water provide fan-shaped spray-tip which disperses water at angle of not less than 15 degrees.
3. For spray application of heated water provide equipment capable of maintaining temperature, at flow rates indicated, between 140° and 160 ° F.

2.6 ACCESSORY MATERIALS

A. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film-forming, strippable masking material for protecting glass, metal, and polished stone surfaces from damaging effects of acidic and alkaline masonry cleaners.
1. Acceptable Product:
a. PROSOCO; Sure Klean Strippable Masking.

B. Stone Anchors and Pins: Type and size indicated or, if not indicated, to match existing anchors in size and type. Fabricate anchors and pins from Type 304 stainless steel.

C. Masonry Repair Anchors, Expansion Type: Mechanical fasteners designed for masonry veneer stabilization consisting of 1/4-inch-diameter, Type 304 stainless-steel rod with brass expanding shells at each end and water-shedding washer in the middle. Expanding shells shall be designed to provide positive mechanical anchorage to veneer on one end and backup masonry on the other.
1. Acceptable Products: One of the following:
a. BLOK-LOK Limited; Torq-Lok.
b. Dur-O-Wal, a division of Dayton Superior; Dur-O-Wal Repair Anchor.
c. Hohmann & Barnard, Inc.; #521RA-B Restoration Anchor.

D. Masonry Repair Anchors, Spiral Type: Type 304 stainless-steel spiral rods designed to anchor to backing and veneer. Anchors are flexible in plane of veneer but rigid perpendicular to it.
1. Provide driven-in anchors designed to be installed in drilled holes and relying on screw effect rather than adhesive to secure them to backup and veneer.
2. Acceptable Products: One of the following:
a. BLOK-LOK Limited; Spira-Lok.
b. Dur-O-Wal, a division of Dayton Superior; Dur-O-Flex Friction Pin Anchor.
c. Heckmann Building Products Inc.; #391 Remedial Tie.
d. Hohmann & Barnard, Inc.; Helix Spiro-Ties.

E. Masonry Repair Anchors, Rod/Screen Tube Type: Stainless-steel screen tube with or without Type 304 stainless-steel rod, adhesive installed by injection with manufacturer's standard epoxy adhesive, complete with other devices required for installation.
   1. Acceptable Products: One of the following:
      a. BLOK-LOK Limited; Chem-Lok.
      b. Hohmann & Barnard, Inc.; #520RA.

F. Sealant Materials:
   1. Provide manufacturer's standard chemically curing, elastomeric sealant(s) of base polymer and characteristics indicated below that comply with applicable requirements in Section 079200 - Joint Sealants.
      a. Multi-component, nonsag urethane sealant.
   2. Colors: Provide colors of exposed sealants to match colors of masonry adjoining installed sealant unless otherwise indicated.

G. Joint-Sealant Backing:
   1. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
   2. 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 where such adhesion would result in sealant failure. Provide self-adhesive tape where acceptable.

H. Setting Buttons: Resilient plastic buttons, nonstaining to masonry, sized to suit joint thicknesses and bed depths of masonry units without intruding into required depths of pointing materials.

I. Masking Tape: Nonstaining, nonabsorbent material, compatible with pointing mortar, joint primers, sealants, and surfaces adjacent to joints; that will easily come off entirely, including adhesive.

J. Antirust Coating: Fast-curing, lead- and chromate-free, self-curing, universal modified-alkyd primer complying with MPI #79, Alkyd Anticorrosive Metal Primer or SSPC-Paint 20 or SSPC-Paint 29 zinc-rich coating.
   1. Use coating requiring no better than SSPC-SP 2, "Hand Tool Cleaning" surface preparation according to manufacturer's literature or certified statement.

K. Miscellaneous Products: Select materials and methods of use based on the following, subject to approval of a mockup:
   1. Previous effectiveness in performing the work involved.
   2. Little possibility of damaging exposed surfaces.
   3. Consistency of each application.
   4. Uniformity of the resulting overall appearance.
   5. Do not use products or tools that could do the following:
      a. Remove, alter, or in any way harm the present condition or future preservation of existing surfaces, including surrounding surfaces not in contract.
      b. Leave a residue on surfaces.

2.7 MORTAR MIXES

A. Preparing Lime Putty: Slake quicklime and prepare lime putty according to appendix to ASTM C 5 and manufacturer's written instructions.

B. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.
   1. Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not retemper or use partially hardened material.

C. Colored Mortar: Produce mortar of color required by using specified ingredients. Do not alter specified proportions without Architect's approval.
   1. Mortar Pigments: Where mortar pigments are indicated, do not exceed a pigment-to-cement ratio of 1:10 by weight.

D. Do not use admixtures in mortar unless otherwise indicated.

E. Mortar Proportions: Mix mortar materials in proportions as determined by the preconstruction testing.
   1. Proportion setting mortar the same as pointing mortar except mortar pigments are not required.

2.8 CHEMICAL CLEANING SOLUTIONS

A. Dilute chemical cleaners with water to produce solutions not exceeding concentration recommended by chemical-cleaner manufacturer.

B. Acidic Cleaner Solution for Brick and Stone: Dilute with water to produce hydrofluoric acid content of 3 percent or less, but not greater than that recommended by chemical-cleaner manufacturer.

PART 3 - EXECUTION

3.1 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from masonry restoration work.
   1. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of restoration and cleaning work.

B. Comply with chemical-cleaner manufacturer's written instructions for protecting building and other surfaces against damage from exposure to its products. Prevent chemical-cleaning solutions from coming into contact with people, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.
   1. Cover adjacent surfaces with materials that are proven to resist chemical cleaners used unless chemical cleaners being used will not damage adjacent surfaces. Use materials that contain only waterproof, UV-resistant adhesives. Apply masking agents to comply with manufacturer's written instructions. Do not apply liquid masking agent to painted or porous surfaces. When no longer needed, promptly remove masking to prevent adhesive staining.
   2. Keep wall wet below area being cleaned to prevent streaking from runoff.
   3. Do not clean masonry during winds of sufficient force to spread cleaning solutions to unprotected surfaces.
   4. Neutralize and collect alkaline and acid wastes for disposal off Owner's property.

5. Dispose of runoff from cleaning operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

C. Prevent mortar from staining face of surrounding masonry and other surfaces.
1. Cover sills, ledges, and projections to protect from mortar droppings.
2. Keep wall area wet below rebuilding and pointing work to discourage mortar from adhering.
3. Immediately remove mortar in contact with exposed masonry and other surfaces.
4. Clean mortar splatters from scaffolding at end of each day.

3.2 CLEANING MASONRY, GENERAL

A. Clean masonry by beginning with the gentlest possible methods and cleaning materials as determined by the approved cleaning mockup. Proceed systematically with stronger methods and materials only as required by the conditions and only as approved by the Architect and SHPO.

B. Proceed with cleaning in an orderly manner; work from bottom to top of the test cleaning area of each scaffold width and from one end of the test area to the other. Ensure that dirty residues and rinse water will not wash over cleaned, dry surfaces.

C. Use only those cleaning methods indicated for each masonry material and location.
1. Do not use wire brushes or brushes that are not resistant to chemical cleaner being used. Do not use plastic-bristle brushes if natural-fiber brushes will resist chemical cleaner being used.
2. Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip. Adjust pressure and volume to ensure that cleaning methods do not damage masonry.
   a. Equip units with pressure gages.
3. For chemical-cleaner spray application, use low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with cone-shaped spray tip.
4. For water-spray application, use fan-shaped spray tip that disperses water at an angle of 25 to 50 degrees.

D. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging masonry surfaces.

E. Water Application Methods:
1. Water-Spray Applications:
   a. Water-spray pressure is not to exceed low-pressure.
   b. Unless otherwise indicated, hold spray nozzle at least 12 inches from surface of masonry and apply water in horizontal back and forth sweeping motion, overlapping previous strokes to produce uniform coverage.

F. Chemical-Cleaner Application Methods: Apply chemical cleaners to masonry surfaces to comply with chemical-cleaner manufacturer's written instructions; use brush or spray application. Do not spray apply at pressures exceeding 50 psi. Do not allow chemicals to remain on surface for periods longer than those indicated or recommended by manufacturer.

G. Rinse off chemical residue and soil by working upward from bottom to top of each treated area at each stage or scaffold setting. Periodically during each rinse, test pH of rinse water running off of cleaned area to determine that chemical cleaner is completely removed.

1. Apply neutralizing agent and repeat rinse if necessary to produce tested pH of between 6.7 and 7.5.

H. After cleaning is complete, remove protection no longer required. Remove tape and adhesive marks.

3.3 PRELIMINARY CLEANING

A. Removing Plant Growth: Completely remove visible plant, moss, and shrub growth from masonry surfaces. Carefully remove plants, creepers, and vegetation by cutting at roots and allowing to dry as long as possible before removal. Remove loose soil and debris from open masonry joints to whatever depth they occur.

B. Preliminary Cleaning: Before beginning general cleaning, remove extraneous substances that are resistant to cleaning methods being used. Extraneous substances include paint, calking, asphalt, and tar.
1. Carefully remove heavy accumulations of material from surface of masonry with a sharp chisel. Do not scratch or chip masonry surface.
2. Remove asphalt and tar with solvent-type paint remover.
   a. Comply with requirements in "Paint Removal" Article.
   b. Apply paint remover only to asphalt and tar by brush without prewetting.
   c. Allow paint remover to remain on surface for 10 to 30 minutes.
   d. Repeat application if needed.

3.4 CLEANING STONE AND BRICK WORK

A. Cold-Water Wash: Use cold water applied by very low-pressure spray.

B. Mold, Mildew, and Algae Removal:
1. Wet masonry with cold water applied by low-pressure spray.
2. Apply mold, mildew, and algae remover by brush or very low-pressure spray.
3. Scrub masonry with medium-soft brushes until mold, mildew, and algae are thoroughly dislodged and can be removed by rinsing. Use small brushes for mortar joints and crevices. Dip brush in mold, mildew, and algae remover often to ensure that adequate fresh cleaner is used and that masonry surface remains wet.
4. Rinse with cold water applied by very low-pressure spray to remove mold, mildew, and algae remover and soil.
5. Repeat cleaning procedure above where required to produce cleaning effect established by mockup.

C. Chemical Cleaning:
1. Wet masonry with cold water applied by very low-pressure spray.
2. Apply cleaner to masonry in two applications by brush or very low-pressure spray. Let cleaner remain on surface for period indicated below:
   a. As recommended by chemical-cleaner manufacturer.
3. Rinse with cold water applied by very low-pressure spray to remove chemicals and soil.
4. Repeat cleaning procedure above where required to produce cleaning effect established by mockup. Do not repeat more than once

3.5 UNUSED ANCHOR REMOVAL

A. Remove masonry anchors, brackets, wood nailers, and other extraneous items no longer in use unless identified as historically significant or indicated to remain.
1. Remove items carefully to avoid spalling or cracking masonry.

2. Where directed, if an item cannot be removed without damaging surrounding masonry, do the following:
   a. Cut or grind off item approximately 3/4 inch beneath surface and core drill a recess of same depth in surrounding masonry as close around item as practical.
   b. Immediately paint exposed end of item with two coats of antirust coating, following coating manufacturer's written instructions and without exceeding manufacturer's recommended dry film thickness per coat. Keep paint off sides of recess.
3. Patch the hole where each item was removed unless directed to remove and replace the masonry unit.

3.6 STONE REMOVAL AND REPLACEMENT

A. At locations indicated, remove stone that has deteriorated or is damaged beyond repair or is indicated to be removed and reinstalled to facilitate repairs to underlying structure. Carefully demolish or remove entire units from joint to joint, without damaging surrounding stone, in a manner that permits replacement with full-size units.

B. Support and protect remaining stonework that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.

C. Notify Architect of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing stone or unit masonry backup, rotted wood, rusted metal, and other deteriorated items.

D. Remove in an undamaged condition as many whole stone units as possible.
1. Remove mortar, loose particles, and soil from stone by cleaning with hand chisels, brushes, and water.
2. Remove sealants by cutting close to stone with utility knife and cleaning with solvents.
3. Store stone for reuse. Store off ground, on skids, and protected from weather.
4. Deliver cleaned stone not required for reuse to Owner unless otherwise indicated.

E. Clean stone surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement.

F. Replace removed damaged stone with other removed stone and salvaged stone in good quality, where possible, or with new stone matching existing stone, including size. Do not use broken units unless they can be cut to usable size.

G. Install replacement stone into bonding and coursing pattern of existing stone. If cutting is required, use a motor-driven saw designed to cut stone with clean, sharp, unchipped edges. Finish edges to blend with appearance of edges of existing stone.
1. Maintain joint width for replacement stone to match existing joints.
2. Use setting buttons or shims to set stone accurately spaced with uniform joints.

H. Set replacement stone with completely filled bed, head, and collar joints. Butter vertical joints for full width before setting and set units in full bed of mortar unless otherwise indicated. Replace existing anchors with new anchors of size and type indicated.
1. Tool exposed mortar joints in repaired areas to match joints of surrounding existing stonework.
2. Rake out mortar used for laying stone before mortar sets and point new mortar joints in repaired area to comply with requirements for repointing existing stone, and at same time as repointing of surrounding area.
3. When mortar is sufficiently hard to support units, remove shims and other devices interfering with pointing of joints.

3.7 SETTING REPLACEMENT DIMENSION STONE WORK WITH MORTAR

A. Set stones in full bed of mortar with vertical joints slushed full, unless otherwise indicated.
   1. Install stone anchors, pins, and dowels where indicated and as required.
   2. Place setting buttons of adequate size, in sufficient quantity, and of same thickness as indicated joint width, to prevent mortar from squeezing out to maintain uniform joint widths. Hold buttons at least one joint width back from face of stones.
   3. Do not set heavy stones or projecting courses until mortar in courses below has hardened sufficiently to resist being squeezed out of joint.
   4. Fill anchor holes with mortar.

B. Rake out mortar from joints to depths of not less than 1/2 inch nor less than that required to expose sound mortar for joints pointed with mortar, or to provide sufficient depth for sealant and sealant backing for joints pointed with sealants.

C. Prepare stone joint surfaces for pointing with mortar by removing dust and mortar particles. Where setting mortar was removed to depths greater than surrounding areas, apply first layer of pointing mortar in layers not greater than 3/8 inch until a uniform depth is formed; compact each layer thoroughly and allow to become thumbprint hard before applying next layer.

D. Point stone joints by placing and compacting pointing mortar in layers not greater than 3/8 inch.

E. Tool joints with a round joiner having a diameter 1/8 inch larger than width of joint, when pointing mortar is thumbprint hard.

3.8 SETTING REPLACEMENT DIMENSION STONE WORK WITH SEALANT JOINTS

A. Examine surfaces indicated to receive stone, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of stone units. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Attach anchors securely to stones and to backup surfaces.

C. Set stone units with a minimum joint width as indicated to match existing, using spacer bars to maintain uniform joint spacing, being careful not to disturb leveling base. Use string lines to keep straight lines. Select units to blend color and texture variations.

D. Fill anchor holes with sealant.

E. Where dowel holes occur at pressure-relieving joints, provide compressive material above and below dowels.

F. For stones supported on clip or continuous angles, set stones on setting buttons, setting shims, or sheets of resilient low-durometer material.
   1. Place setting buttons of adequate size, in sufficient quantity, and of same thickness as indicated joint width, to maintain uniform joint widths. Hold buttons at least one joint width back from face of stones.

G. Install concealed flashing at continuous shelf angles, lintels, ledges, and similar obstructions to the downward flow of water so as to divert such water to the exterior.

H. Keep cavities open where unfilled space is indicated between back of stone cladding and backup wall; do not fill cavities with mortar or grout.

I. Place weepholes/vents in joints where moisture may accumulate including base of cavity walls, above shelf angles, and flashing. Locate weepholes/vents at intervals not exceeding 2 feet and those serving as vents only, at intervals not exceeding 5 feet horizontally and 20 feet vertically.

J. Install compressible joint filler, backer rod and sealant at joints as indicated and as specified in Section 079200 - Joint Sealants.

3.9 STONE-FRAGMENT REPAIR

A. Carefully remove cracked or fallen stone fragment indicated to be repaired. Reuse only stone fragment that is in sound condition.

B. Remove soil, loose particles, mortar, and other debris or foreign material, from fragment surfaces to be bonded and from parent stone where fragment had broken off, by cleaning with stiff-fiber brush.

C. Pinning: Before applying adhesive, prepare for mechanical anchorage consisting of 1/4-inch-diameter, stainless-steel pins set into 1/4-inch-diameter holes drilled at a 45-degree downward angle through face of fragment and into parent stone. Center and space pins between 3 and 5 inches apart and at least 2 inches from any edge. Insert pins at least 2 inches into parent stone and 2 inches into fragment with end countersunk at least 3/4 inch from exposed face of fragment.

D. Apply stone-to-stone adhesive to comply with adhesive manufacturer's written instructions. Coat bonding surfaces of fragment and parent stone, completely filling all crevices and voids.

E. Fit stone fragment onto parent stone while adhesive is still tacky and hold fragment securely in place until adhesive has cured. Use shims, clamps, wedges, or other devices as necessary to align face of fragment with face of parent stone.

F. Clean adhesive residue from exposed surfaces and patch chipped areas and exposed drill holes as specified in "Stone Patching" Article.

3.10 CRACK INJECTION

A. General: Comply with cementitious crack-filler manufacturer's written instructions.

B. Drill 1/4-inch-diameter injection holes as follows:
1. Transverse Cracks Less Than 3/8 inch Wide: Drill holes through center of crack at 12 to 18 inches o.c.
2. Transverse Cracks More Than 3/8 inch Wide: Drill holes through center of crack at 18 to 36 inches o.c.
3. Delaminations: Drill holes at approximately 18 inches o.c. both vertically and horizontally.
4. Drill holes 2 inches deep. Where possible drill holes in mortar joints.

C. Clean out drill holes and cracks with compressed air and water. Remove dirt and organic matter, loose material, sealants, and failed crack repair materials.

D. Place plastic injection ports in drilled holes and seal face of cracks between injection ports with clay or other nonstaining, removable plugging material. Leave openings at upper ends of cracks for air release.

E. Inject cementitious crack filler through ports sequentially, beginning at one end of area and working to opposite end; where possible, begin at lower end of injection area and work upward. Inject filler until it extrudes from adjacent ports. After port has been injected, plug with clay or other suitable material and begin injecting filler at adjacent port, repeating process until all ports have been injected.

F. Clean cementitious crack filler from face of stone before it sets by scrubbing with water.

G. After cementitious crack filler has set, remove injection ports, plugging material, and excess filler. Patch injection holes and surface of cracks as specified in "Stone Patching" Article.

3.11 STONE PATCHING

A. Patch the following stone units unless another type of replacement or repair is indicated:
1. Units indicated to be patched.
2. Units with holes.
3. Units with chipped edges or corners.
4. Units with small areas of deep deterioration.

B. Remove and replace existing patches unless otherwise indicated or approved by Architect.

C. Remove deteriorated material and remove adjacent material that has begun to deteriorate. Carefully remove additional material so patch will not have feathered edges but will have square or slightly undercut edges on area to be patched and will be at least 1/4 inch thick, but not less than recommended by patching compound manufacturer.

D. Mask adjacent mortar joint or rake out for repointing if patch will extend to edge of stone unit.

E. Mix patching compound in individual batches to match each stone unit being patched. Combine one or more colors of patching compound, as needed, to produce exact match.

F. Brush-coat stone surfaces with slurry coat of patching compound according to manufacturer's written instructions.

G. Place patching compound in layers as recommended by patching compound manufacturer, but not less than 1/4 inch or more than 2 inches thick. Roughen surface of each layer to provide a key for next layer.
1. Trowel, scrape, or carve surface of patch to match texture and surrounding surface plane or contour of the stone. Shape and finish surface before or after curing, as determined by testing, to best match existing stone.
2. Build patch up 1/4 inch above surrounding stone and carve surface to match adjoining stone after patching compound has hardened.

H. Keep each layer damp for 72 hours or until patching compound has set.

I. Remove and replace patches with hairline cracks or that show separation from stone at edges, and those that do not match adjoining stone in color or texture.

3.12 BRICK REMOVAL AND REPLACEMENT

A. At locations indicated, remove bricks that are damaged, spalled, or deteriorated. Carefully demolish or remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units.

1. When removing single bricks, remove material from center of brick and work toward outside edges.

B. Support and protect remaining masonry that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.

C. Notify Architect of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items.

D. Clean bricks surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement.

E. Replace removed damaged brick with new brick matching existing brick, including size.

F. Install replacement brick into bonding and coursing pattern of existing brick. If cutting is required, use a motor-driven saw designed to cut masonry with clean, sharp, unchipped edges.
1. Maintain joint width for replacement units to match existing joints.
2. Use setting buttons or shims to set units accurately spaced with uniform joints.

G. Lay replacement brick with completely filled bed, head, and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet both replacement and surrounding bricks that have ASTM C 67 initial rates of absorption (suction) of more than 30 g/30 sq. in. per min. Use wetting methods that ensure that units are nearly saturated but surface is dry when laid.
1. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork.
2. Rake out mortar used for laying brick before mortar sets and point new mortar joints in repaired area to comply with requirements for repointing existing masonry, and at same time as repointing of surrounding area.
3. When mortar is sufficiently hard to support units, remove shims and other devices interfering with pointing of joints.

3.13 REANCHORING VENEERS

A. Install masonry repair anchors in horizontal mortar joints and according to manufacturer's written instructions. Install at not more than 16 inches o.c. vertically and 32 inches o.c. horizontally unless otherwise indicated. Install at locations to avoid penetrating flashing.

B. Recess anchors at least 5/8 inch from surface of mortar joint and fill recess with pointing mortar.

3.14 PAINTING STEEL UNCOVERED DURING THE WORK

A. Inspect steel exposed during masonry removal. Where Architect determines that it is structural, or for other reasons cannot be totally removed, prepare and paint it as follows:
1. Remove paint, rust, and other contaminants according to SSPC-SP 2, "Hand Tool Cleaning", SSPC-SP 3, "Power Tool Cleaning" or SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning", as applicable to meet paint manufacturer's recommended preparation.
2. Immediately paint exposed steel with two coats of antirust coating, following coating manufacturer's written instructions and without exceeding manufacturer's recommended rate of application (dry film thickness per coat).

B. If on inspection and rust removal, the cross section of a steel member is found to be reduced from rust by more than 1/16 inch, notify Architect before proceeding.

3.15 REPOINTING MASONRY

A. Rake out and repoint joints to the following extent:
   1. All joints as indicated.

B. Rake out joints as follows, according to procedures demonstrated in approved mockup:
   1. Remove mortar from joints to depth of 2-1/2 times joint width, but not less than 1/2 inch or not less than that required to expose sound, unweathered mortar.
   2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
   3. Do not spall edges of masonry units or widen joints. Replace or patch damaged masonry units as directed by Architect.
      a. Cut out mortar by hand with chisel and resilient mallet. Do not use power-operated grinders without Architect's written approval based on approved quality-control program.

C. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks, loose masonry units, rotted wood, rusted metal, and other deteriorated items.

D. Pointing with Mortar:
   1. Rinse masonry joint surfaces with water to remove any dust and mortar particles. Time application of rinsing so that, at time of pointing, excess water has evaporated or run off, and joint surfaces are damp but free of standing water.
   2. Apply first layer of pointing mortar to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch until a uniform depth is formed. Compact each layer thoroughly and allow to become thumbprint-hard before applying next layer.
   3. After joints have been filled to a uniform depth, place remaining pointing mortar in 3 layers with each of first and second layers filling approximately 2/5 of joint depth and third layer the remaining 1/5. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing bricks have rounded edges recess final layer slightly from face. Take care not to spread mortar over edges onto exposed masonry surfaces, or to featheredge mortar.
   4. When mortar is thumbprint hard, tool joints to match original appearance of joints, unless otherwise indicated. Remove excess mortar from edge of joint by brushing.
      a. Match existing mortar joint profiles.
   5. Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours including weekends and holidays.
   6. Hairline cracking within the mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.

E. Pointing with Sealant:
   1. After raking out, rinse masonry joint surfaces with water to remove any dust and mortar particles. Time application of rinsing so that, at time of pointing, excess water has evaporated or run off, and joint surfaces are damp but free of standing water.
   2. Apply first layer of pointing mortar to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch until a uniform depth is formed. Compact each layer thoroughly and allow to become thumbprint-hard before applying next layer.
   3. After joints have been filled to a uniform depth as required for installation of sealant backer or bond breaker as detailed and specified, allow to cure.
   4. Clean and prepare joint surfaces according to Section 079200 - Joint Sealants. Prime joint surfaces unless sealant manufacturer recommends against priming. Do not allow primer to spill or migrate onto adjoining surfaces.

5. Fill sealant joints with specified joint sealant according to Section 079200 - Joint Sealants and the following:
   a. Install cylindrical sealant backing beneath the sealant, except where space is insufficient. There, install bond-breaker tape.
   b. Install sealant using only proven installation techniques that will ensure that sealant will be deposited in a uniform, continuous ribbon, without gaps or air pockets, and with complete wetting of the joint bond surfaces equally on both sides. Fill joint flush with surrounding masonry and matching the contour of adjoining mortar joints.
   c. Install sealant as recommended by sealant manufacturer but within the following general limitations, measured at the center (thin) section of the bead:
      1) Fill joints to a depth equal to joint width, but not more than 1/2 inch deep or less than 1/4 inch deep.
   d. Do not allow sealant to overflow or spill onto adjoining surfaces, or to migrate into the voids of adjoining surfaces, particularly rough textures. Remove excess and spillage of sealant promptly as the work progresses. Clean adjoining surfaces by the means necessary to eliminate evidence of spillage, without damage to adjoining surfaces or finishes, as demonstrated in an approved mockup.
6. Cure sealant according to Section 079200 - Joint Sealants.

3.16 FINAL CLEANING

A. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, spray applied at low pressure.
   1. Do not use metal scrapers or brushes.
   2. Do not use acidic or alkaline cleaners.

B. Wash adjacent woodwork and other nonmasonry surfaces. Use detergent and soft brushes or cloths.

C. Clean mortar and debris from roofs; remove debris from gutters and downspouts. Rinse off roof and flush gutters and downspouts.

D. Sweep and rake adjacent pavement and grounds to remove mortar and debris. Where necessary, pressure wash pavement surfaces to remove mortar, dust, dirt, and stains.

3.17 FIELD QUALITY CONTROL

A. Architect's Project Representatives: Architect will assign Project representatives to help carry out Architect's responsibilities at the site, including inspection and documentation of existing conditions and failures, as well as observing progress and quality of testing and sample portions of the Work. Allow Architect's Project representatives use of lift devices and scaffolding, as needed, to observe progress and quality of portion of the Work uncovered and testing completed.

B. Notify Architect's Project representatives in advance of times when lift devices and scaffolding will be relocated. Do not relocate lift devices and scaffolding until Architect's Project representatives have had reasonable opportunity to make inspections and observations of work areas at lift device or scaffold location.

END OF SECTION 04 01 00

SECTION 04 20 00 - UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Exterior concrete masonry units.
2. Decorative concrete masonry units.
3. Mortar and grout.
4. Masonry joint reinforcement.
5. Miscellaneous masonry accessories.

B. Products Installed but not Furnished under This Section:
1. Cast-stone trim in unit masonry.

C. Related Section:
1. Section 04 01 00 - Maintenance of Masonry.
2. Section 04 72 00 - Cast Stone Masonry.

1.2 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Initial Selection:
1. Decorative CMUs, in the form of small-scale units.
2. Colored mortar.

C. Samples for Verification: For each type and color of the following:
1. Decorative CMUs.
2. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project.

D. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109 for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

1.4 QUALITY ASSURANCE

A. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.

C. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.6 PROJECT CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

B. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

PART 2 - PRODUCTS

2.1 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6 except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

2.2 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
   1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.

B. Integral Water Repellent: Provide units made with integral water repellent for exposed units.
   1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E514 as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.
      a. Available Manufacturers: One of the following:
         1) BASF Corporation.
         2) Euclid Chemical Company (The); an RPM company.
         3) GCP Applied Technologies Inc.

C. CMUs: ASTM C 90.
   1. Density Classification: Normal weight.
   2. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.

D. Decorative CMUs: ASTM C90.
   1. Density Classification: Normal weight.
   2. Pattern and Texture:
      a. Standard pattern, rock-face finish.
   3. Colors: As selected by Architect from manufacturer's full range.

2.3 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Colored Cement Products: Packaged blend made from portland cement and hydrated lime and mortar pigments, all complying with specified requirements, and containing no other ingredients.
   1. Colored Portland Cement-Lime Mix:
      a. Available Manufacturers: One of the following:
         1) Essroc.
         2) Holcim (US) Inc.
         3) Lafarge North America Inc.
         4) Lehigh Hanson; HeidelbergCement Group.

E. Aggregate for Mortar: ASTM C 144.
   1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

F. Aggregate for Grout: ASTM C 404.

G. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.
   1. Available Manufacturers: One of the following:
      a. BASF Corporation.
      b. Euclid Chemical Company (The); an RPM company.
      c. GCP Applied Technologies Inc.

H. Water: Potable.

2.4 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615 or ASTM A 996, Grade 60.

B. Masonry Joint Reinforcement, General: ASTM A 951.
   1. Exterior Walls: Hot-dip galvanized carbon steel.
   2. Wire Size for Side Rods: 0.187-inch diameter.
   3. Wire Size for Cross Rods: 0.187-inch diameter.
   4. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.

5. Provide in lengths of not less than 10 feet.

C. Masonry Joint Reinforcement for Single-Wythe Masonry: Ladder type with single pair of side rods.

2.5 MISCELLANEOUS ANCHORS

A. Anchor Bolts: Headed or L-shaped steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153, Class C; of dimensions indicated.

2.6 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane, or PVC.

B. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

2.7 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
   1. Do not use calcium chloride in mortar or grout.
   2. Use portland cement-lime mortar unless otherwise indicated.
   3. For reinforced masonry, use portland cement-lime mortar.

B. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated.
   1. Use Type N.

C. Pigmented Mortar: Use colored cement product.
   1. Mix to match Architect's sample.
   2. Application: Use pigmented mortar for exposed mortar joints with the following units:
      a. Decorative CMUs.

D. Grout for Unit Masonry: Comply with ASTM C 476.
   1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
   2. Proportion grout in accordance with ASTM C 476, Table 1 or Paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
   3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
   1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
   2. Verify that reinforcing dowels are properly placed.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Thickness: Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

D. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:
   1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.
   2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
   3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:
   1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
   2. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
   3. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
   4. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.

C. Joints:
1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

C. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

F. Fill cores in hollow CMUs with grout and reinforcing bars under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

3.5 MORTAR BEDDING AND JOINTING

A. Lay hollow CMUs as follows:
1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.
1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.

2. Wet joint surfaces thoroughly before applying mortar.
3. Rake out mortar joints for pointing with sealant.

D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

3.6 MASONRY JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
1. Space reinforcement not more than 16 inches o.c.

3.7 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

C. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
3. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

END OF SECTION 04 20 00

SECTION 04 72 00 - CAST STONE MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Cast-stone trim including the following:
      a. Wall caps.

B. Related Sections:
   1. Section 04 20 00 "Unit Masonry" for installing cast-stone units in unit masonry.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show fabrication and installation details for cast-stone units. Include dimensions, details of reinforcement and anchorages if any, and indication of finished faces.
   1. Include building elevations showing layout of units and locations of joints and anchors.

C. Samples for Initial Selection: For colored mortar.

D. Samples for Verification:
   1. For each trim shape required, 10 inches in length.
   2. For colored mortar, make Samples using same sand and mortar ingredients to be used on Project. Label Samples to indicate types and amounts of pigments used.

E. Full-Size Samples: For each color, texture, and shape of cast-stone unit required.
   1. Make available for Architect's review at Project site.
   2. Make Samples from materials to be used for units used on Project.
   3. Approved Samples may be installed in the Work.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer.
   1. Include copies of material test reports for completed projects, indicating compliance of cast stone with ASTM C 1364.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer of cast-stone units similar to those indicated for this Project that has sufficient production capacity to manufacture required units.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Coordinate delivery of cast stone with unit masonry work to avoid delaying the Work and to minimize the need for on-site storage.

B. Pack, handle, and ship cast-stone units in suitable packs or pallets.
   1. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast-stone units if required, using dollies with wood supports.
   2. Store cast-stone units on wood skids or pallets with nonstaining, waterproof covers, securely tied. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.

C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

D. Store mortar aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

1.6 PROJECT CONDITIONS

A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements in TMS 602/ACI 530.1/ASCE 6.
   1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until cast stone has dried, but no fewer than seven days after completing cleaning.

B. Hot-Weather Requirements: Comply with hot-weather construction requirements in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Cast Stone: Obtain cast-stone units from single source from single manufacturer.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

2.2 CAST-STONE MATERIALS

A. General: Comply with ASTM C 1364.

B. Portland Cement: ASTM C 150, Type I or Type III, containing not more than 0.60 percent total alkali when tested according to ASTM C 114. Provide natural color or white cement as required to produce cast-stone color indicated.

C. Coarse Aggregates: Granite, quartz, or limestone complying with ASTM C 33; gradation and colors as needed to produce required cast-stone textures and colors.

D. Fine Aggregates: Natural sand or crushed stone complying with ASTM C 33, gradation and colors as needed to produce required cast-stone textures and colors.

E. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, nonfading, and resistant to lime and other alkalis.

F. Admixtures: Use only admixtures specified or approved in writing by Architect.

G. Reinforcement: Deformed steel bars complying with ASTM A 615, Grade 60. Use galvanized or epoxy-coated reinforcement when covered with less than 1-1/2 inches of cast-stone material.
1. Epoxy Coating: ASTM A 775.
2. Galvanized Coating: ASTM A 767.

H. Embedded Anchors and Other Inserts: Fabricated from stainless steel complying with ASTM A 240, ASTM A 276, or ASTM A 666, Type 304.

2.3 CAST-STONE UNITS

A. Available Manufacturers: One of the following:
1. American Artstone Co., Inc.
2. Stoneworks Architectural Precast.
3. MarcStone, LLC.

B. Cast-Stone Units: Comply with ASTM C 1364.
1. Units shall be manufactured using the vibrant dry tamp or wet-cast method.
2. Units shall be resistant to freezing and thawing as determined by laboratory testing according to ASTM C 666, Procedure A, as modified by ASTM C 1364.

C. Fabricate units with sharp arris and accurately reproduced details, with indicated texture on all exposed surfaces unless otherwise indicated.
1. Slope exposed horizontal surfaces 1:12 to drain unless otherwise indicated.
2. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.
3. Provide drips on projecting elements unless otherwise indicated.

D. Fabrication Tolerances:
1. Variation in Cross Section: Do not vary from indicated dimensions by more than 1/8 inch.
2. Variation in Length: Do not vary from indicated dimensions by more than 1/360 of the length of unit or 1/8 inch, whichever is greater, but in no case by more than 1/4 inch.
3. Warp, Bow, and Twist: Not to exceed 1/360 of the length of unit or 1/8 inch, whichever is greater.
4. Location of Grooves, False Joints, Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8 inch on formed surfaces of units and 3/8 inch on unformed surfaces.

E. Cure Units as Follows:
1. Cure units in enclosed, moist curing room at 95 to 100 percent relative humidity and temperature of 100 deg F for 12 hours or 70 deg F for 16 hours.
2. Keep units damp and continue curing to comply with one of the following:
   a. No fewer than five days at mean daily temperature of 70 deg F or above.
   b. No fewer than six days at mean daily temperature of 60 deg F or above.
   c. No fewer than seven days at mean daily temperature of 50 deg F or above.
   d. No fewer than eight days at mean daily temperature of 45 deg F or above.

F. Acid etch units after curing to remove cement film from surfaces to be exposed to view.

G. Colors and Textures: As selected by Architect from manufacturer's full range.

2.4 MORTAR MATERIALS

A. Provide mortar materials that comply with Section 042000 "Unit Masonry."

B. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

C. Hydrated Lime: ASTM C 207, Type S.

D. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

E. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979. Use only pigments with a record of satisfactory performance in masonry mortar.
   1. Available Manufacturers: One of the Contract.
      a. Davis Colors.
      b. Lanxess Corporation.
      c. Solomon Colors, Inc.

F. Aggregate for Mortar: ASTM C 144.
   1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
   2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
   3. White-Mortar Aggregates: Natural white sand or crushed white stone.

G. Water: Potable.

2.5 ACCESSORIES

A. Anchors: Type and size indicated, fabricated from Type 304 stainless steel complying with ASTM A 240, ASTM A 276, or ASTM A 666.

B. Dowels: 1/2-inch-diameter round bars, fabricated from Type 304 stainless steel complying with ASTM A 240, ASTM A 276, or ASTM A 666.

C. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cast-stone manufacturer and expressly approved by cleaner manufacturer for use on cast stone and adjacent masonry materials.
   1. Available Manufacturers: One of the Contract.
      a. Diedrich Technologies, Inc.; a division of Sandell Construction Solutions.
      b. EaCo Chem, Inc.
      c. PROSOCO, Inc.

2.6 MORTAR MIXES

A. Comply with requirements in Section 042000 "Unit Masonry" for mortar mixes.

B. Do not use admixtures including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
   1. Do not use calcium chloride in mortar or grout.
   2. Use portland cement-lime mortar unless otherwise indicated.

C. Comply with ASTM C 270, Proportion Specification.
   1. For setting mortar, use Type N.
   2. For pointing mortar, use Type N.

D. Pigmented Mortar: Use colored cement product.
   1. Pigments shall not exceed 10 percent of portland cement by weight.
   2. Mix to match Architect's sample.
   3. Application: Use pigmented mortar for exposed mortar joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, 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 SETTING CAST STONE IN MORTAR

A. Set cast stone as indicated on Drawings. Set units accurately in locations indicated, with edges and faces aligned according to established relationships and indicated tolerances.
   1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
   2. Coordinate installation of cast stone with installation of flashing specified in other Sections.

B. Wet joint surfaces thoroughly before applying mortar or setting in mortar.

C. Set units in full bed of mortar with full head joints unless otherwise indicated.
   1. Set units with joints 1/4 to 3/8 inch wide unless otherwise indicated.
   2. Build anchors and ties into mortar joints as units are set.
   3. Fill dowel holes and anchor slots with mortar.
   4. Fill collar joints solid as units are set.
   5. Build concealed flashing into mortar joints as units are set.
   6. Keep head joints in copings and between other units with exposed horizontal surfaces open to receive sealant.
   7. Keep joints at shelf angles open to receive sealant.

D. Rake out joints for pointing with mortar to depths of not less than 3/4 inch. Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.

E. Point mortar joints by placing and compacting mortar in layers not greater than 3/8 inch. Compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.

F. Tool exposed joints slightly concave when thumbprint hard. Use a smooth plastic jointer larger than joint thickness.

G. Rake out joints for pointing with sealant to depths of not less than 3/4 inch. Scrub faces of units to remove excess mortar as joints are raked.

H. Point joints with sealant to comply with applicable requirements in Section 079200 "Joint Sealants."
   1. Prime cast-stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant unless otherwise indicated.

I. Provide sealant joints at head joints of wall caps and other horizontal surfaces; at expansion, control, and pressure-relieving joints; and at locations indicated.
   1. Keep joints free of mortar and other rigid materials.
   2. Build in compressible foam-plastic joint fillers where indicated.
   3. Form joint of width indicated, but not less than 3/8 inch.
   4. Prime cast-stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant unless otherwise indicated.
   5. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in Section 079200 "Joint Sealants."

3.3 INSTALLATION TOLERANCES

A. Variation from Plumb: Do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.

B. Variation from Level: Do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.

C. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches or one-fourth of nominal joint width, whichever is less.

D. Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16 inch, except where variation is due to warpage of units within tolerances specified.

3.4 ADJUSTING AND CLEANING

A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.

B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.

C. In-Progress Cleaning: Clean cast stone as work progresses.
   1. Remove mortar fins and smears before tooling joints.
   2. Remove excess sealant immediately, including spills, smears, and spatter.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:
   1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

2. Test cleaning methods on sample; leave one sample uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of cast stone.
3. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
5. Clean cast stone by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
6. Clean cast stone with proprietary acidic cleaner applied according to manufacturer's written instructions.

END OF SECTION 04 72 00

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Steel framing and supports for mechanical and electrical equipment.
2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
3. Slotted channel framing.
4. Loose bearing and leveling plates for applications where they are not specified in other Sections.

B. Products furnished, but not installed, under this Section include the following:
1. Loose steel lintels.
2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

C. Related Requirements:
1. Section 04 20 00 "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
2. Section 05 12 00 "Structural Steel Framing" for steel framing, supports, elevator machine beams, and other steel items attached to the structural-steel framing.
3. Section 09 91 13 "Exterior Painting" and Section 09 91 23 "Interior Painting" for primers and finish coatings.

1.3 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of metal fabrications that are anchored to or that receive other work. 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.

1.4 ACTION SUBMITTALS

A. Product Data: For the following:
1. Fasteners.
2. Shop primers.
3. Shrinkage-resisting grout.
4. Prefabricated building columns.
5. Slotted channel framing.
6. Metal bollards.

7. Pipe and duct guards.

B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For professional engineer's experience with providing delegated-design engineering services of the kind indicated, including documentation that engineer is licensed in the jurisdiction in which Project is located.

B. Mill Certificates: Signed by stainless steel manufacturers, certifying that products furnished comply with requirements.

C. Welding certificates.

D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

E. Research Reports: For post-installed anchors.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:
1. AWS D1.1, "Structural Welding Code - Steel."
2. AWS D1.2, "Structural Welding Code - Aluminum."
3. AWS D1.6, "Structural Welding Code - Stainless Steel."

1.7 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 42 00 "Quality Assurance", to design ships ladders.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Steel Plates, Shapes, and Bars: ASTM A36.

C. Stainless Steel Sheet, Strip, and Plate: ASTM A240 or ASTM A666, Type 304.

D. Stainless Steel Bars and Shapes: ASTM A276, Type 304.

E. Steel Tubing: ASTM A500, cold-formed steel tubing.

F. Steel Pipe: ASTM A53, Standard Weight (Schedule 40) unless otherwise indicated.

G. Zinc-Coated Steel Wire Rope: ASTM A741.
   1. Wire Rope Fittings: Hot-dip galvanized-steel connectors with capability to sustain, without failure, a load equal to minimum breaking strength of wire rope with which they are used.

H. Cast Iron: Either gray iron, ASTM A48, or malleable iron, ASTM A47, unless otherwise indicated.

I. Aluminum Plate and Sheet: ASTM B209, Alloy 6061-T6.

J. Aluminum Extrusions: ASTM B221, Alloy 6063-T6.

2.3 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
   1. Provide stainless steel fasteners for fastening aluminum or stainless steel.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.

C. High-Strength Bolts, Nuts, and Washers: ASTM F3125, Grade A325, Type 3, heavy-hex steel structural bolts; ASTM A563, Grade DH3, heavy-hex carbon-steel nuts; and where indicated, flat washers.

D. Stainless Steel Bolts and Nuts: Regular hexagon-head annealed stainless steel bolts, ASTM F593; with hex nuts, ASTM F594; and, where indicated, flat washers; Alloy Group 1.

E. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563; and, where indicated, flat washers.
   1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

F. Anchors, General: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing in accordance with ASTM E488, conducted by a qualified independent testing agency.

G. Cast-in-Place Anchors in Concrete: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47 malleable iron or ASTM A27 cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329.

H. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
   1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941, Class Fe/Zn 5, unless otherwise indicated.
   2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless steel bolts, ASTM F593, and nuts, ASTM F594.

I. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B633, Class Fe/Zn 5, as needed for fastening to inserts.

2.4 MISCELLANEOUS MATERIALS

A. Shop Primers: Provide primers that comply with Section 09 91 13 "Exterior Painting," Section 09 91 23 "Interior Painting," and Section 09 96 00 "High-Performance Coatings."

B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

C. Water-Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.

D. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

E. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

F. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187.

H. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

I. Concrete: Comply with requirements in Section 03 30 00 "Cast-in-Place Concrete" for normal-weight, air-entrained concrete with a minimum 28-day compressive strength of 3000 psi.

2.5 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
1. Fabricate units from slotted channel framing where indicated.
2. Furnish inserts for units installed after concrete is placed.

C. Galvanize miscellaneous framing and supports in exterior walls and where indicated.

2.7 SHELF ANGLES

A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and 24 inches o.c., unless otherwise indicated.
1. Provide mitered and welded units at corners.
2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches larger than expansion or control joint.

B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.

C. Galvanize shelf angles located in exterior walls.

D. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.8 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
   1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.

C. Galvanize exterior miscellaneous steel trim.

2.9 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

B. Galvanize exterior bearing and leveling plates.

2.10 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.

B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span, but not less than 8 inches unless otherwise indicated.

C. Galvanize loose steel lintels located in exterior walls.

2.11 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.12 GENERAL FINISH REQUIREMENTS

A. Finish metal fabrications after assembly.

B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.13 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153 for steel and iron hardware and with ASTM A123 for other steel and iron products.
   1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean galvanized surfaces of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.

C. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
   1. Shop prime with primers specified in Section 09 91 13 "Exterior Painting," Section 09 91 23 "Interior Painting" and Section 09 96 00 "High-Performance Coatings".

D. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
   1. Items Indicated to Receive Primers Specified in Section 09 96 00 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
   2. Other Steel Items: SSPC-SP 3, "Power Tool Cleaning."
   3. Galvanized-Steel Items: SSPC-SP 16, "Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals."

E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
   1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

B. Anchor supports for ceiling hung toilet partitions, overhead doors, four-fold doors, and other framing securely to, and rigidly brace from, building structure.

3.3 INSTALLATION OF METAL BOLLARDS

A. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing.

B. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.

C. After concrete has cured for a minimum of 28 days, install HDPE bollard covers.

3.4 INSTALLATION OF PIPE GUARDS

A. Provide pipe guards at exposed pipes and ducts where indicated. Install by bolting to wall or column with expansion anchors.

3.5 INSTALLATION OF BEARING AND LEVELING PLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.

B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with shrinkage-resistant grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.6 REPAIRS

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780.

END OF SECTION 05 50 00

SECTION 06 10 53 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Framing with dimension lumber.
   2. Wood blocking and nailers.
   3. Soffit vents.

B. Related Section:

1.2 DEFINITIONS

A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.

B. Dimension Lumber: Lumber of 2 inches nominal or greater size but less than 5 inches nominal size in least dimension.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
   2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

B. Samples:
   1. Soffit Vents: 6-inch lengths.

1.4 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For the following, from ICC-ES:
   1. Preservative-treated wood.
   2. Power-driven fasteners.
   3. Metal framing anchors.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
   1. Factory mark each piece of lumber with grade stamp of grading agency.
   2. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 15 percent unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
   1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:
   1. Wood sills, sleepers, blocking, and similar concealed members in contact with masonry or concrete.

2.3 DIMENSION LUMBER FRAMING

A. Joists, Rafters, and Other Framing: No. 2 grade.
   1. Species:
      a. Hem-fir (north); NLGA.
      b. Southern pine; SPIB.
      c. Douglas fir-larch; WCLIB or WWPA.
      d. Spruce-pine-fir; NLGA.
      e. Douglas fir-south; WWPA.
      f. Hem-fir; WCLIB or WWPA.
      g. Douglas fir-larch (north); NLGA.
      h. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
   1. Blocking.
   2. Nailers.

B. Dimension Lumber Items: Construction or No. 2 grade lumber of any of the following species:
   1. Hem-fir (north); NLGA.
   2. Mixed southern pine or southern pine; SPIB.
   3. Spruce-pine-fir; NLGA.
   4. Hem-fir; WCLIB or WWPA.
   5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

C. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

2.5 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
   1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

2.6 METAL FRAMING ANCHORS

A. Available Manufacturer:
   1. Simpson Strong-Tie Co., Inc.

B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653, G60 coating designation.

2.7 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.

B. Continuous Soffit Vents:
   1. Acceptable Product:
      a. Cor-A-Vent S-400 Soffit Strip Vent.
   2. Colors as selected by Architect from manufacturer’s standard colors.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

C. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

D. Do not splice structural members between supports unless otherwise indicated.

E. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

F. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
   1. Use inorganic boron for items that are continuously protected from liquid water.

G. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
   1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
   2. ICC-ES evaluation report for fastener.

H. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 WOOD BLOCKING AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.3 SOFFIT VENT INSTALLATION

A. Install soffit vents according to manufacturer’s written instructions.

3.4 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 10 53

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Formed wall sheet metal fabrications.

1.3 COORDINATION

A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Shop Drawings: For sheet metal flashing and trim.
   1. Include plans, elevations, sections, and attachment details.
   2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
   3. Include identification of material, thickness, weight, and finish for each item and location in Project.
   4. Include details for forming, including profiles, shapes, seams, and dimensions.
   5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
   6. Include details of termination points and assemblies.
   7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
   8. Include details of special conditions.
   9. Include details of connections to adjoining work.
   10. Detail formed flashing and trim at scale of not less than 3 inches per 12 inches.

C. Samples for Initial Selection: For each type of sheet metal and accessory indicated with factory-applied finishes.

D. Samples for Verification: For each type of exposed finish.
   1. Sheet Metal Flashing: 12 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.7 WARRANTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.
   1. Exposed Coil-Coated Finish:
      a. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   2. Color: As selected by Architect from manufacturer's full range.
   3. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

2.3 FLEXIBLE FLASHING

A. Rubberized-Asphalt Flashing: Composite, self-adhesive, flashing product consisting of a pliable, rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.040 inch.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
   1. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.

C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

D. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

E. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.

F. Weep Products:
1. Wicking Material: Absorbent rope, made from cotton, 1/4 to 3/8 inch in diameter, in length required to produce 2-inch exposure on exterior.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
2. Obtain field measurements for accurate fit before shop fabrication.
3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

C. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

D. Do not use graphite pencils to mark metal surfaces.

2.6 WALL SHEET METAL FABRICATIONS

A. Opening Flashings: Fabricate head, sill, and similar flashings as indicated on Drawings. Form head and sill flashing with 2-inch-high, end dams. Fabricate from the following materials:
1. Aluminum: 0.032 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FLEXIBLE FLASHING INSTALLATION

A. Apply flexible flashing where indicated to comply with manufacturer's written instructions.
   1. Prime substrates as recommended by flashing manufacturer.
   2. Lap seams and junctures with other materials at least 4 inches except that at flashing flanges of other construction, laps need not exceed flange width.
   3. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

3.3 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
   1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
   2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
   3. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
   4. Torch cutting of sheet metal flashing and trim is not permitted.
   5. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.

D. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

E. Seal joints as required for watertight construction.

3.4 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Opening Flashings: Install continuous head, sill, and similar flashings as indicated on Drawings.

3.5 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.6 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean off excess sealants.

C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 62 00

SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Silicone joint sealants.
   2. Urethane joint sealants.
   3. Butyl joint sealants.

1.2 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Samples for Initial Selection: Manufacturer's 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 kind 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. Qualification Data: For Installer.

B. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

D. Sample Warranties: For special warranties.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Product Testing: Test joint sealants using a qualified testing agency.
   1. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

C. Preinstallation Conference: Conduct conference at Project site.

D. Mock-Up: Demonstrate surface preparation techniques and workmanship of sealant application.
   1. Prepare and install minimum 2-foot long, mock-ups sealant joint for each type of joint and surface using procedures, tools, materials, equipment intended for actual surface preparation and application.
   2. Prior to installing exterior sealants, field test sealants adhesion to actual Project joint substrates as follows:
      a. Notify Architect seven days in advance of dates and times when test joints will be performed.
      b. Arrange for manufacturer’s technical representative to observe, monitor, and review the mock-up process.
      c. Test sealant per Field Quality Control requirements in Part 3 of this Section.
   3. Observe sealant for surface staining or discoloration.
   4. Retain approved mock-ups as intended standards for the duration of the Project.

1.5 PROJECT 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.

1.6 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 years from date of Substantial Completion.

B. 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 natural 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 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. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

C. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

D. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE SEALANTS

A. Silicone, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use NT.
   1. Acceptable Products: One of the following:
      a. GE Construction Sealants; Momentive Performance Materials Inc.; SCS2000 SilPruf.
      b. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex Sil 265 LTS.
      c. Pecora Corporation; 896-TBS or PCS.
      d. Sika Corporation; Joint Sealants; Sikasil WS-295 or Sikasil WS-295 FPS.
      e. The Dow Chemical Company; Dow Corning® 791 Silicone Weatherproofing Sealant.

2.3 URETHANE JOINT SEALANTS

A. Urethane, M, NS, 25, NT: Multicomponent, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade NS, Class 25, Use NT.
   1. Acceptable Products: One of the following:
      a. BASF Corporation-Construction Systems; MasterSeal NP 2.
      b. Bostik, Inc.; Chem-Calk 500.
      c. Pecora Corporation; Dynatred.
      d. Sika Corporation; Sikaflex - 2c NS.

2.4 BUTYL JOINT SEALANTS

A. Butyl-Rubber-Based Joint Sealants: ASTM C 1311.
   1. Acceptable Products: One of the following:
      a. Bostik, Inc.; Chem-Calk 300.
      b. Pecora Corporation; BC-158.

2.5 JOINT SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
   1. Available Manufacturers: One of the following:
      a. BASF Corporation-Construction Systems.
      b. Construction Foam Products, a division of Nomaco, Inc.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), 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.

C. 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.

2.6 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.
   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.

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 C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind 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 according to 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 per Figure 8A in ASTM C 1193, unless otherwise indicated.
   4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.
   5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.

a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
   1. Extent of Testing: Test completed and cured sealant joints as follows:
      a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
      b. Perform 1 test for each 1000 feet of joint length thereafter or 1 test per each floor per elevation.
   2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
      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.
   3. Inspect tested joints and report on the following:
      a. Whether sealants filled joint cavities and are free of voids.
      b. Whether sealant dimensions and configurations comply with specified requirements.
      c. 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 passes sealant manufacturer's field-adhesion hand-pull test criteria.
   4. 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 fill, sealant configuration, and sealant dimensions.
   5. 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.

B. 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. Sealants failing adhesion test shall be removed, substrates cleaned, sealants reinstalled, and re-testing performed.

D. Maintain test log and submit report to Architect indicating tests, locations, dates, results, and remedial actions.

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 and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
   1. Joint Locations:
      a. Joints as indicated on Drawings.
   2. Urethane Joint Sealant: Multicomponent, nonsag, Class 25.
   3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
   1. Joint Locations:
      a. Joints as indicated on Drawings.
   2. Silicone Joint Sealant: Single component, nonsag, Class 50.
   3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

C. Joint-Sealant Application: Concealed mastics.
   1. Joint Locations:
      a. Joints as indicated on Drawings.
   2. Joint Sealant: Butyl-rubber based.
   3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 07 92 00

SECTION 08 11 13 – HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Non-rated and Fire-rated steel doors.
2. Non-rated and Fire-rated steel door frames.

B. Related Sections:
1. Section 04 20 00 “Unit Masonry” for grout fill of metal frames and placement of anchors into masonry wall construction.
2. Section 08 71 00 "Door Hardware."
3. Section 09 90 00 “Painting” for field finishing of doors and frames.

1.3 REFERENCES

A. Department of Justice (DOJ):
1. ADAAG – Americans with Disabilities Act Accessibility Guidelines.

B. American National Standards Institute (ANSI):
1. ANSI 224.1 – Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
2. ANSI 250.8 – Specifications for Standard Steel Doors and Frames (SDI-100).

C. ASTM International:
1. ASTM A653 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
2. ASTM C1363 – Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies
3. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
4. ASTM E413 – Classification for Rating Sound Insulation.

D. National Fire Protection Association (NFPA)
1. NFPA 80 – Fire Doors and Other Opening Protectives.
2. NFPA 105 - Standard for the Installation of Smoke Door Assemblies and other Opening Protectives.
3. NFPA 252 – Standard Methods of Fire Tests of Door Assemblies.

E. Underwriters Laboratories Inc. (UL):
1. UL 10B – Fire Tests of Door Assemblies.
2. UL 10C – Positive Pressure Fire Tests of Door Assemblies.
3. UL 1784 – Air Leakage Tests of Door Assemblies.

1.4 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.5 SUBMITTALS

A. Product Data: For each type of product.
1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, temperature-rise ratings, and finishes.

B. Shop Drawings: Include the following:
1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of moldings, removable stops, and glazing.
6. Details of conduit and preparations for power, signal, and control systems.

C. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

D. Fire Rated Assembly Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with ANSI 250.8.

A. Fire Rated Door Construction: Conform to NFPA 252. Where required by code, provide rated openings with labeled units listed by UL, Intertek/Warnock Hersey, or Factory Mutual.

B. Fire Rated Stair Doors: Rate of rise of 450 degrees F across door thickness at non sprinklered buildings.

C. Installed Fire Rated Door Assembly: Conform to NFPA 80 for fire rated class as indicated on Drawings.

D. Attach label from agency approved by authority having jurisdiction to identify each fire rated door.
1. Indicate temperature rise rating for stair doors.

E. Surface Burning Characteristics:
1. Foam Insulation: Maximum 75/450-flame spread/smoke developed index when tested in accordance with ASTM E84.

F. Apply label from agency approved by authority having jurisdiction to identify each foam plastic insulation material.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
   1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

1.2 RECYCLING

A. Recycle all existing doors, frames and hardware that are not designated for reuse. Refer to Section 01 74 19 – Construction Waste Management and Disposal.

B. Verify with Owner prior to the recycling of the doors and hardware.

1.3 FIELD MEASUREMENTS

A. When re-using existing doors, replacing doors in existing frames, or replacing hardware on existing doors, field verify all existing doors, frames and hardware prior to manufacturing of any doors, frames and hardware.

PART 2 - PRODUCTS

2.1 STEEL DOORS AND FRAMES

A. Product Description: Shop fabricated 1-3/4 inch thick steel doors, door panels, and frames; fire rated and non-rated types; flush face, and.

B. Manufacturers
   1. Basis of design Steelcraft L Series
   2. Acceptable Manufacturers and Products:
      a. Ceco Door Products; Medallion H1X prep 16 gage.
      b. Curries Company; 747T 16 gage.
      c. Substitutions: Not allowed.
   3. Door requirements:
      a. All doors are to be handed doors with the lock side of the door beveled. Cut through hinges are prohibited.
      b. See hardware groups in Section 08 71 00 DOOR HARDWARE for requirements of number of hinges.
      c. Doors to have High Frequency Hinge Reinforcement.
      d. All doors to be galvannealed to ASTM A653, A60 steel sheet faces.
      e. Provide galvannealed steel end cap closures (18-ga minimum) at top and bottom edges of doors as an integral part of the door construction. Caps are to be flush or slightly below the legs of the door end channel. Seal joints in top edges of doors against water penetration.
      f. All doors to be Model 2 Seamless.
      g. Exterior doors are to be insulated with Polystyrene.
      h. For doors with closers, provide a 14 gauge steel reinforcement plate 3-1/2” x 14” at closer location.

i. Sound Rated Door: Minimum STC rating of 32, measured in accordance with ASTM E413.

4. Frame Requirements:
   a. Door frames to be 14 gauge sheet steel with mitered or coped, continuously welded corners. Frames to be full profile welded units.
   b. At door frames, provide steel reinforcements welded to frame as follows:
      1) High frequency hinge reinforcement all hinges: 12 gauge.
      2) Closer and holder: 12 gauge, frame width x 14”.
      3) Floor clips: 16 gauge, frame width by 3-1/2"
      4) Provide additional reinforcement as required to receive all surface applied hardware.

2.2 ACCESSORIES

A. Door Silencers: Provide door silencers on all doors except on weather-stripped frames and rated doors with smoke gaskets. Drill stops to receive door silencers as follows. Keep holes clear during construction.
   1. Single-Door Frames: Drill stop in strike jamb to receive three door silencers. Silencers are to be IVES SR64.
   2. Double-Door Frames: Drill stop in head jamb to receive two door silencers. Silencers are to be IVES SR64.

B. Glazing Stops: Rolled steel, channel shape, mitered corners; prepared for countersunk style tamper proof screws.

C. Undercoating: For coating the inside face of frames requiring corrosion resistance including exterior frames and frames that are filled with grout. Apply to a minimum dry film thickness of 3 mils. Undercoating to meet fire resistive assembly requirements.
   1. Steelcraft, Ceco Door Products, Curries Company, and Republic Builders Product all have an acceptable Undercoating spray product.

D. Primer: ANSI A250.10 rust inhibitive type.

E. Supports and Anchors: Fabricate from not less than 0.0478 inch thick steel sheet; 0.0516 inch thick galvannealed steel where used with galvannealed frames.
   1. Provide anchors at each jamb spaced not to exceed 2’-6” on center; minimum of three per jamb.
      a. Masonry anchors: Adjustable.
      b. Metal stud anchors: Welded to frame.

F. Inserts, Bolts, and Exposed Fasteners: Manufacturer’s standard units. Where items are to be built into exterior walls, hot-dip galvanize complying with ASTM A153, Class C or D, as applicable. Unless otherwise indicated, provide countersunk flat heads for exposed screws and bolts.

2.3 FABRICATION

A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Hollow-Metal Doors:
   1. Universal non-handed doors are not accepted.

2. Steel-Stiffened Door Cores: Provide minimum thickness 0.026 inch, steel vertical stiffeners of same material as face sheets extending full-door height, with vertical webs spaced not more than 6 inches apart. Spot weld to face sheets no more than 5 inches
   a. Fill spaces between stiffeners with glass- or mineral-fiber insulation.
3. Fire Door Cores: As required to provide fire-protection and temperature-rise ratings indicated.
4. Vertical Edges for Single-Acting Doors: Bevel edges 1/8 inch in 2 inches.

C. Hollow-Metal Frames:
1. Fabricate frames as full-profile, back-welded units with no evidence of welds on exposed faces.
   a. Form frames accurately to indicated profiles with hairline joints. Miter faces at corners. Provide tightly closed miters or butt joints at rabbets, soffits, and stop joints.
   b. Rough bucks and head reinforcement shall be 12 gauge steel
   c. Frame units too large for shipment shall be fabricated with concealed splice connections for field assembly after factory pre-assembly
2. Fabricate frames to suit masonry wall coursing with 2 inches head member.
3. Closer Reinforcements: Fabricate according to ANSI/SDI A250.6 with full sleeve closer reinforcement plates full width of frame minimum 14 gauge.
4. High Frequency Hinge Reinforcement: Provide ALL frames with mortise butt type hinges with minimum 14 gauge high frequency hinge reinforcements over the top and bottom of the hinge reinforcement at all hinge locations.
5. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
6. Fabricate frames to suit masonry wall coursing with 2 inches head member.
7. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
8. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
9. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
10. Jamb Anchors: Provide number and spacing of anchors as follows:
    a. Masonry Type: Locate anchors not more than 16 inches from top and bottom of frame. Space anchors not more than 32 inches o.c., to match coursing, and as follows:
       1) Two anchors per jamb up to 60 inches high.
       2) Three anchors per jamb from 60 to 90 inches high.
       3) Four anchors per jamb from 90 to 120 inches high.
       4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
    b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
       1) Three anchors per jamb up to 60 inches high.
       2) Four anchors per jamb from 60 to 90 inches high.
       3) Five anchors per jamb from 90 to 96 inches high.
       4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
    c. Compression Type: Not less than two anchors in each frame.
    d. Post installed Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
11. Head Anchors: Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.

12. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
    a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

D. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce doors and frames to receive non-templated, mortised, and surface-mounted door hardware.
2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

E. Steel reinforcements, welded to frame, shall be provided as follows:
1. Hinge and Pivot Reinforcement: See description in section 2.1.
2. Closer and Holder: 12-gauge by 14-inches by frame width.
3. Floor Clips: 16-gauge by 3-1/2-inches.
4. Provide mortar-tight full enclosure steel cover boxes over mortises. Rough bucks and head reinforcement shall be 14-gauge steel.
5. In order to facilitate the installation and maintenance of closures and weatherstripping, secure one-inch rigid foam insulation at the head of the frame and at the vertical stops were surface hardware is installed prior to filling the frame with mortar.

F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with mitered hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite are capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Provide loose stops and moldings on inside of hollow-metal work.
5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
6. Install removable stops with cadmium-plated, small head Jackson screws from the secured side of the opening.

2.4 SHOP FINISHING

A. Surface Preparation: Doors and Frames are to be thoroughly cleaned and chemically treated to remove dirt, oil, grease, and other contaminants that could impair paint adhesion.
1. Doors shall be pressure belt sanded to remove all irregularities.

B. Primer: All surfaces of the door and frame exposed to view shall receive a factory applied coat of rust inhibiting primer, baked-on, which complies with ANSI A224.1 acceptance criteria, and is compatible with field applied coatings.

C. Undercoating: Spray apply on exterior door frames and doors installed in masonry with grout filled frames.
1. Coating may be shop applied in the shop or field applied by the installer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify opening sizes and tolerances are acceptable.

3.2 INSTALLATION

A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.

B. Coordinate installation of doors and frames with installation of hardware specified in Section 08 71 00.

C. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
   1. Coordinate doorframes with masonry, gypsum board, and concrete wall construction for frame anchor placement. Refer to Drawings for partition types.
   2. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
      a. At fire-rated openings, install frames according to NFPA 80.
      b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
      c. Install frames with removable stops located on secure side of opening.
      d. Install door silencers in frames before grouting.
      e. Apply bituminous coating at doors to be grouted.
         1) At exterior locations apply bituminous coating up to 24 inches.
         2) In order to facilitate the installation and maintenance of closures and weatherstripping, secure one-inch rigid foam insulation at the head of the frame and at the vertical stops where surface hardware is installed prior to filling the frame with grout.
      f. Where grouting is required, frames shall be braced or fastened to prevent the pressure of the grout from deforming the frame members.
      g. Do not grout head of frames unless reinforcing has been installed in head of frame.
      h. Protect hardware locations and prep from grout/mortar.
      i. Do not grout vertical or horizontal closed mullion members.
      j. Protect adjacent floor finishes from grout liquid.
      k. Do not caulk or seal the bottom of the frames.
      l. Remove temporary braces necessary for installation only after frames have been properly set and secured.
      m. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
   3. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
      a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
   4. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
      a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
      b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.

c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

D. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Steel Doors:
a. Between Door and Frame Jambs and Head: 1/8 inch plus or minus 1/32 inch.
b. Between Edges of Pairs of Doors: 1/8 inch to 1/4 inch plus or minus 1/32 inch.
c. At Bottom of Door: 5/8 inch plus or minus 1/32 inch.
d. Between Door Face and Stop: 1/16 inch to 1/8 inch plus or minus 1/32 inch.

3.3 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow-metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

END OF SECTION 08 11 13

SECTION 08 36 13 - SECTIONAL DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes:
   1. Un-insulated Sectional Overhead Doors **(OH-1)**.
      a. Electric drive system and controls.
      b. Wiring from electric circuit disconnect, to control panel, to motor and all accessories.
      c. Safety features.
      d. Accessories.

B. Related Sections:
   1. Division 05 Specification Section "Metal Fabrications" for miscellaneous steel supports, door-opening framing, corner guards, and bollards.

1.3 REFERENCES

A. NEMA - National Electrical Manufacturers Association.

1.4 SYSTEM DESCRIPTION

A. Electrical Motor operated unit with manual override in case of power failure.

1.5 DEFINITIONS

A. Operation Cycle: One cycle of a door is complete when it is moved from the closed position to the fully open position and returned to the closed position.

1.6 ACTION SUBMITTALS

A. Product Data: For each type and size of sectional overhead door and accessory. Include the following:
   1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
   2. Diagrams with descriptions to indicate specific model numbers for all parts and assemblies.
   3. Operating instructions.
   4. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
      a. Motors: Show nameplate data and ratings, characteristics, and mounting arrangements.
   5. Summary of forces and loads on walls and jambs.
   6. Literature describing manufacturers full range of color and gloss for factory-applied finishes.

B. Manufacturer’s Installation Instructions: Indicate installation sequence and procedures, adjustment, and alignment procedures.

C. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
   1. Include dimensioned plans, elevations, sections, anchorage methods, hardware locations, and installation details.
   2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
   3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
   4. For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.
   5. Show locations of controls, locking devices, detectors or replaceable fusible links, and other accessories.
   6. Include diagrams for power, signal, and control wiring.

D. Samples for Initial Selection:
   1. Exterior and interior panels: Manufacturers full range of standard finishes for color, gloss and finish.

E. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below. Submit three samples, with previously approved finish, to indicate range of variation in the finish.
   1. Frame: Minimum 6 inches long.
   2. Metal door panel: Minimum 12 inches long, with actual panel profile and height.

1.7 INFORMATIONAL SUBMITTALS

A. Installer Qualifications: Qualification Data from an entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

1.8 CLOSEOUT SUBMITTALS

A. Special warranty.

B. Maintenance Data: For overhead coiling doors to include in maintenance manuals.
   1. Maintenance data shall include lubrication requirements and frequency, periodic adjustments required, scheduled maintenance suggested, manufacturer’s data sheets, and equipment interconnection diagrams.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by coiling door manufacturer for both installation and maintenance of units required for this Project.

B. Source Limitations: Obtain Sectional doors and all components and accessories from single source from single manufacturer.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Regulatory Requirements: Electrical components shall be NEMA approved and UL listed.

1.10 COORDINATION

A. Coordinate the work with installation of electric power and locations and sizes of conduit.

1.11 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of sectional doors that fail in materials or workmanship within specified warranty period of 10 years from date of Substantial Completion.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including, but not limited to, excessive deflection.
      b. Failure of components or operators before reaching required number of operation cycles.
      c. Faulty operation of hardware.
      d. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use; rust through.
      e. Delamination of exterior or interior facing materials.

B. Special Warranty - Finishes: Manufacturer agrees to repair or replace components that show evidence of deterioration of factory-applied finishes within specified warranty period of 10 years from date of Substantial Completion. Deterioration includes fading, cracking, chalking or peeling.

C. Three year or 20,000 cycle limited warranty on motor assembly.

PART 2 - PRODUCTS

2.1 SECTIONAL DOORS

A. Sectional Doors:
   1. **(OH-1)** Basis of Design Product: Subject to compliance with requirements, provide Overhead Door Company Model 596 insulated steel door, or a comparable product one of the following:
      a. Clopay
      b. Wayne Dalton
      c. Raynor.

2.2 PERFORMANCE REQUIREMENTS

A. Operation-Cycle Requirements: Provide sectional overhead door components and operators capable of operating for not less than 25,000 cycles.

B. Operation Speeds: Provide door components and operators to result in operating speeds of not less than the following:
   1. Door Opening and Closing Speed: Variable, adjustable, minimum 9 inches per second and maximum 12 inches per second.

C. Structural Performance: Provide sectional overhead doors capable of withstanding the effects of gravity loads and the following loads and stresses without evidencing permanent deformation of door components:
   1. Wind Loads: Determine loads based on the following minimum design wind pressures:
      a. Uniform pressure (velocity pressure) of 20 lbf/sq. ft., acting inward and outward.

b. Testing: According to ASTM E330.
2. Deflection Limits: Design sectional overhead doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.
3. Air Infiltration: Maximum rate not more than indicated when tested according to ASTM E 283.
a. Maximum Rate: 0.022 cfm at 25 mph.

2.3 MATERIALS

A. Door Assembly: Commercial grade aluminum extrusions with polyurethane insulation and weather-tight tongue in groove design meeting joints. Fabricate door sections so finished door assembly is rigid and aligned, with tight hairline joints and free of warp, twist, and deformation.
1. Panel Thickness: 2 1/8” inches.
2. Double End Stiles:0.75” wall thickness commercial grade aluminum extrusions with polyurethane insulation.
3. Astragal: U-shaped flexible PVC in retainer of full-length 0.055 inch (1.4 mm) rigid PVC.
4. Fully glazed panels:
a. Glazing: 1 inch nominal (25 mm) insulated tempered glass.
5. Motor type: Minimum 1 HP AC drive, 220 V, 3 phase, variable speed to provide specified opening and closing speeds, and with soft acceleration and braking. Doors using a motor with a clutch or pump will not be accepted.
a. Coordinate electrical characteristics of motor with electrical contractor.
6. Spring Counterbalance: Sized to weight of the door, with a helically wound, oil tempered torsion spring mounted on a steel shaft; cable drum of diecast aluminum with high strength galvanized aircraft cable. Sized with a minimum 7 to 1 safety factor.
a. High cycle spring: 25,000 cycles.
7. Insulation: CFC-free and HCFC-free polyurethane, fully encapsulated and with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84.
8. Thermal Values: Minimum R-value of 3.8.
9. Air Infiltration: 0.022 cfm at 25 mph.

B. Finish and Color:
1. Clean aluminum so surfaces are free of oil and other contaminants, and pretreat with a conversion coating of type suited to primer and finish coats
2. Apply manufacturer's primer and finish coats to interior and exterior door faces after forming, according to coating manufacturer's written instructions for application, thermosetting, and minimum dry film thickness.
3. Exterior Finish: Two coat baked-on polyester selected from manufacturer’s full range.
4. Interior Finish: Two coat baked-on polyester with manufacturers standard White color.
5. 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.

C. Hardware and Accessories:
1. Galvanized steel hinges and fixtures. Ball bearing rollers with hardened steel races.
2. Lock: Slide lock with interlock switch for automatic operator.
3. Weatherstripping:
a. EPDM bulb-type strip at bottom section.
b. Flexible Jamb seals.
c. Flexible Header seal.
4. Track: Provide track as recommended by manufacturer to suit loading and other performance requirements, minimum .061 inch thickness.
a. Size: 2 inch (51 mm).
b. Type: Standard lift.

2.4 ELECTRICAL CONTROLS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Manufacturer's premium controls system including:
   1. Remote Control Station: Provide momentary contact, 3-button control station with push - button controls labeled "Open", "Close" and "Stop".
   2. Provide interior units, fully guarded, surface mounted, heavy-duty type, with general-purpose NEMA ICS 6 enclosure in one of the following types:
      a. Enclosure Type: NEMA Type 4.
   3. Controller shall include expansion panels as required to allow connection to the Owner's building management system.

2.5 SAFETY SYSTEMS

A. Obstruction Detection Device: Provide each motorized door with indicated external automatic safety sensor able to protect full width of door opening. Activation of sensor immediately stops and reverses downward door travel.

A. Obstruction Detection: Automatic external entrapment protection consisting of automatic safety sensor capable of protecting full width of door opening. Activation of device immediately stops and reverses downward door travel.
   1. Monitored Entrapment Protection: Provide electric sensor edge on bottom section designed to interface with door-operator control circuit to detect damage to or disconnection of sensor and complying with requirements in UL 325.

B. Photo-electric control: Provide each motorized door with a photo-electric device that will stop and reverse the downward door travel if the light beam is broken or blocked. Device shall be:
   1. NEMA Type 4.

C. Limit Switches: Provide adjustable switches, interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

D. Provide auxiliary chain hoist: for emergency manual operation while disconnecting motor, without affecting timing of limit switch. Mount disconnect and operator so they are accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

E. Radio Controls: Provide 3 button radio transmitter to provide remote open, close, stop functionality.
   1. Provide external antenna and coaxial wiring to receiver to enhance radio control reception.

2.6 ACCESSORIES

A. Provide for manual operation in event of power outage.
   1. Push/Pull handles on interior side of door.
   2. Pull-Down Strap

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.

B. Examine locations of electrical connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install door, track, and operating equipment complete with necessary hardware, jamb and head molding strips, anchors, inserts, hangers, and equipment supports according to Shop Drawings, manufacturer's written instructions, and as specified.

B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

C. Fasten vertical track assembly to framing, spaced not less than 24 inches apart. Hang horizontal track from structural overhead framing with angle or channel hangers fastened to framing by welding or bolting or both. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.

D. Fit and align assembly including hardware. Install level and plumb, to provide smooth operation.
   1. Coordinate installation of electrical service. Complete wiring from disconnect to unit components.

3.3 FIELD QUALITY CONTROL

A. Engage a factory-authorized service representative to perform startup services.
   1. Complete installation and startup checks according to manufacturer's written instructions.
   2. Test and adjust controls and safety devices. Adjust hardware and moving parts to function smoothly.
   3. Replace damaged and malfunctioning controls and equipment.
   4. Provide documentation of test results.

B. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

C. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

3.4 ADJUSTING AND CLEANING

A. Clean door assemblies and components.

B. Lubricate bearings and sliding parts; adjust doors to operate easily, free from warp, twist, or distortion and with weathertight fit around entire perimeter.

C. Adjust door assembly to smooth operation and in full contact with weatherstripping.

D. Touch-up Painting: Immediately after welding galvanized track to track supports, clean field welds and abraded galvanized surfaces and repair galvanizing to comply with ASTM A 780.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

3.6 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of rolling slat-door Installer, including preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
   1. Perform maintenance, including emergency callback service, during normal working hours.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain sectional overhead doors.

END OF SECTION 08 36 13

SECTION 08 42 13 - ALUMINUM-FRAMED ENTRANCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Aluminum-framed entrance door systems.

1.2 RELATED REQUIREMENTS

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

1. Section 08 71 00 Door Hardware
2. Section 08 51 13 Aluminum Windows

1.3 ALLOWANCES

A. See Section 01 21 00 "Allowances" for description of allowances affecting items specified in this Section.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data:

1. Aluminum-framed entrance door systems.

B. Product Data Submittals: For each product.

1. Construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Operating characteristics, electrical characteristics, and furnished accessories.

C. Shop Drawings:

1. Plans, elevations, sections, full-size details, and attachments to other work.
2. Details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
3. Full-size isometric details of each type of vertical-to-horizontal intersection of aluminum-framed entrance door systems, showing the following:

a. Joinery, including concealed welds.
b. Anchorage.
c. Expansion provisions.
d. Glazing.
e. Flashing and drainage.

4. Connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
5. Signed and sealed by the qualified professional engineer responsible for their preparation.

D. Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available colors for each type of exposed finish.

E. Samples for Verification: Actual sample of finished products for each type of exposed finish.

1. Size: Manufacturers' standard size.

1.6 INFORMATIONAL SUBMITTALS

A. Energy Performance Certificates: For aluminum-framed entrance door systems, accessories, and components, from manufacturer.

1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance.

B. Qualification Statements: For Installer.

C. Sample Warranties: For aluminum-framed entrance door systems.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For aluminum-framed entrance door systems.

1.8 QUALITY ASSURANCE

A. Installer Qualifications:
1. Entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.9 WARRANTY

A. Aluminum Entrance Door Warranty
1. Products: Submit a written warranty, executed by the entrance door manufacturer, for a period of two years from the date of manufacture, against defective materials or workmanship, including substantial non-compliance with applicable specification requirements and industry standards, which result in premature failure of the entrance doors, finish, or parts, outside of normal wear.

2. In the event that entrances or components are found defective, manufacturer will repair or provide replacement material without charge at manufacturer's option.
3. Warranty for all components included in the entrance manufacturer's scope of work must be direct from the manufacturer (non pass-through) and non pro-rated for the entire term. Warranty must be assignable to the non-residential owner, and transferable to subsequent owners through its length.

B. Special Finish Warranty, Factory-Applied Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.

2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain all components of aluminum-framed entrance door systems, including framing and accessories, from single manufacturer.

2.2 MANUFACTURERS

A. Acceptable Manufacturer
1. Basis of Design:
a. Wausau Window and Wall Systems – EN-8300i Historical Thermal Barrier Entrances.
2. Substitutions
a. Other manufacturers' products that meet or exceed specified design requirements may be considered. Submit the following information with request for substitutions at least ten (10) working days prior to bid date.
1) Test reports specified.
2) Full proposal details and samples specified in.
3) Copy of manufacturer's warranty specified in.
3. Substitute products not pre-approved by the Architect via addenda will not be considered.

2.3 PERFORMANCE REQUIREMENTS

A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Aluminum-framed storefronts shall withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
2. Failure also includes the following:

a. Thermal stresses transferring to building structure.
b. Glass breakage.
c. Noise or vibration created by wind and thermal and structural movements.
d. Loosening or weakening of fasteners, attachments, and other components.
e. Failure of operating units.

B. Structural Loads:
1. Design Loads: Base on IBC wind loading requirements including site specific requirements.
2. Basic wind velocity at Project site is 115 mph, Exposure C as indicated on the Structural Drawings.

C. Structural Performance at Design Loads:
1. System shall withstand +/- 30 psf when tested per ASTM E 330.
a. Maximum allowable deflection of L/175 of the clear span for spans up to 13’-6” or L/240 of clear spans plus 1/4-inch for spans greater than 13’-6” or an amount that restricts edge deflection of individual glazing lites of glass to 3/4-inch whichever is smaller.

D. Structural Performance at 1.5x design loads:
1. System shall withstand +/- 45 psf when tested per ASTM E 330.
a. There shall be no permanent deformation of main frame members in excess of 0.2% of its clear span, glass breakage, or permanent damage to fasteners or anchors.

E. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
1. Shall not exceed 0.06 cfm/ft^2 at 6.24 psf static air pressure differential.

F. Water Infiltration Performance:
1. Static: No uncontrolled water entry at a 12 psf static pressure differential with water applied at a minimum rate of 5 gal/ft^2 hr when tested per ASTM E 331.
2. Dynamic: No uncontrolled water entry at 12 psf dynamic pressure with water applied at a minimum rate of 5 gal/ft^2hr when tested per AAMA 501.1.

G. Thermal Cycling:
1. There shall be no air and water infiltration exceeding primary performance requirements, buckling, stress on glass, edge seal failure, excess stress on structure, anchors and fasteners, or reduction in performance when tested in accordance with AAMA 501.5 at a temperature range of -20 °F to 180 °F. Interior ambient air temperature at 70°F (+/- 5 °F) for hot and cold cycles.

2.4 MATERIALS

A. Aluminum Framing Members
1. Extruded aluminum billet, 6063-T5 or T6 alloy for primary non-radius components; 6063-T5 or T6, 6005-T5, 6105-T5 or 6061-T6 for anchor components; all meeting the requirements of ASTM B221.
2. Aluminum sheet alloy 5005-H32 (for anodic finishing), or alloy 3003-H14 (for painted or unfinished sheet) meeting the requirements of ASTM B209.
3. Principal entrance frame, rail and stile members will be a minimum 0.125" in thickness at hardware mounting webs and section flanges.
4. Extruded or formed trim components will be a minimum 0.060" in thickness.
5. Minimum thermal barrier frame depth front-to-back 4 7/8". Thermal barrier door leaf depth front-to-back 2 1/4” minimum.
   a. Rails and stiles to be tubular aluminum extrusions.
   b. Entrance frames to be designed for self-mulling (stacking), as well as incorporation of single-frame transom and side lites.

2.5 COMPONENTS

A. Hardware
1. Entrance door hardware is specified in Section 08 71 00, and may include but not be limited to; hinges, pivots, push/pull handles, dead bolts, hook bolts, thumb turns, locking cylinders, shoot bolts, electromagnetic locks, access control, panics, closers, and/or threshold sweeps.

B. Sealants
1. All sealants shall comply with applicable provisions of AAMA 800 and/or Federal Specifications FS-TT-001 and 002 Series.
2. Frame joinery sealants shall be suitable for application specified and as tested and approved by entrance manufacturer.

C. Glass
1. Provide in accordance with Section 08 80 00.
2. Sealed insulating glass shall be tested and certified in accordance with ASTM E2190.

D. Glazing
1. Provide in general accordance with Section 08 80 00.
2. Glazing method shall be in general accordance with the GANA Glazing Manual for specified glass type, or as tested and approved by the manufacturer.

E. Glazing Materials
1. Setting Blocks/Edge Blocking: Provide in sizes and locations recommended by GANA Glazing Manual. Setting blocks used in conjunction with soft-coat low-e glass shall be silicone.
2. Back-bedding tapes, expanded cellular glazing tapes, toe beads, heel beads and cap beads shall meet the requirements of applicable specifications cited in AAMA 800.
3. Glazing gaskets shall be non-shrinking, weather-resistant, and compatible with all materials in contact.
4. Structural silicone sealant where used shall meet the requirements of ASTM C1184.
5. Spacer tape in continuous contact with structural silicone shall be tested for compatibility and approved by the sealant manufacturer for the intended application.
6. Gaskets in continuous contact with structural silicone shall be extruded silicone or compatible material.

F. Steel Components
1. Provide steel reinforcements as necessary to meet the performance requirements of 1.03.
2. Concealed mild steel anchors and reinforcing shall be factory painted after fabrication with TGIC powder coating, or rust-inhibitive primer complying with Federal Specification TT-P-645B.

G. Receptors:
1. Provide extruded aluminum receptors to receive transom and side lite framing as shown on architectural drawings.
2. Finish to match entrance door frames.

H. Sill Kick Plate: (*Optional)*
1. Provide high-profile aluminum door panel bottom stile, or intermediate framing member to accept an aluminum sheet glazed-in, as a “kick plate”. Kick plate height to be _____ inches. *(Specify)*

I. Improved Access Sill:
1. Provide a ribbed thermal barrier extruded aluminum threshold as shown on architectural drawings and/or specified in Division 8 “Door Hardware.”

2.6 FABRICATION

A. General:
1. Finish, fabricate and shop assemble frame, door rail and stile members into complete entrance doors under the responsibility of one manufacturer.
2. No bolts, screws or fastenings shall impair independent frame movement, or bridge the thermal barrier, unless such bridging was also present in thermal test units and thermal models.
3. Fabricate to allow for thermal movement of materials when subjected to a temperature differential from -30 °F exterior ambient temperature to +180 °F exterior surface temperature.

B. Frames:
1. Cope and mechanically fasten each corner; then seal weather tight.
2. Make provisions for continuity of frame joinery seals at extrusion webs.

C. Door Leaves (Active and Inactive)
1. Fabricate entrance door corners using 316 Series stainless steel tie rod connection design allowing for field adjustment, then sealed weather tight.
2. Make provisions for continuity of door rail and stile joinery seals at extrusion webs.

D. Glass Drainage: (field glazed units only)
1. Provision shall be made to insure that water will not accumulate and remain in contact with the perimeter area of sealed insulated glass.

E. Thermal Break Construction
1. Continuous extruded 6/6 polyamide nylon with 25% glass fiber reinforcing, mechanically crimped into cross-knurled cavities.
2. Minimum thermal separation ¼".
3. Quality assurance records must be maintained and available as requested.

F. Weather-stripping:
1. Bulb- or fin-type neoprene, EPDM, silicone, dual-durometer PVC, polypropylene, TPE, wool pile or other suitable material as tested and approved by the door manufacturer.
2. Miter, crowd, stake or join at corners. Provide drainage to exterior as necessary.

2.7 FINISHES

A. Finish of Aluminum Components
1. Finish of all exposed areas of aluminum entrance doors shall be done in accordance with the appropriate AAMA Voluntary Guide Specification shown

Designation	Description	Standard	Color
Interior Paint	50% PVDF, Enamel, Acrylic or Polyester	AAMA 2603	As selected by Architect suitable for INTERIOR finishes
Exterior Paint	70% PVDF	AAMA 2605	As selected by Architect suitable for INTERIOR or EXTERIOR finishes

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, 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 ALUMINUM-FRAMED ENTRANCE DOOR SYSTEMS

A. General
1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Seal perimeter and other joints watertight unless otherwise indicated.

B. Metal Protection
1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or installing nonconductive spacers.
2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Set continuous sill members and flashing in full sealant bed, as specified in Divi "Joint Sealants," to produce weathertight installation.

D. Installation of Trim and Inside and Outside Corners:

1. Install trim as indicated on Drawings. Mechanically fasten retainer clips where allowed by wall surround conditions. Where not possible, use VHB™ tape to secure clips to substrate. Follow manufacturer's printed instructions for preparation and application requirements.
2. Install and anchor plumb and true in alignment and relation to adjacent openings and established lines.
3. Sharp edged tools shall not be used as dimpling of trim will not be permitted. Dimpled or disfigured trim shall be replaced at no cost to the Owner.
4. Where snap-in securement to retainer clips is not possible, utilize VHB™ tape to provide securement per manufacturer's instructions. Avoid excessive application of VHB™ tape to prevent misalignment of pieces.

E. Install components plumb and true in alignment with established lines and grades.

F. Install glazing as specified in Division 08 Section "Glazing."

G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.
1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.

3.3 ERECTION TOERANCES

A. Install aluminum-framed systems to comply with the following maximum erection tolerances:
1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet; 1/4 inch over total length.
2. Alignment:
   a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch.
   b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch.

B. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.

3.4 ADJUSTING

A. Adjust operating entrance door hardware to function smoothly as recommended by manufacturer.

3.5 CLEANING

A. Comply with AAMA 609 and 610 for methods, equipment, and materials to clean finished aluminum after installation and for subsequent periodic maintenance.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths.

C. Take care to remove dirt from corners, and wipe surfaces clean.

D. Remove excess sealant from glass and aluminum by method acceptable to sealant and finish manufacturer.

3.6 PROTECTION

A. Protect installed products from damage during subsequent construction.

B. Protect anodized finishes from prolonged exposure to alkaline, such as lime in masonry mortar, or acidic and other corrosive materials.

END OF SECTION 08 42 13

SECTION 08 51 13 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes aluminum windows for exterior locations.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   2. Review and discuss the finishing of aluminum windows that is required to be coordinated with the finishing of other aluminum work for color and finish matching.
   3. Review, discuss, and coordinate the interrelationship of aluminum windows with other exterior wall components. Include provisions for anchoring, flashing, weeping, sealing perimeters, and protecting finishes.
   4. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.
   5. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

1.4 REFERENCES

A. AAMA/WDMA/CSA 101/I.S.2/A440-05 “Standard/Specification for Windows, Doors, and Unit Skylights.”

B. AAMA 502 “Voluntary Specification for Field Testing of Newly Installed Fenestration Products.”

C. AAMA 611 “Voluntary Specification for Anodized Architectural Aluminum.”

D. AAMA 701/702 “Voluntary Specification for Pile Weatherstripping and Replaceable Fenestration Weatherseals.”

E. AAMA 1503 “Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.”

F. AAMA 2605 “Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.”

G. ASTM E 283 “Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.”

H. ASTM E 330 “Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference.”

I. ASTM E 547 “Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Differential.”

J. ASTM E 1332 “Standard Classification for Determination of Outdoor-Indoor Transmission Class.”

K. ASTM E 2190 “Standard Specification for Insulating Glass Unit Performance and Evaluation.”

L. ASTM F 588 “Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact.”

M. NFCR 100 “Procedure for Determining Fenestration Product U-Factors.”

1.5 SUBMITTALS

A. Product Data: Manufacturer shall supply product data for each type of window required, including:
   1. Construction details and fabrication methods.
   2. Data of hardware and accessories.
   3. Recommendations for maintenance and cleaning of exterior surfaces.

B. Shop Drawings: For aluminum windows.
   1. Before proceeding with the manufacture of windows, the window contractor shall submit complete shop drawings with installation details for the Architect’s review. These drawings shall also show window elevations, details of all window sections, collateral materials, details of anchorage, and associated hardware.

C. Samples: Window manufacturer shall submit three (3) samples of finish.

D. Window manufacturer shall submit test reports from an AAMA- and NVLAP-accredited laboratory certifying compliance with performance specifications for each type of window supplied for this project.

E. Window manufacturer shall submit a copy of the product warranty to be applied to this project.

F. Product Schedule: For aluminum windows. Use same designations indicated on Drawings.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by test reports and calculations.

B. Installer Qualifications: An installer acceptable to aluminum window manufacturer for installation of units required for this Project.

C. Testing shall be performed by an independent architectural testing laboratory accredited by the American Architectural Manufacturer's Association (AAMA), the National Voluntary Laboratory Accreditation Program (NVLAP) and the International Conference of Building Officials (ICBO) and such other accreditation as may be required by state of local building regulations.

D. Manufacturer shall provide the Architect and Owner a notarized affidavit of compliance certifying that the windows furnished for this project are identical in every aspect of design, component parts (including sealants and the application thereof, reinforcing members, and similar items) and fabrication techniques as the windows tested in the laboratory for which test reports have been furnished.

1.7 WARRANTY

A. Manufacturer shall warrant the products against material defects or defects in manufacturing. If a defect is discovered and brought to the attention of the Manufacturer, the defect shall be corrected at no cost to the Owner. Warranty shall not be pro-rated. Warranties requiring the Owner to return windows to the factory for repair or replacement shall not be accepted.
   1. Windows: Warrant for ten (10) years against defects in material or workmanship under normal use.
   2. Insulating Glass Units: Warrant seal for ten (10) years against visual obstruction from film formation or moisture collection between internal glass surfaces, excluding that caused by glass breakage or abuse.
   3. Finish:
      a. Organic Finish Conforming to AAMA 2605-05: Warrant for ten (10) years against chipping, peeling, cracking, chalking, and fading.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain aluminum windows from single source from single manufacturer.

2.2 WINDOW PERFORMANCE REQUIREMENTS

A. Uniform Load Structural Test:
   1. With sash in a closed position window shall be tested in accordance with ASTM E 330 at a static air pressure difference of 65.0 pounds per square foot with pressure applied both positively and negatively.
   2. Static air pressure difference shall be 1.5 times the design pressure. (1.5 is the factor used to provide a margin of safety in aluminum windows).
   3. At conclusion of test, there shall be no glass breakage; permanent damage to fasteners, hardware parts, support arms, or actuating mechanisms. Nor any other damage which would cause the window to be inoperable. Permanent deformation of any frame, sash, or ventilator member shall not exceed 0.04% of its span.

B. Air Infiltration:
1. With sash in a closed and locked position window shall be tested in accordance with ASTM E 283 and shall meet the following performance requirements:
a. Air infiltration on windows with less than 18 feet of operable sash crack perimeter shall not exceed 2.8 cfm per square foot of window area when tested in a static pressure drop of 1.57 psf (equivalent to 25 mph wind velocity) or 6.3 cfm total when tested at 6.24 psf (equivalent to 50 mph wind velocity).
b. Air infiltration on windows with 18 or more feet of operable sash crack perimeter shall not exceed 0.05 cfm per square foot of window area at a static pressure drop of 1.57 psf or 0.15 cfm at 6.24 psf.

C. Water Resistance:
1. Tests shall be conducted in accordance with ASTM E 331. No water shall pass the innermost plane of the window when tested at a static air pressure difference of 12.0 psf.

D. Thermal Performance:
1. When tested in accordance with AAMA 1503 or according to NFRC 100 the thermal transmittance due to conduction (Uc) shall not exceed 0.42 on the entire specimen.
2. When tested in accordance with AAMA 1503 or according to NFRC 100 the Condensation Resistance Factor (CRF) shall not be less than 52 on the entire specimen.

E. Forced Entry Resistance:
1. When tested in accordance with ASTM F 588, window shall perform to a minimum Performance Level 10.

F. Thermal Movements: Provide aluminum windows, including anchorage, that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change: 120 deg F ambient; 180 deg F material surfaces.

2.3 ALUMINUM WINDOWS

A. Manufacturer:
1. Basis-of-Design: St. Cloud Window, Inc., 390 Industrial Blvd, Sauk Rapids, MN 56379, Phone: 800-383-9311 Fax: 320-255-1513.
a. SCW2500 - Historic Steel Replica Projecting.
b. SCW2500 - Historic Steel Replica Fixed Lite.
c. SCW2500 - Projecting Awning.
d. SCW2500 - Fixed.
2. Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
a. Kawneer; 8225TL Isolock® Window
b. TRACO.
c. Wausau Window and Wall Systems.
d. EFCO, a Pella Company; Series S-325.

2.4 MATERIALS

A. Aluminum Extrusions:
1. Shall be accurately extruded aluminum alloy 6063-T6.
2. All primary sash and frame members shall have a minimum wall thickness as determined to comply with performance and design requirements.

B. Insect Screens:
1. Screen frames shall be tubular extruded aluminum, finished with 18 x 16 screen cloth, securely held in place by means of reusable vinyl spline. Roll-formed screen frames shall not be accepted.
2. Provide screens on operating vents.
3. Wicket Screens:
a. Wicket screens shall be mounted to the interior side of frame over the operating vent. Wicket screens shall be constructed of 0.062-inch extruded aluminum and will incorporate a sliding wicket screen to allow for operation of vent cam handles.
4. Mesh shall be aluminum.

C. Thermal Barrier:
1. Provide continuous extruded high performance nylon 6/6 polyamide with multi-directional 25% glass fiber reinforcing as manufactured by Technoform or equal. Polyamide material shall be from a minimum of 90% virgin components, with a maximum 10% pre-consumer regrind. Aluminum components shall be mechanically crimped into cross knurled cavities and obtain a minimum composite shear value of 800 pounds for a 4-inch section. Rolled in PVC, single directional glass fiber reinforced polyamide and pour and debridge urethane thermal break systems will not be acceptable.

D. Weather-Stripping.
1. A rubberized vinyl EPDM weather-stripping bulb shall be used in secured extruded ports at frame vent perimeter locations.

E. Hardware:
1. Awning: Concealed 4-bar stainless steel balanced arm hinges shall be used at the jamb sides of vents for opening and closing operation. The frame vent shall be equipped with a cam lock at each jamb to hold the vent in a tightly closed and locked position.
a. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range.

F. Glazing:
1. Glazing shall comply with the performance requirements specified in Section 088000 “Glazing.”
2. Windows shall be fully factory glazed with 1-inch overall insulated glass as specified in Section 088000 “Glazing.”
3. Glass shall be glazed with removable stops and shall be replaceable without dismantling the sash or frame members.
4. A continuous polyshim tape shall be used on the exterior glazing leg and a continuous silicone cap bead over the polyshim bonding to the glass edge to prevent moisture from intruding into the window system. A continuous rubberized vinyl compression bulb shall be used on the interior glazing stops.

G. Muntins:
1. Muntin grids shall be extruded aluminum with exposed surfaces finished to match window exterior and interior colors.
2. Muntin grids shall be applied to the interior and exterior of the glass lite to simulate a true-divided lite.
3. Insulated glass units shall incorporate between glass grids.
4. Grid patterns shall match existing as indicated on Drawings and as directed by Architect.

H. Strap Anchors:
1. A continuous aluminum slip-on F-channel mounting clip shall be used on the interior side of window frame perimeter to anchor window frames in place. A fastener shall be anchored through mounting clip into the wall section 6 inches from each frame edge and

at 16 inches on center or a determined spacing as set forth by engineered load calculations. After fasteners are in place, a trim cover plate shall be snapped over the mounting clip to conceal fasteners.

2.5 FABRICATION

A. Joints of the frame shall be butt type and secured by means of thread-cutting stainless steel screws anchored into screw ports which shall be an integral part of the frame members. The vent frame shall use miter-type joinery and be secured together with the use of aluminum corner keys and crimped. Corner joints shall be joined neatly and sharp edges shall be de-burred and filed smooth. Joints shall be sealed for weather tightness with the use of small joint sealer material.

2.6 ALUMINUM FINISHES

A. Interior and Exterior:
1. Polyvinylelidene Fluoride PVDF Organic Coatings: Finish shall be 70% fluoropolymer (PVDF) organic coating in a color selected by Architect. Applied coatings shall meet or exceed AAMA 2605-05, including 10 years Florida exposure and 4000 hours humidity tests.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.

C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Window and related window components shall be installed in accordance with requirements of the Owner and the approved shop drawings of the manufacturer. Installation shall be by a contractor who is experienced and who shall document at least one other project of similar nature and scope for which the window products were successfully installed.

B. Materials shall be erected plumb, level, and true, relative to the building structure. The maximum variation from plumb and level shall not exceed 1/8-inch (plus or minus) over ten feet.

C. Approved insulation materials shall be installed in the frame cavity on the interior portion of the window frame. Area adjacent to the exterior of the window frame shall remain uninsulated. The

window installer shall use caution in the insulation operation to avoid overlapping insulation materials across the thermal-barrier connector thus bridging the two separate frame members.

D. Perimeter Sealant:
   1. Sealant as specified in Section 079200 “Joints Sealants” shall be applied per the installation drawings and details at points where the aluminum master frame and/or panning intersects the masonry or other exterior wall finish. The sealant material shall be applied in a manner which ensures a continuous air- and water-tight perimeter seal.

3.3 ADJUSTING, CLEANING, AND PROTECTION

A. After installation, the installer shall remove sealants and other misplaced materials from surfaces, including adjacent work. The window frame, sash, and glass shall be cleaned thoroughly with materials and methods recommended by the window and glass manufacturers and shall not cause defacement of the work.

B. Installer shall make adjustments to window sash and hardware to cause the operating sash to function properly and in accordance with the manufacturer’s standards.

C. Protection of Glass and Window Materials: Protect from contact with contaminating substances resulting from construction operations. After installation and cleaning of windows by window contractor, the general contractor shall be responsible for maintaining the cleanliness and protection of the window from damage from other trades.

END OF SECTION 085113

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SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Mechanical door hardware for the following:
      a. Swinging doors.
   2. Match existing door hardware manufacturers, products, and finishes unless noted otherwise.

B. Related Requirements:
   1. Division 08 Section "Aluminum-Framed Entrances and Storefronts" for entrance door hardware.
   2. Division 8 Section “Automatic Door Operators” for powered door operators.
   3. See electrical and technology drawings for access control system work.

1.3 COORDINATION

A. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

B. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site prior to the installation of hardware.

   1. Manufacturers’ representatives to arrange and conduct meeting to instruct installers on proper installation of hardware.

   2. Conference participants must include Owner and installers.

   3. Letter of compliance must be sent to Architect and Owner.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For electrified door hardware.
   1. Include diagrams for power, signal, and control wiring.

2. Include details of interface of electrified door hardware and building safety and security systems.

C. Door Hardware Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant. Coordinate door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
2. Format: Use same scheduling sequence and format and use same door numbers as in door hardware schedule in the Contract Documents.
3. Content: Include the following information:
   a. Identification number, location, hand, size, and material of each door and frame.
   b. Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
   c. Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
   d. Description of electrified door hardware sequences of operation and interfaces with other building control systems.
   e. Fastenings and other installation information.
   f. Explanation of abbreviations, symbols, and designations contained in door hardware schedule.
   g. Mounting locations for door hardware.
   h. List of related door devices specified in other Sections for each door and frame.

1.6 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of electrified door hardware.

B. Product Test Reports: For compliance with accessibility requirements, for tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.

C. Field quality-control reports.

D. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of door hardware to include in maintenance manuals.

B. Schedules: Final door hardware and keying schedule.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and of an Architectural Hardware Consultant who is available during the course of the Work to consult Contractor, Architect, and Owner about door hardware and keying.
1. Warehousing Facilities: In Project's vicinity.
2. Scheduling Responsibility: Preparation of door hardware and keying schedule.

B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and

extent to that indicated for this Project and who is currently certified by DHI as an Architectural Hardware Consultant (AHC).

1.9 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including excessive deflection, cracking, or breakage.
      b. Faulty operation of doors and door hardware.
      c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
   2. Warranty Period: Three years from date of Substantial Completion unless otherwise indicated below:
      a. Exit Devices: Two years from date of Substantial Completion.
      b. Manual Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

C. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the DOJ's "2010 ADA Standards for Accessible Design", the ABA standards of the Federal agency having jurisdiction, and ICC A117.1.
   1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
   2. Comply with the following maximum opening-force requirements:
      a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
   3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.
   4. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.

2.2 MANUFACTURERS

A. Source Limitations: Obtain each type of door hardware from single manufacturer.

2.3 BUTT HINGES

A. Acceptable manufacturers and respective catalog numbers:

		Hager	Ives	Stanley	McKinney
1	Standard Weight, Ball Bearing	BB1279	5BB1	FBB179	TA2714
2	Standard Weight, Ball Bearing, Non-Ferrous	BB1191	5BB1	FBB191	TA2314
3	Standard Weight, Ball Bearing, Hospital Tip	****	5BB1HT	****	HTA2314
4	Heavy Weight, Ball Bearing	BB1168	5BB1HW	FBB168	T4A3786
5	Heavy Weight, Ball Bearing, Non-Ferrous	BB1199	5BB1HW	FBB199	T4A3386
6	Heavy Weight, Ball Bearing, Hospital Tip	IHTHB953	5BB1HWHT	IHTCB1961R	HT4A3386

B. Application Criteria
1. Furnish the following hinge quantities for each door leaf:
3 hinges for doors up to 90 inches.
1 additional hinge for every 30 inch on doors over 90 inches.
4 hinges for Dutch door applications.
2. Furnish hinge weight and type as follows:
Standard weight: ball bearing hinge for interior openings up to 36 inches wide.
Heavyweight: 4 ball bearing hinge for all vestibule doors.
Heavyweight: 4 ball bearing hinge for exterior openings unless otherwise listed in group.
3. Furnish hinges for exterior doors, fabricated from brass, bronze or stainless steel.
Unless otherwise specified, hinges for interior doors may be fabricated from steel.
4. Furnish hinges in the following sizes:
5” x 5” 2 ¼” thick doors
4 ½” x 4 ½” 1 ¾” thick doors
5. Furnish hinges with flat bottom tips with non-rising pins at interion doors, non-removable loose pins (NRP) at exterior and out swinging interior doors.
6. Furnish all hinges to template standards
7. Furnish hospital tip hinges for all detention applications.

2.4 POWER TRANSFERS

A. Acceptable manufacturers and respective catalog numbers:

1.	Von Duprin	No Substitution
Concealed Ten Wire	EPT-10	

2.5 LOCKS AND LATCHES

A. Acceptable manufacturers and respective catalog numbers:

		Schlage	No Substitution
1.	Grade 1 Mortise	L Series	
2.	Grade 1 Cylindrical	ND Series	
3.	Grade 1 Deadbolt	BC600 Series	
4.	ND-Series Maintenance Kit	40-097	
5.	L-Series Maintenance Kit	40-054	

B. All locks to be SFIC compatible.

C. Mortise lock is preferred lock type.

D. For renovation projects, contact the County’s Security & Access Division for type and series of lock.

E. 1ea. L-lock or ND-lock maintenance kit for new construction or large renovations.

2.6 KEYING

A. Acceptable manufacturers and respective catalog numbers
   1. Best — No Substitution
   2. SFIC 7 Pin Uncombinated :"TB"

B. All locks and cylinders shall be provided with interchangeable cores.

C. Best SFIC uncombinated cores provided from the awarded door hardware distributor.

D. All permanent cores shall be provided to the County's Security & Access Division for keying purposes.

E. All locks under this section shall be keyed by the County's Security & Access Division.

F. Provide all locks and cylinders in the keyway as required to accommodate owners existing key system.

G. Provide all exterior doors and (4) additional doors with temporary construction cores for use during construction.

H. The County's Security & Access Division shall replace temporary construction cores with permanent cores. Temporary cores shall be turned over to the County's Security & Access Division.

I. Furnish a total of 2 uncut keys per lock cylinder to the county's Security & Access Division. Actual cut keys to be determined by the County's Security & Access Division.

2.7 CLOSERS

A. Acceptable manufacturers and respective catalog numbers:
   1. LCN 4040XP — No Substitution

B. Closers shall use high strength cast iron cylinders, forged main arms, and 1 piece forged steel pistons.

C. Closers shall utilize a stable fluid withstanding temperature range of +120deg F to -30deg F without seasonal adjustment of closer speed to properly close the door. Closers for fire-rated doors shall be provided with temperature stabilizing fluid that complies with standards UL10C.

D. Pressure Relief Valve, PRV, shall not be acceptable.

2.8 KICK PLATES AND MOP PLATES

A. Acceptable manufacturers
   1. Hiawatha
   2. Ives
   3. Hager

B. Furnish protective plates as specified in hardware groups.

C. Where specified, provide 10" kick plates, 36" armor plates, and 4" mop plates. Unless otherwise specified, metal protective plates shall be .050" thick; plastic plates shall be 1/8" thick.

D. Protective plates shall be 2" less door width, or 1" less door width at pairs. All protective plates shall be beveled 4 sides and counter sunk. Protection plates over 16" shall not be provided for labeled doors unless specifically approved by door manufacturers listing.

E. Where required by adjacent hardware, protection plates shall be factory drilled for cylinders or other mortised hardware.

2.9 WEATHERSTRIP, THRESHOLDS, GASKETING

A. Acceptable manufacturers and respective catalog numbers:

	Pemko	NGP	Reese
1 Weatherstrip	45041	A626	958
2 Top Jamb Gasket	290PK	701EP	856
3 Adhesive Gasket	S88	5050	797
4 Meeting Edge Seals	18041	9605	959
5 Adhesive Edge Seal	S77	5060	****
6 Automatic Door Bottom	4131	222	370
7 Sweeps	18061_NB	B606	964
8 Sweep w/ drip	345A (Brush)	C627A	354A
9 Drip Cap	346	16	R201

B. Top jamb gasket to be installed continuously at top of frame prior to closer installation for uninterrupted seal.

C. Coordinate finish to match doors (IE: bronze, or clear aluminum) in aluminum door/frame section

2.10 THRESHOLDS

A. Acceptable manufacturers and respective catalog numbers:

	Pemko	NGP	Reese
1 Saddle Thresholds	171	425	S205

2.11 ELECTRIC STRIKES

A. Von Duprin
1. 6210 For Mortise Locks
2. 6211 For Cylindrical Locks
3. 6223 For Mortise or Cylindrical In Double Doors (Wood or Metal)

B. H.E.S.
1. 9400 For Rim Exit Devices
2. 9600 For Rim Exit Devices
3. 9500 For Rim Exit Devices On Fire Rated Doors & Frames

2.12 DOOR POSITION SWITCHES

A. Acceptable manufacturers and respective catalog numbers:

	Schlage Electronics	Sentrol
1 Concealed	679 Series	1076W

2.13 KEY CABINETS

A. Acceptable manufacturers and respective catalog numbers:

	Key Control	Telkey
1 1200-1205 AA	M228-2480	RWC-AWC

B. Furnish 1 each model 1200 or 1205 AA key cabinet with a capacity 1.5 times the number of key sets.

C. Provide one key cabinet with at least one hook for each key set, plus additional hooks for 50% expansion.

D. Furnish key cabinet complete with cam lock, permanent key tags, and change key cards

2.14 FINISHES AND BASE MATERIALS

A. Unless otherwise indicated in the hardware groups or herein, hardware finishes shall be applied over base metals as specified in the following finish schedule:

	HARDWARE ITEM	BHMA FINISH AND BASE MATERIAL
1.	Butt Hinges: Exterior, or Non-Ferrous	630 (US32D)
2.	Butt Hinges: Interior	652 (US26D)
3.	Continuous Hinges	630 (US32D)
4.	Flush Bolts	626 (US26D)
5.	Exit Devices	626 (US26D)
6.	Locks and Latches	626 (US26D)
7.	Pulls and Push Plates/Bars	630 (US32D)
8.	Coordinators	600 (Prime painted or mill alum.)
9.	Closers	689 (Powder Coat Aluminum)
10.	Protective Plates	630 (US32D)
11.	Overhead Stops	630 (US32D)
12.	Wall Stops and Holders	630 (US32D)
13.	Thresholds	628 (Mill Aluminum)
14.	Weather-strip, Sweeps Drip Caps	Aluminum Anodized
15.	Magnetic Holders	Sprayed Aluminum
16.	Magnetic Locks	628 (US28)
17.	Miscellaneous	626 (US26D)

2.15 FABRICATION

A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rating labels and as otherwise approved by Architect.
1. Manufacturer's identification is permitted on rim of lock cylinders only.

B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.

C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
3. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.16 ADDITIONAL NOTES

A. All existing hardware to be removed and turned over to the owner as directed.

B. Install all hardware with manufacturer’s provided fasteners.

C. The hardware supplier must supply opening specific electrical diagrams covering the application specified. These must be submitted with the shop drawings to the Architect as well as the General Contractor for installation and a copy retained for the owner’s file.

D. All hardware must comply with the current fire, safety listings, and codes and must bear labels from UL, WH or other recognized testing agency.

E. All Architectural hardware shall be manufactured no earlier than 6 months prior to shipping to job site for installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
1. Standard Steel Doors and Frames: ANSI/SDI A250.8.

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

C. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

1. Do not notch perimeter gasketing to install other surface-applied hardware.

D. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

E. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.3 FIELD QUALITY CONTROL

A. Independent Architectural Hardware Consultant: Engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.
1. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.4 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Warranty Adjustment: 11 months after substantial completion, adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.5 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.6 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

3.7 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain door hardware.

3.8 DOOR HARDWARE SCHEDULE

A. Furnish hardware items in the amount indicated unless additional hardware is required for a complete and operable facility. Ensure completeness, proper function, and proper application of hardware for each door.

Hardware Group 01 (Exterior, Single Aluminum Framed Entrance Door and Frame)
Each door shall have:

4 each	Butt Hinges	as Required
1 each	Mortise set – Storeroom function	
1 each	Cylinder	
1 each	Surface Closer	
1 each	Kick Plate	
1 each	Rain Drip	By Door Supplier
1 set	Door Sweep	By Door Supplier
1 set	Weatherstripping	By Door Supplier
1 each	Threshold	By Door Supplier

Hardware Group 02 (Exterior, Single Aluminum Framed Entrance Door and Frame with Access Control)
Each door shall have:

1 each	Power Transfer	
1 each	Electric Strike	Fail Secure
1 each	Door Position Switch	
4 each	Butt Hinges	as Required
1 each	Mortise set – Storeroom function	
1 each	Cylinder	
1 each	Surface Closer	
1 each	Kick Plate	
1 each	Rain Drip	By Door Supplier
1 set	Door Sweep	By Door Supplier
1 set	Weatherstripping	By Door Supplier
1 each	Threshold	By Door Supplier

COORDINATE KEYPAD/ACCESS DEVISE WITH COUNTY.

Hardware Group 03 (Exterior, Single Hollow Metal Frame, Wood Door) **ALTERNATE**
Each door shall have:

4 each	Butt Hinges	as Required
1 each	Mortise set – Storeroom function	
1 each	Cylinder	
1 each	Surface Closer	
1 each	Kick Plate	
1 each	Rain Drip	
1 set	Door Sweep	
1 set	Weatherstripping	
1 each	Threshold	

END OF SECTION 08 71 00

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes:
   1. Glass for windows.
   2. Glazing sealants and accessories.

1.3 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. IBC: International Building Code.

D. Interspace: Space between lites of an insulating-glass unit.

1.4 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.6 INFORMATIONAL SUBMITTALS

A. Product Certificates: For glass.

B. Sample Warranties: For special warranties.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
   1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

1.9 WARRANTY

A. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
   1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. 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:
   1. AGC Glass Company North America, Inc.
   2. Cardinal Glass Industries.
   3. Guardian Industries Corp.; SunGuard.
   4. Oldcastle BuildingEnvelope™.
   5. Pilkington North America.
   6. PPG Industries, Inc.
   7. Viracon, Inc.

B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.

C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300.
   1. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.
      a. Basic Wind Speed: 90 mph.
   2. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

C. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
   1. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
   1. GANA Publications: "Glazing Manual."
   2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Thickness: Where glass thickness is indicated, it is a minimum.
   1. Minimum Glass Thickness for Exterior Lites: 6 mm.

D. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.

B. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
   1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

C. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
   1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.5 INSULATING GLASS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.
   1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
   2. Spacer: Manufacturer's standard spacer material and construction.
   3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.6 GLAZING SEALANTS

A. General:
   1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
   2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
      a. Dow Corning Corporation; Dow Corning® 790 Silicone Building Sealant.
      b. GE Construction Sealants; Momentive Performance Materials Inc.; SCS2700 SilPruf LM.
      c. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex Sil 290.
      d. Pecora Corporation; 890NST.
      e. Sika Corporation; SikaSil WS-290.
      f. Tremco Incorporated; Spectrem 1.

2.7 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
   1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.

2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.8 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.9 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.

3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where length plus width is larger than 50 inches.
1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.6 CLEANING AND PROTECTION

A. Immediately after installation remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
   1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.7 INSULATING GLASS SCHEDULE

A. Glass Type **GL-1**: Clear insulating glass.
   1. Overall Unit Thickness: 1 inch.
   2. Minimum Thickness of Each Glass Lite: 6 mm.
   3. Outdoor Lite: Annealed float glass.
   4. Clear Low-E Coating: Pyrolytic on second surface.
   5. Interspace Content: Air.
   6. Indoor Lite: Annealed float glass.

B. Glass Type **GL-1T**: Clear insulating glass (Safety glass).
   1. Overall Unit Thickness: 1 inch.
   2. Minimum Thickness of Each Glass Lite: 6 mm.
   3. Outdoor Lite: Fully tempered float glass.
   4. Clear Low-E Coating: Pyrolytic on second surface.
   5. Interspace Content: Air.
   6. Indoor Lite: Fully tempered float glass.
   7. Safety glazing required.

END OF SECTION 08 80 00

ARCHITECTURAL AND STRUCTURAL CONDITIONS REPORT

former Olmsted County Highway Department Shop
1407 3rd Avenue SE
Rochester MN 55904

for

Olmsted County
151 4th Street SE
Rochester MN 55904-3710

KANE AND JOHNSON ARCHITECTS, INC.
2460 Highway 63 North, Suite 100, Rochester, MN 55906
(507) 288-1839 fax (507) 288-1830
email: jcoyle@kjarchitects.com

Project Number: 2013405

Issue Date: September 18, 2013
Revised: October 2, 2013
Revised: June 2, 2014

KANE AND JOHNSON ARCHITECTS, INC.
ROCHESTER, MN • MINNEAPOLIS/ST. PAUL, MN

KANE AND JOHNSON ARCHITECTS, INC.
2460 Highway 63 North • Suite 100 • Rochester, MN • 55906
507/ 288-1839 • Fax 507/ 288-1830 • email info@kjarchitects.com

September 18, 2013 (Revised October 2, 2013; June 2, 2014)

Scott Vreeman, Assistant Facilities Manager
Olmsted County Building Operations
151 4th Street SE
Rochester MN 55904-3710
(507) 328-7742 Telephone
(507) 328-7962 FAX

Project Name: **Olmsted County 1407-Building (former Highway Department Shop) Roof and Wall Repairs**

Work Description: **Architectural and Structural Condition Report**

Mr. Scott Vreeman,

The intent of this inspection report is to document the existing conditions of the building located at 1407 3rd Avenue S.E. in Rochester, Minnesota and provide our professional opinion of the building condition, repair recommendations and re-construction phasing.

This report is based on casual observations for a synopsis of the general condition. It is not intended to be used as a construction document.

If our recommendations are implemented then further investigations, tests, and inspections may be necessary to complete Construction Documents prepared for the specific work items described herein.

Sincerely,

David I. Kane, President

JTC/slm/2013405/210/2013-09-18

Table of Contents

A. INTRODUCTION AND EXECUTIVE SUMMARY

This section does not address mechanical, electrical, civil or interiors conditions.

1. Introduction

On June 26, 2013, Kane and Johnson Architects, Inc. was retained to prepare an existing conditions report for the building owned by Olmsted County located at 1407 3rd Avenue in Rochester, Minnesota. The building is currently used for equipment and vehicle storage and was formerly the County Highway Department Maintenance Shop.

In the course of this effort, the Architect and Structural Engineer made three site visits to investigate and document the condition of the building.

2. Executive Summary

This effort is an Architectural and Structural Conditions Report. The intention is to provide our professional opinion as to the current condition of the building and offer the Owner short-term and long-term construction recommendations. Within this report are:

A. Short-term recommendations in order to stabilize the building structure, specifically the roof and exterior walls; and
B. Long-term recommendations in order to rehabilitate and extend the useful life of the building shell.

3. Subject Property

See Existing Conditions

A. East Building - 1938: Original Building. The original building was constructed in 1938 as a W.P.A. work project designed by A.C. Leonard, County Engineer and Peter P. Bross, Consulting Architect. This garage building is built as follows:
   1) Footprint: Approximately 83'-6" wide and 98'-0" long
   2) Foundations: Cast in place concrete.
   3) Walls: Limestone clad CMU block walls
   4) Trusses: Steel bow string with 2x10 wood joists roof assembly.
   5) Floors: 8" poured in place concrete slab, built in trench drains.
   6) Barrel Roof: EPDM rubber roof (1992, Marsh Roofing).
   7) Windows: Aluminum storefront frames with 1" insulated glass. These appear to be replacement windows installed in the last 15-years approximately. The east wall windows appear to be greater than 30-years old approximately.

Existing Conditions/Repair Needs Summary

The building's exterior walls and roof appear to be structurally sound with exception to select areas of the limestone in need of minor to moderate repair.

The roof has extensive leaks throughout and needs short-term repairs in order to prevent further damage to the building's structure. The roofing should be replaced within the next three-years to avoid substantial maintenance costs and potential damage to the wood roof deck and joist assembly.

B. West Building – 1958: Addition. This addition was constructed in 1958 as a Maintenance Building Expansion designed by Daniel M. Robbins & Associates - Architects. This building is constructed as follows:
   1) Footprint: Approximately 83'-6" wide and 82'-0" long.

2) Foundations: Cast in place concrete.
3) Walls: Brick veneer on CMU block walls.
4) Trusses: Steel bar joist, steel deck with suspended liner panels.
5) Floors: 8" poured in place concrete slab, built in trench drains.
6) Roof: EPDM rubber roof, ½" fiberboard, 3-1/2" expanded polystyrene insulation and ½" perlite over steel roof deck.
7) Windows: Aluminum storefront frames with 1" insulated glass. These appear to be replacement windows installed in the last 15-years approximately.

Existing Conditions/Repair Needs Summary

The building's exterior walls and roof appear to be structurally sound with exception to select areas of the CMU and brick veneer which need minor to moderate repair.

The roof has extensive leaks throughout and needs short-term repairs in order to prevent further damage to the building's structure. The roofing should be replaced within the next three-years to avoid substantial maintenance costs and potential damage to the structural elements of the roof and wall systems.

B. DATA COLLECTION EFFORT

1. Review of Existing Construction Documents
   Documents provided by the Owner were:
   A. East Building, construction documents prepared by A.C. Leonard, County Engineer and Peter P. Bross, Consulting Architect. Plans dated 1938.
   B. West Building, construction documents prepared by Daniel M. Robbins, Architect. Plans dated 1958.

2. Casual On-Site Observations
   Three site visits were performed by the Architect and Structural Engineer to verify existing conditions and discuss various aspects of the project.

1st Site Visit on June 26, 2013.

Present:

- Helen Monsees, Director of Building Operations, Olmsted County
- Daryl Fieck, Building Superintendent, Olmsted County
- Scott Vreeman, Assistant Facilities Manager, Olmsted County
- James Coyle, Project Manager, Kane and Johnson Architects, Inc.
- Al Hiniker, Structural Engineer, Structural Design Group, Inc.

Purpose: Walk the building site to determine short-term and long-term solutions to preserve the structural integrity of the roof and wall systems (known water infiltration issues). County Staff would like to determine necessary repairs, priorities of work and potential construction costs.

2nd Site Visit on July 10, 2013.

Present:

- Scott Vreeman, Assistant Facilities Manager, Olmsted County
- James Coyle, Project Manager, Kane and Johnson Architects, Inc.
- Al Hiniker, Structural Engineer, Structural Design Group, Inc.
- Micah Johansen, Schwickert's Tecta America

Purpose: Examine the roof components for both roof systems (barrel and flat) by means of test cuts to view cross section of each roof type. Samples were taken of roofing components to verify the presence of asbestos or other hazardous materials.

Findings:

a. The timber deck on the barrel roof appears to be in good condition, no evidence of decay in the sample area.
b. The steel deck on the addition appears to be in good condition, no significant evidence of failure in the sample area.
c. The cross section of building materials and a roof condition report for each roof has been prepared by Schwickert's Tecta America and is included as an appendix of this report.

3rd Site Visit on July 22, 2013.

Present:

- Scott Vreeman, Assistant Facilities Manager, Olmsted County
- James Coyle, Project Manager, Kane and Johnson Architects, Inc.
- Al Hiniker, Structural Engineer, Structural Design Group, Inc.

Purpose: Visual examination of exterior and interior walls for evidence of architectural and/or structural issues.

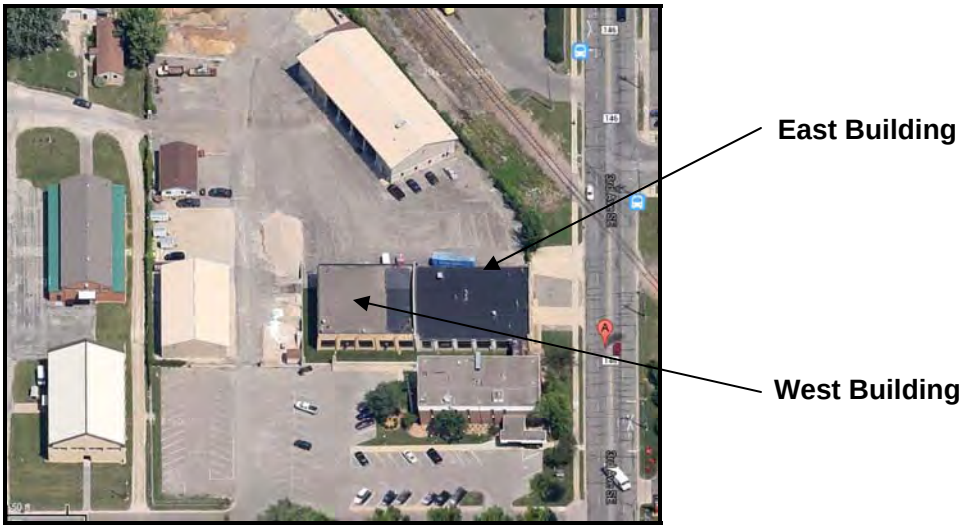
Findings:

a. Interior pilasters appear to be in good condition.
b. Interior/exterior brick wythe have some minor settling cracks that need repair.
c. Limestone walls are substantially in good condition with the exception of the east and west parapet wall areas (small areas of severe damage).
d. Precast concrete has severe decay exposing the wall cavity to water infiltration at:
    1) Wall coping (parapet walls). ***Immediate repair needed.***
    2) Window sills. ***Immediate repair needed.***

C. EXISTING FACILITY DESCRIPTION

1. Architectural Description – East Building
   - a. Construction Date: 1938 approximate
   - b. Area: 9,519 SF
     - 1) First Floor: 8,183 SF
     - 2) Second Floor: 1,336 SF
   - c. Foundation: Cast in place concrete.
   - d. Exterior Walls: Limestone clad block walls.
   - e. Trusses: Steel bow string with 2x10 wood joists roof assembly.
   - f. Ground Floor: 8" poured in place concrete slab, built in trench drains.
   - g. Barrel Roof: 50-mil EPDM VersiGuard rubber roof, ½" hard board, 2nd granular roof, 1st granular roof, ½" hard board, vapor barrier and 3x6 tongue and groove timber-deck.
   - h. Interior Walls: 8" poured in place reinforced concrete.
   - i. Level-2 Floor: 2x10 wood joists @ 12" on center.
   - j. Interior Ceilings: ½" insulation board.
   - k. Hazardous Materials: Roof underlayment. Other areas not determined.
   - l. Modifications: Yes. Link to south building. Date unknown.

2. Architectural Description – West Building
   - a. Construction Date: 1958 approximate.
   - b. Area: 6,847 SF
   - c. Foundation: Cast in place concrete.
   - d. Exterior Walls: Brick veneer on CMU block walls.
   - e. Trusses: Steel bar joist and 1-1/2 steel deck.
   - f. Ground Floor: 4" poured in place concrete slab, built in trench drains.
   - g. Flat Roof: EPDM rubber roof, ½" fiberboard, 3-1/2" expanded polystyrene insulation and ½" perlite over steel roof deck. Approximately 3/16" per 12" slope (7" in 40'-0").
   - h. Interior Walls: CMU (concrete masonry unit) block.
   - i. Interior Ceilings: Suspended metal liner panel.
   - j. Hazardous Materials: None in roof. Other areas not determined.
   - k. Modifications: Yes. Window replacement. Date unknown.



D. RECOMMENDED CONSTRUCTION AND WORK PHASING

Recommended Construction

Based on our observations the following short-term and long-term construction is recommended:

Immediate work necessary to stabilize specific building shell elements:

1. Patch and repair roof coverings. 1-3 Year interim repair.
2. Patch limestone façade at parapet walls. 1-5 Year interim repair.
3. Patch precast concrete roof coping at parapet walls. 1-10 Year interim repair.
4. Patch precast concrete window sills. 1-5 Year interim repair.
5. Replace window and door sealants. Permanent repair.

Projected work necessary to rehabilitate the building shell elements.

6. Replace roof coverings with a 20+ year roof membrane.
7. Repair all exterior limestone façade with full tuck pointing.
8. Replace damaged limestone facing pieces in areas of severe deterioration.
9. Replace precast concrete roof coping at parapet walls.
10. Replace precast concrete window sills.
11. Replace window sill sealants.
12. Repair damaged brick veneer and CMU block in exterior walls.
13. Resurface steel lintels with epoxy coating.
14. Install gutters and downspouts.
15. Rehabilitate the east wall windows to original condition.
16. Replace exterior entrance doors.
17. Provide safety barriers on west retaining wall.

Construction Phasing

To minimize disruption we suggest the following Construction Phasing sequence: temporary/short-term work to stabilize building elements, then long-term repairs to rehabilitate the building.

Phase 1: Stabilize roof element.	Items 1, 2 and 3.
Phase 2: Stabilize wall elements.	Items 4 and 5.
Phase 3: Rehabilitate roof and parapet.	Items 6 and 7.
Phase 4: Rehabilitate façade.	Items 8, 9, 10, 11, 12, 13 and 14.
Phase 5: Rehabilitate fenestrations.	Items 15 and 16.
Phase 6: Safety Barriers.	Item 17.

E. CONSTRUCTION COST ESTIMATE

	Ref.	Quantity	Unit of Measure**	Cost/Unit	Estimated Cost
Stabilization Work					
1) Patch and repair roof coverings.		16,600	SF	Quote	????
2) Roof A					
a. Repair membrane holes.	SP-1	8	EA		$600.00
b. Repair open laps in membrane flashing.	SF-9	16	EA		$1,050.00
c. Repair deteriorated/missing metal flashing sealant.	C-15	20	LF		$250.00
d. Replace loose/missing metal flashing fasteners	C-16	3	EA		$75.00
e. Repair failing seams.	SP-9	230	LF		$4,800.00
f. Secure HVAC stack.	C-37	1	EA		$400.00
g. Repair exposed AC lines.	C-37	1	EA		$250.00
h. Replace missing metal flashing.	C-13	1	EA		$250.00
i. Eliminate water entry at deteriorated stone wall.	C-33				TBD
3) Roof B					
a. Repair open laps in membrane flashing.	SP-9	160	LF		$3,400.00
b. Repair membrane shrinkage.	SP-7	2	EA		$3,900.00
c. Repair unbounded membrane laps.	SP-3	70	LF		$1,750.00
d. Repair membrane shrinkage and curb flashing displacement.	SP-7	30	LF		$2,750.00
e. Repair membrane holes.	SP-1	4	EA		$400.00
f. Repair membrane hole on roof drain.	SP-1	1	EA		$600.00
g. Repair deteriorated stone wall	C-33				Non-roof
1) Patch limestone façade at parapet walls.		40	SF	$45	$1,800
2) Patch precast concrete roof coping at parapet walls.		180	LF	$22	$3,960
3) New sheet metal wall cap and cavity wall framing.		180	LF	$55	$9,900
4) Patch precast concrete window sills.		192	LF	$15	$2,880
5) Replace window and door sealants.		400	LF	$4.50	$1,800
TOTAL STABILIZATION WORK					$20,340
Contingency				10%	
Architectural and Engineering Fee				15%	
Rehabilitation Work					
1) Replace roof coverings with a 20+ year roof membrane.		16,600	SF	$15	$249,000
2) Repair all exterior limestone façade with full tuck pointing.		2,100	SF	$19	$39,900

	Ref.	Quantity	Unit of Measure**	Cost/Unit	Estimated Cost
3) Replace damaged limestone facing in areas of severe deterioration.		125	SF	$45	$5,625
4) Replace precast concrete roof coping at parapet walls.		180	LF	$65	$11,700
5) Replace precast concrete window sills.		192	LF	$35	$6,720
6) Replace window sill sealants.		1400	LF	$4.50	$14,490
7) Repair damaged brick veneer and CMU block in exterior walls.		360	SF	$25	$9,000
8) Resurface steel lintels with epoxy coating.		180	LF	$8	$1,440
9) Install gutters and downspouts.		180	LF	$6.50	$1,170
10) Rehabilitate the east wall windows to original condition.		6	EA	$1,750	$10,500
11) Replace exterior entrance doors.		2	EA	$1,500	$3,000
12) Provide safety barriers on west retaining wall.		90	LF	$15	$1,350
TOTAL REHABILITATION WORK					$353,895
Contingency				10%	$35,390
Architectural and Engineering Fee				10%	$35,390
TOTAL CONSTRUCTION COST					$????

**SF: Square Foot; LF: Linear Foot; EA: Each

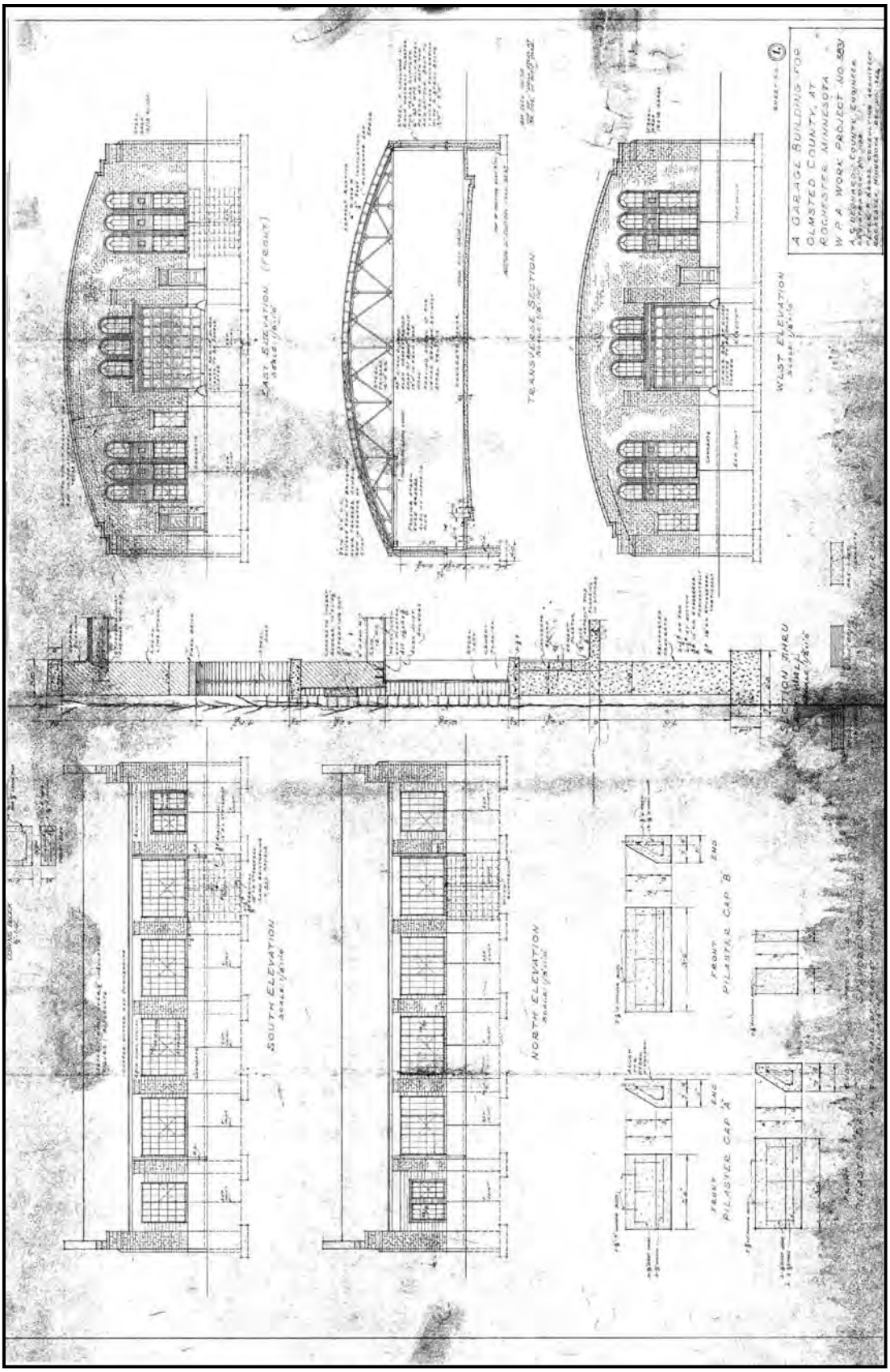
F. EXISTING FACILITY DRAWINGS

East Building – circa 1938 Building Plans.

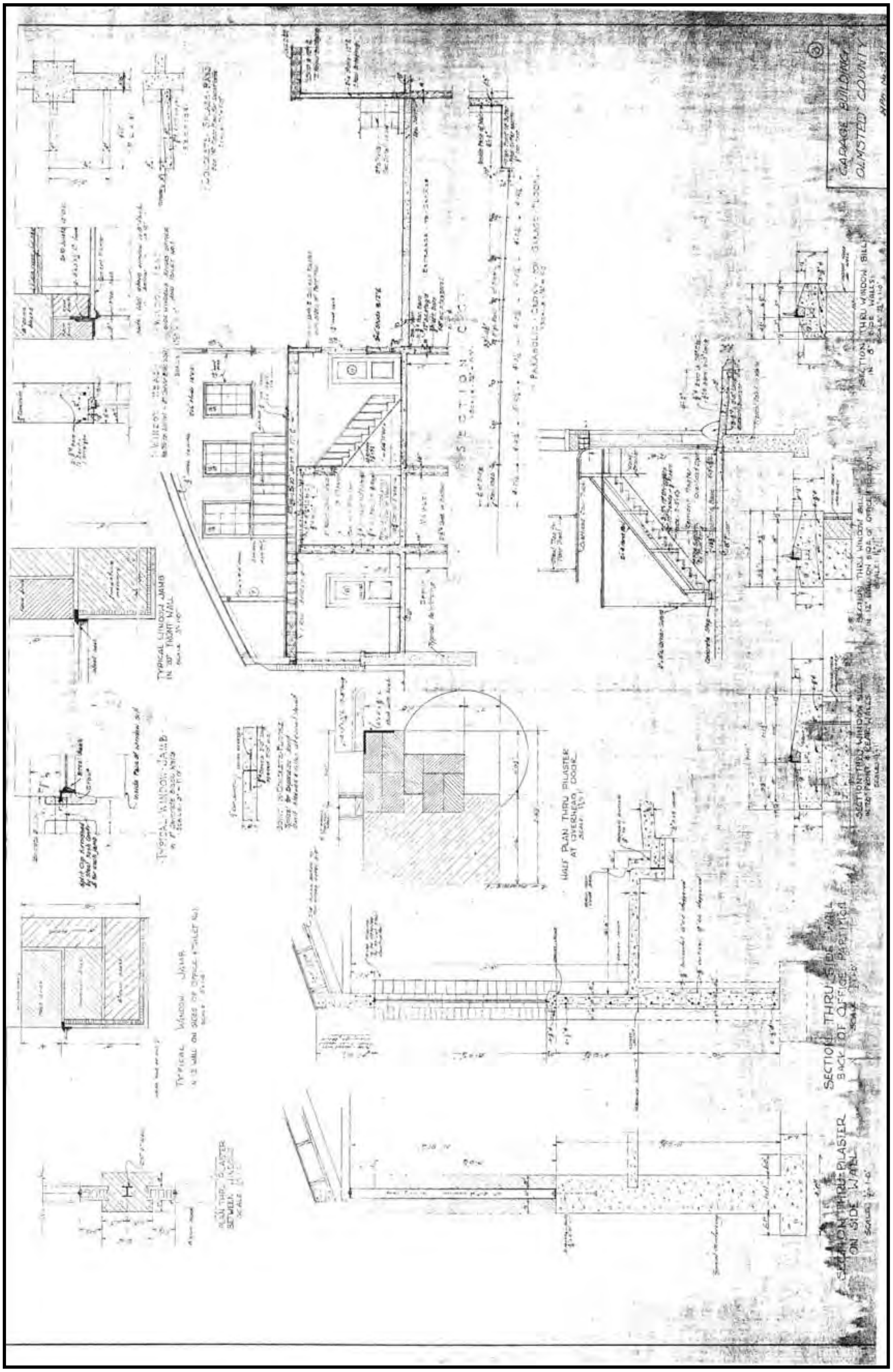
1 of 5 Exterior Elevations and Sections
2 of 5 Missing
3 of 5 Sections and Details
4 of 5 Sections and Details
5 of 5 First and Second Level Floor Plans

West Building – circa 1958 Building Plans (addition)

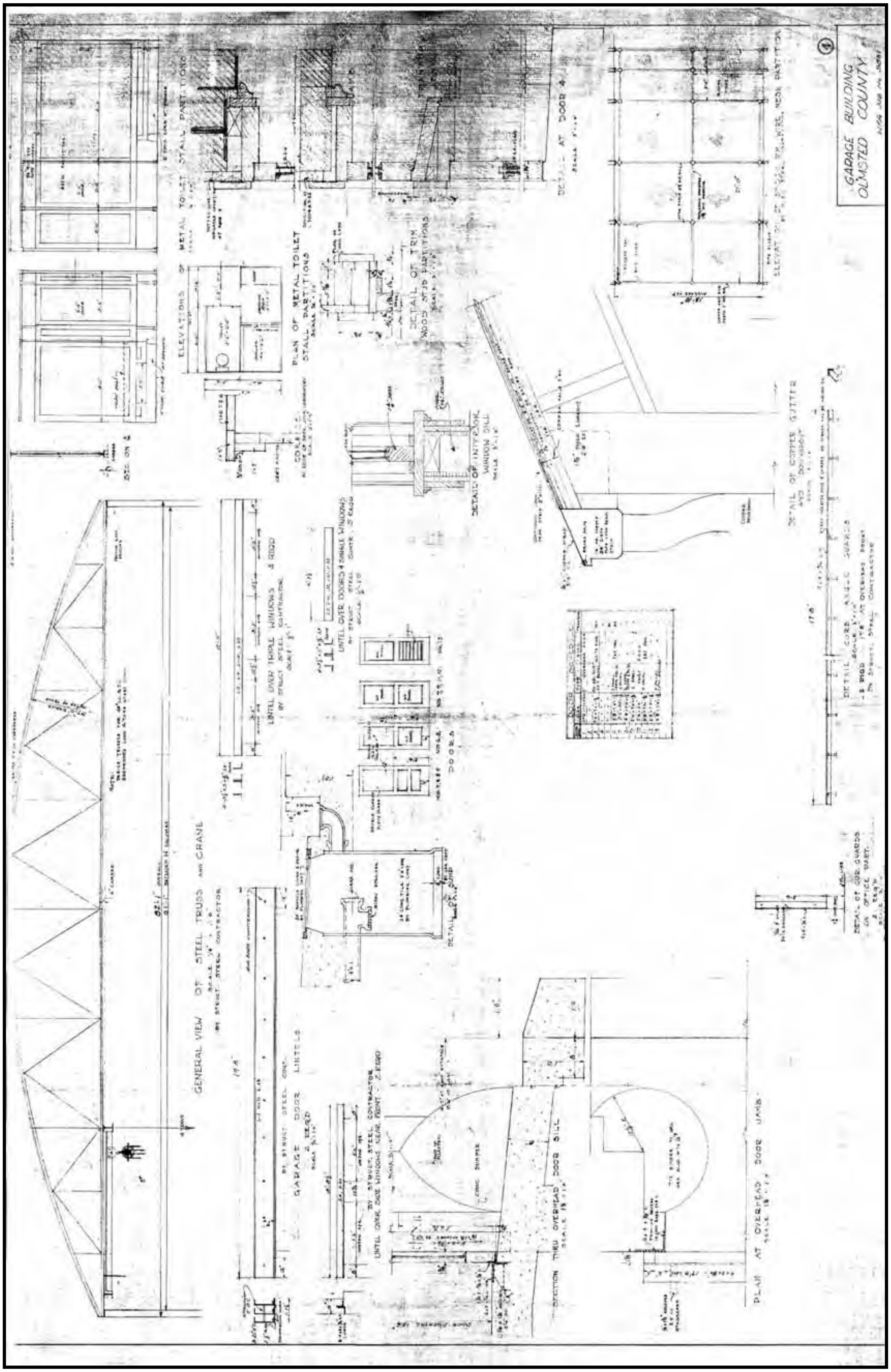
1 of 8 Site Plan
2 of 8 Foundation Plan
3 of 8 Floor Plan
4 of 8 Foundation Details
5 of 8 Building Sections
6 of 8 Exterior Elevations
7 of 8 Attendant Booth Plan and Sections
8 of 8 Electrical Plan



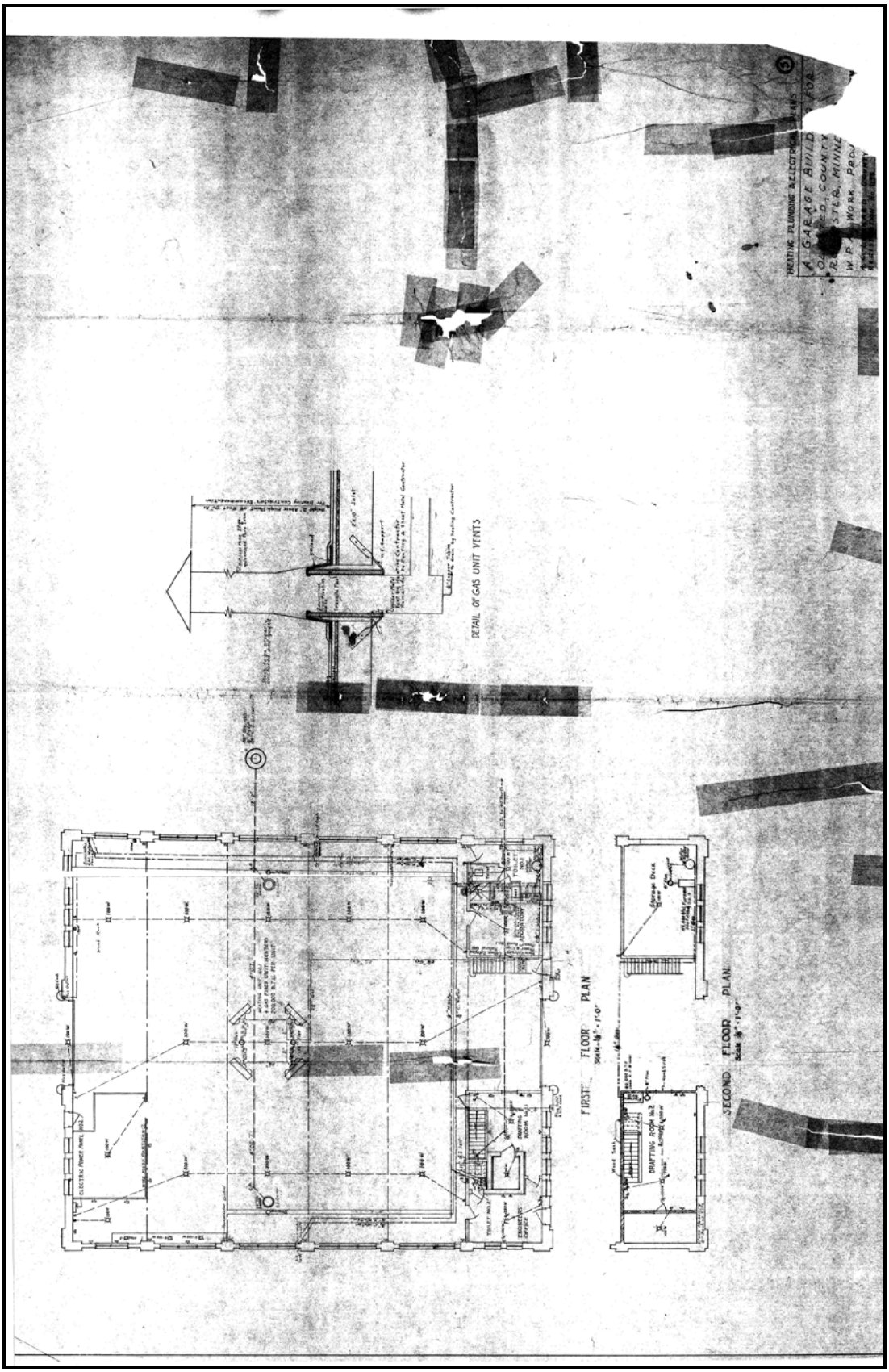
Existing Facility Drawings – East Building 1 of 5
Exterior Elevations



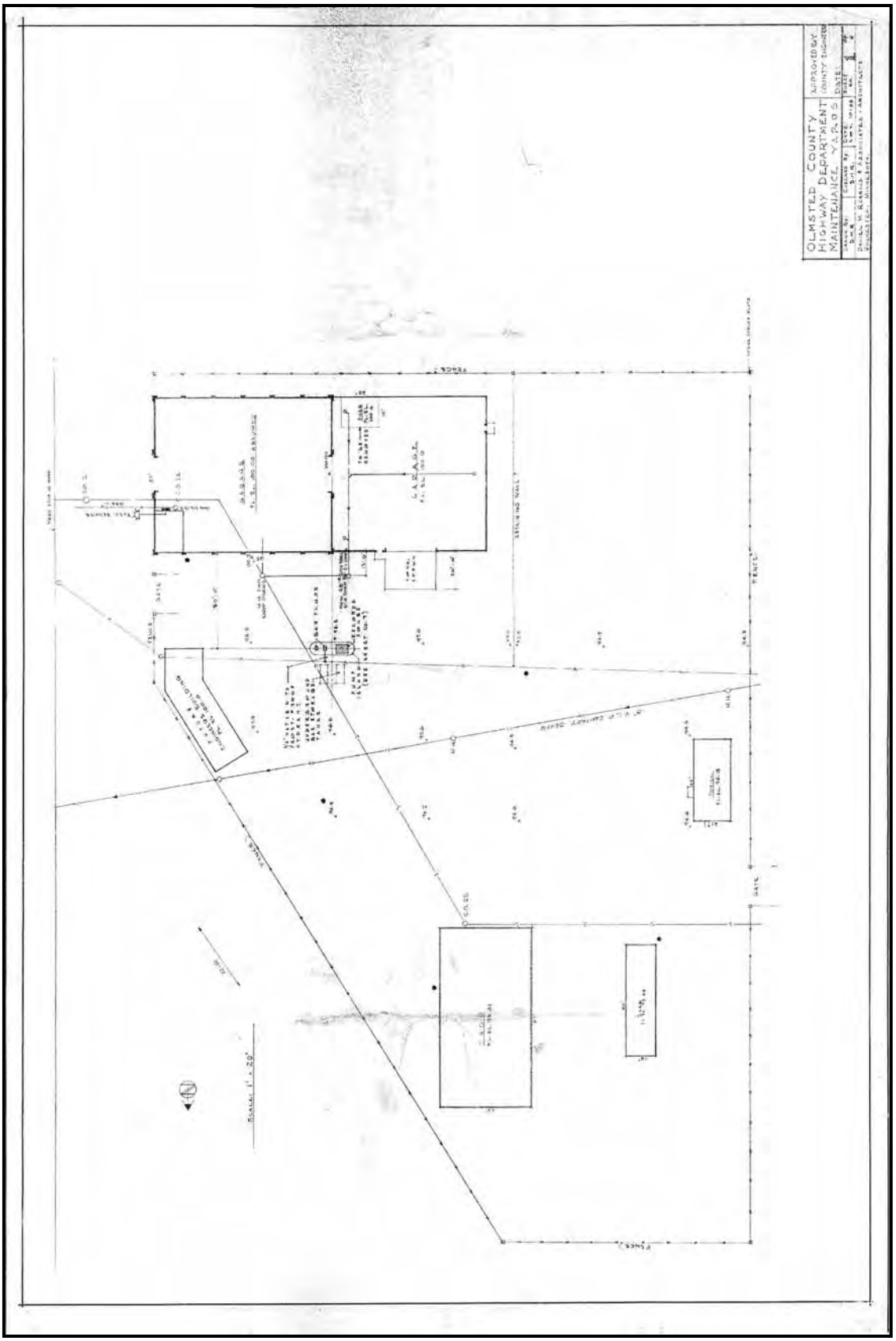
Existing Facility Drawings – East Building
Sections and Details



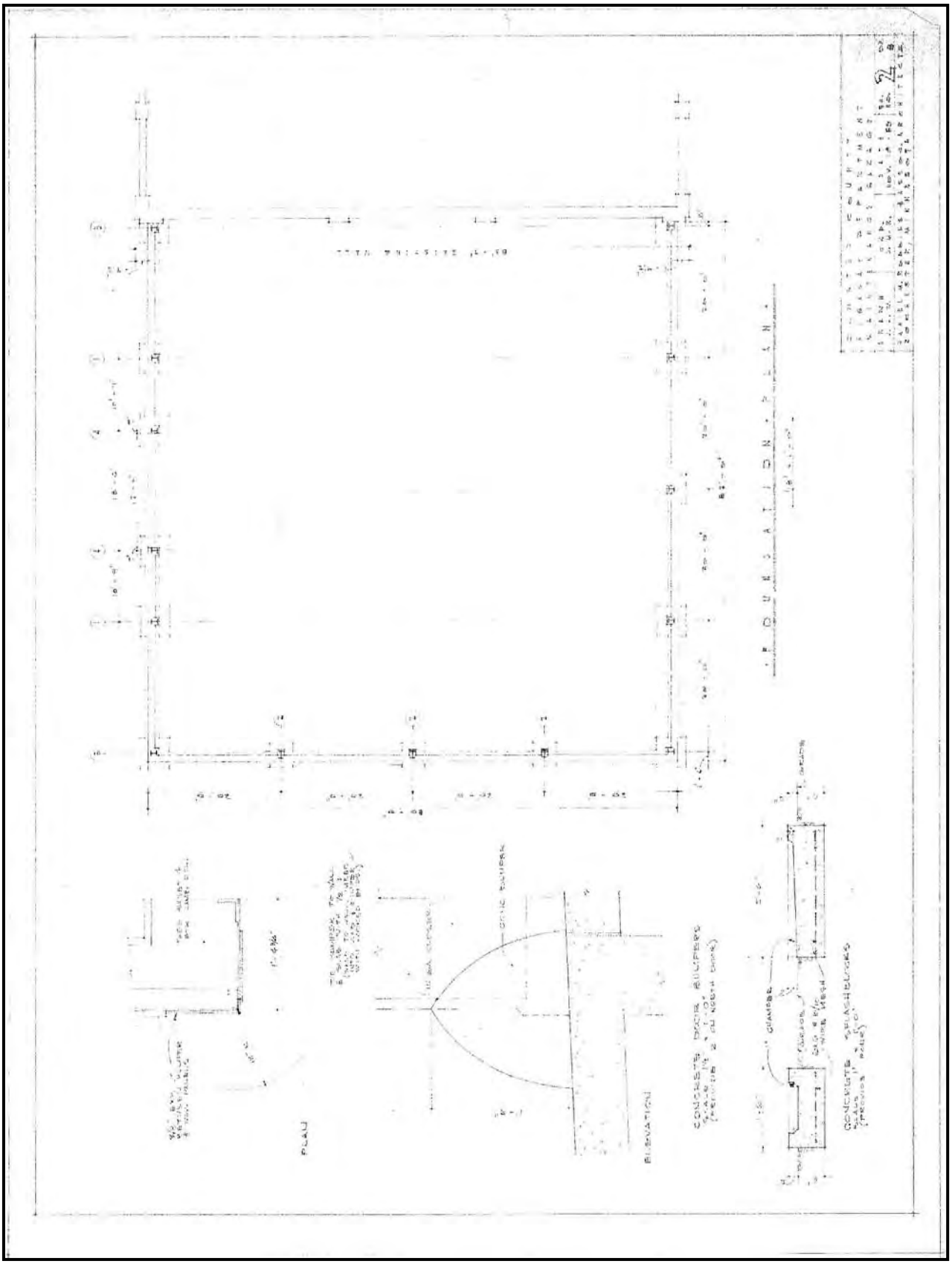
Existing Facility Drawings – East Building 4 of 5
Sections and Details



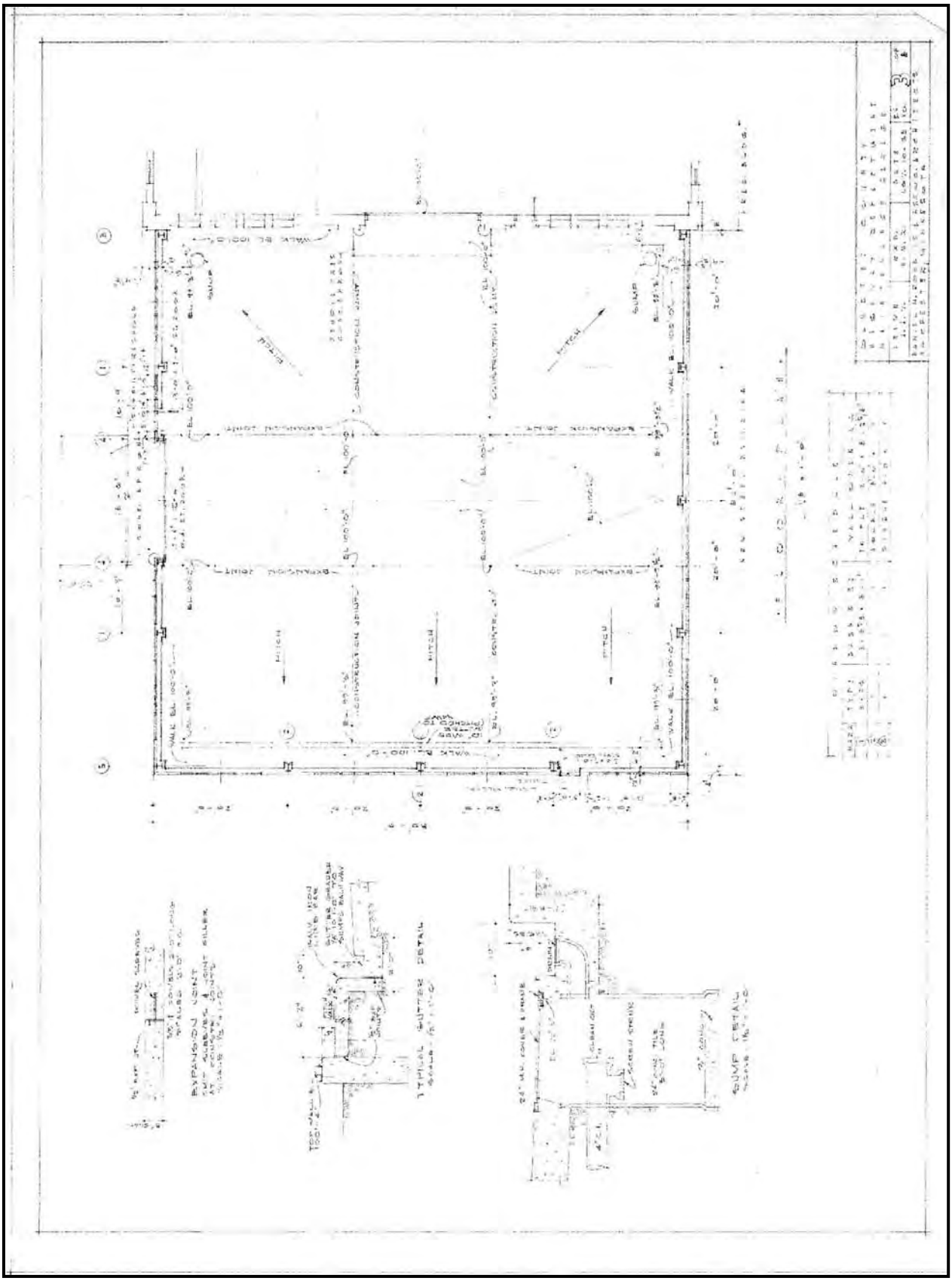
Existing Facility Drawings – East Building 5 of 5
First and Second Level Floor Plans



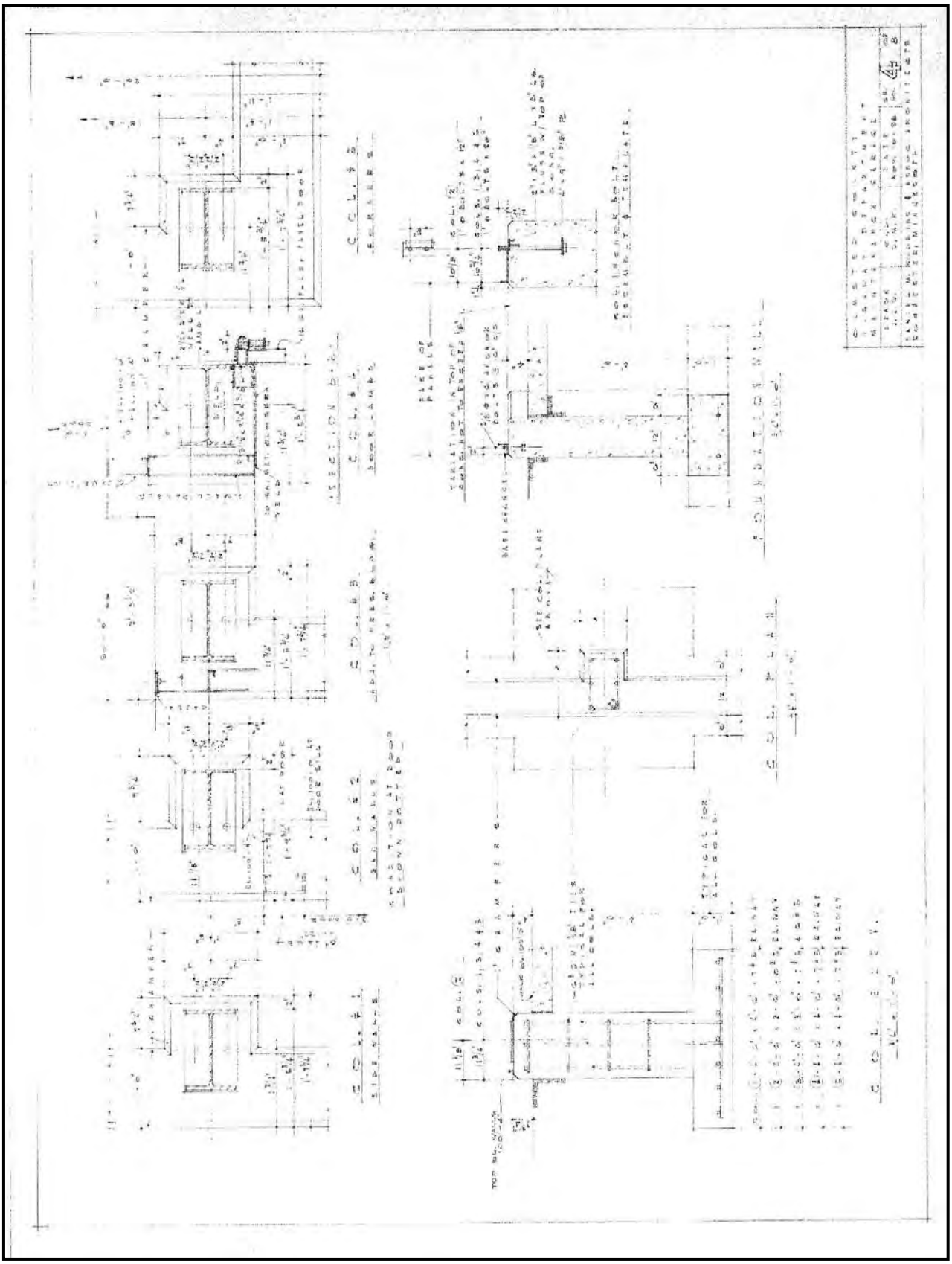
Existing Facility Drawings – West Building 1 of 8
Site Plan



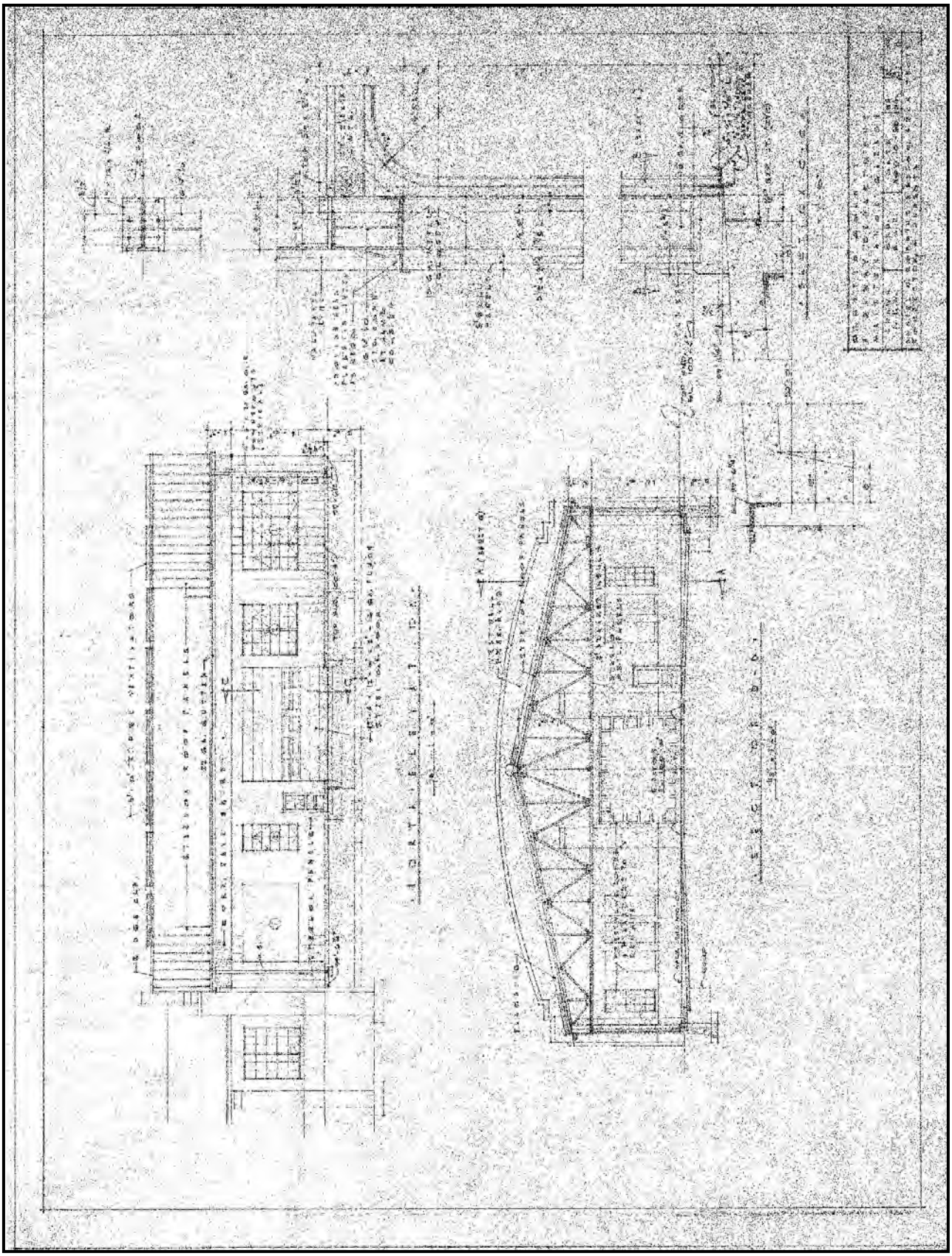
Existing Facility Drawings – West Building 2 of 8
Foundation Plan



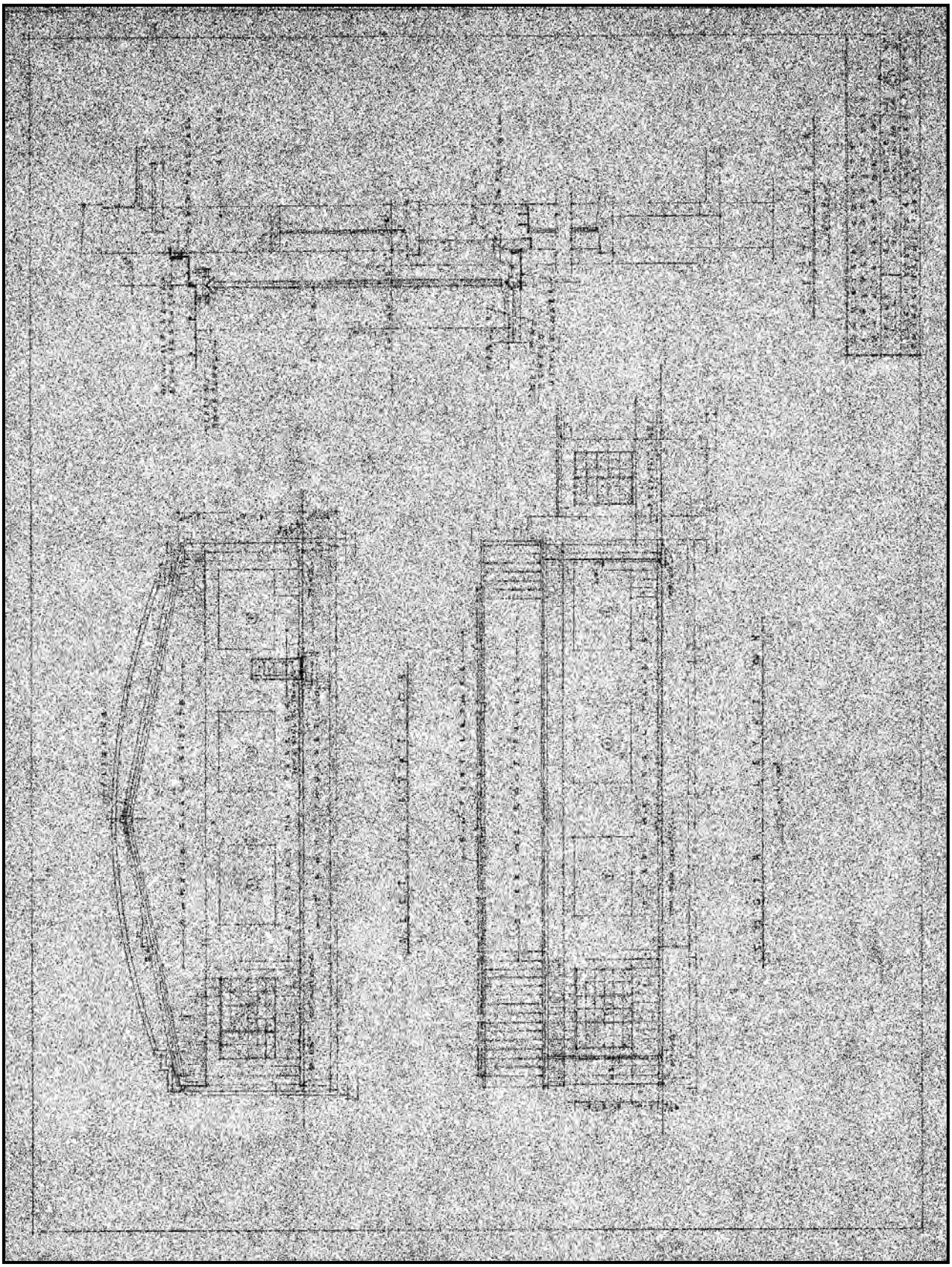
Existing Facility Drawings – West Building 3 of 8
Floor Plan



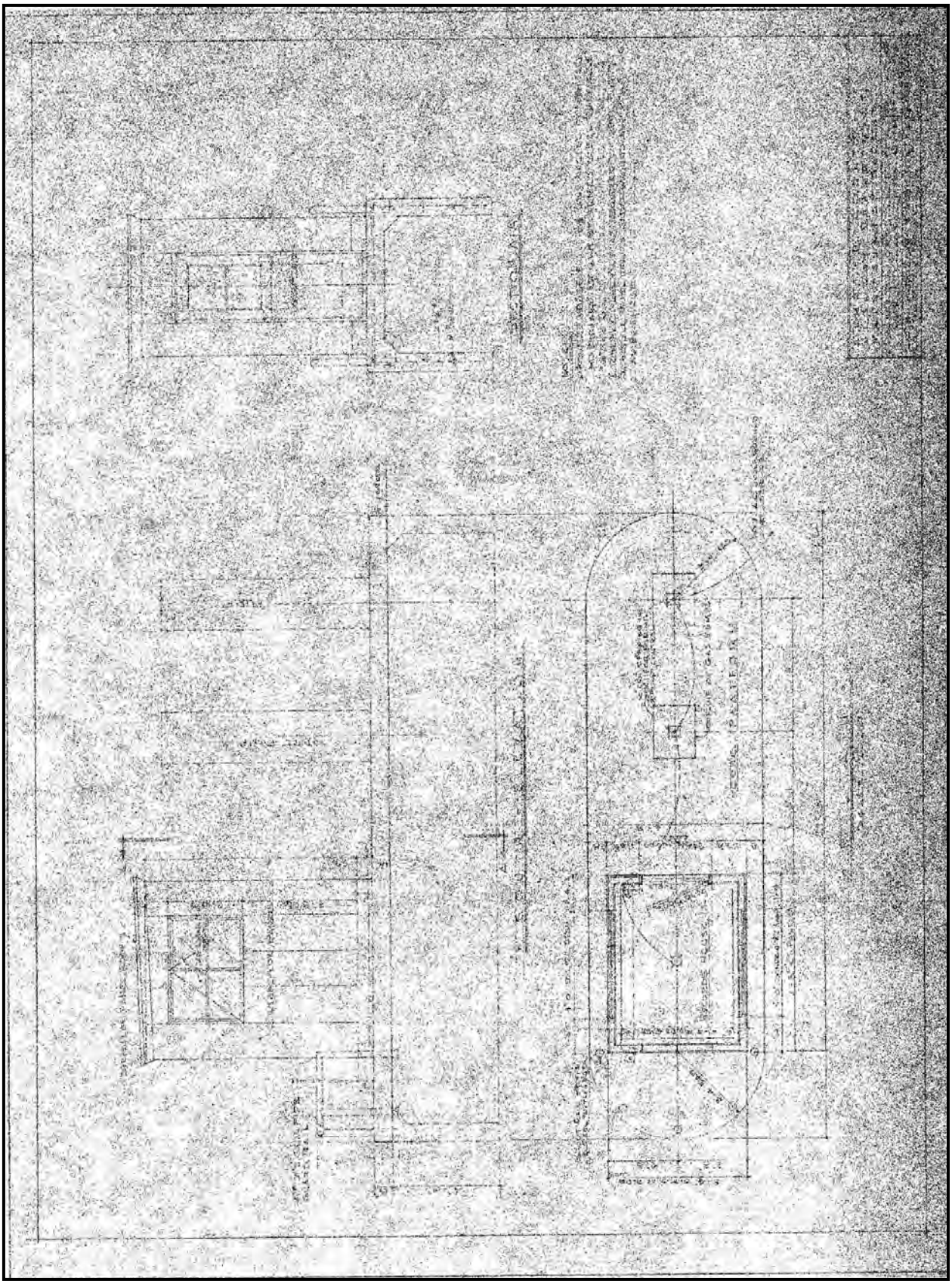
Existing Facility Drawings – West Building 4 of 8
Foundation Details



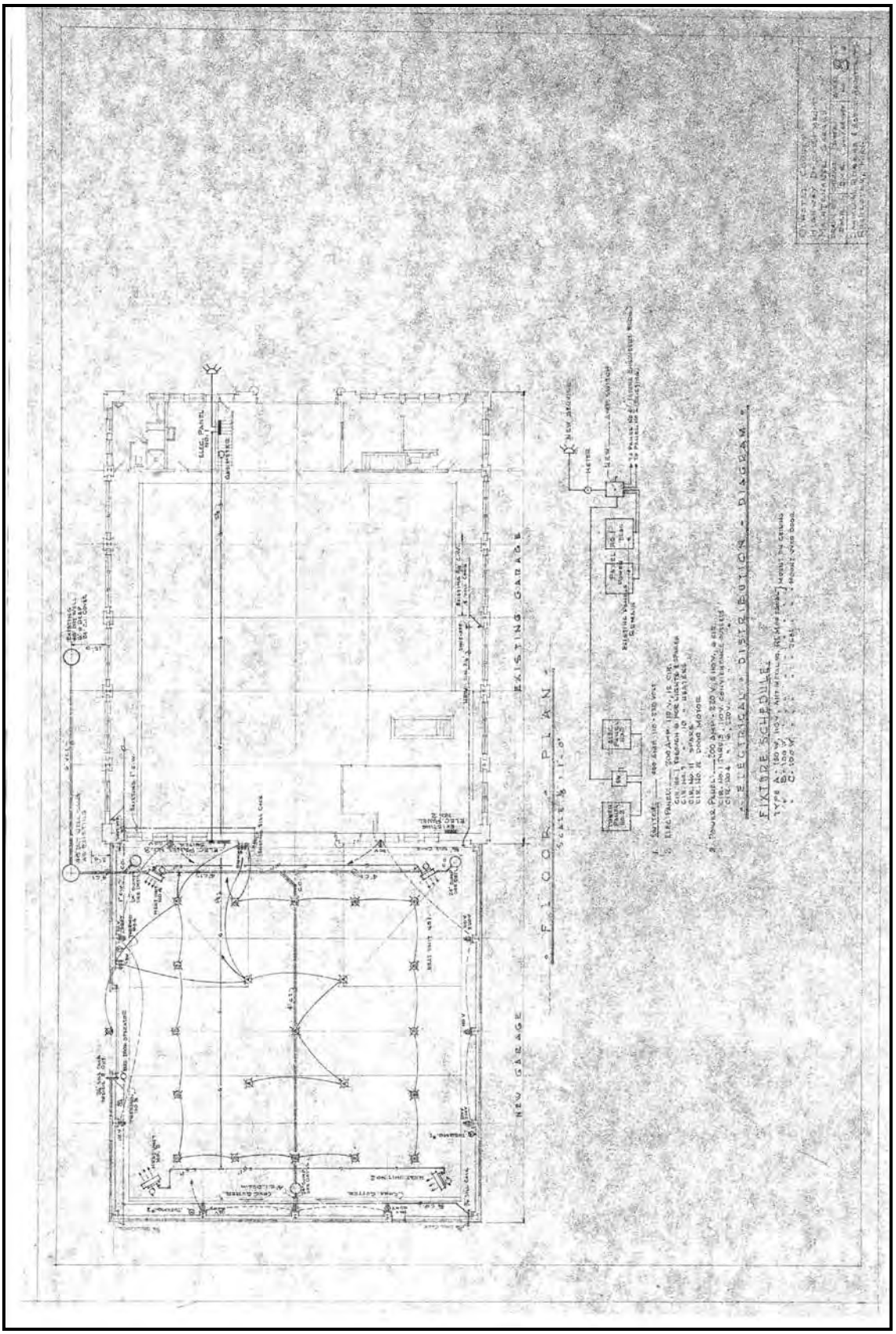
Existing Facility Drawings – West Building 5 of 8
Building Sections



Existing Facility Drawings – West Building 6 of 8
Exterior Elevations



Existing Facility Drawings – West Building 7 of 8
Attendant Booth Plan and Sections



Existing Facility Drawings – West Building 8 of 8
Electrical Plan

G. Existing Facility Photographs **East Building – 1938**

Photo #7: East wall parapet condition. EPDM over brick cavity.

Photo #8: East wall parapet condition. EPDM over brick cavity.

G. Existing Facility Photographs **East Building – 1938**

Photo #9: Roof EPDM identification number.

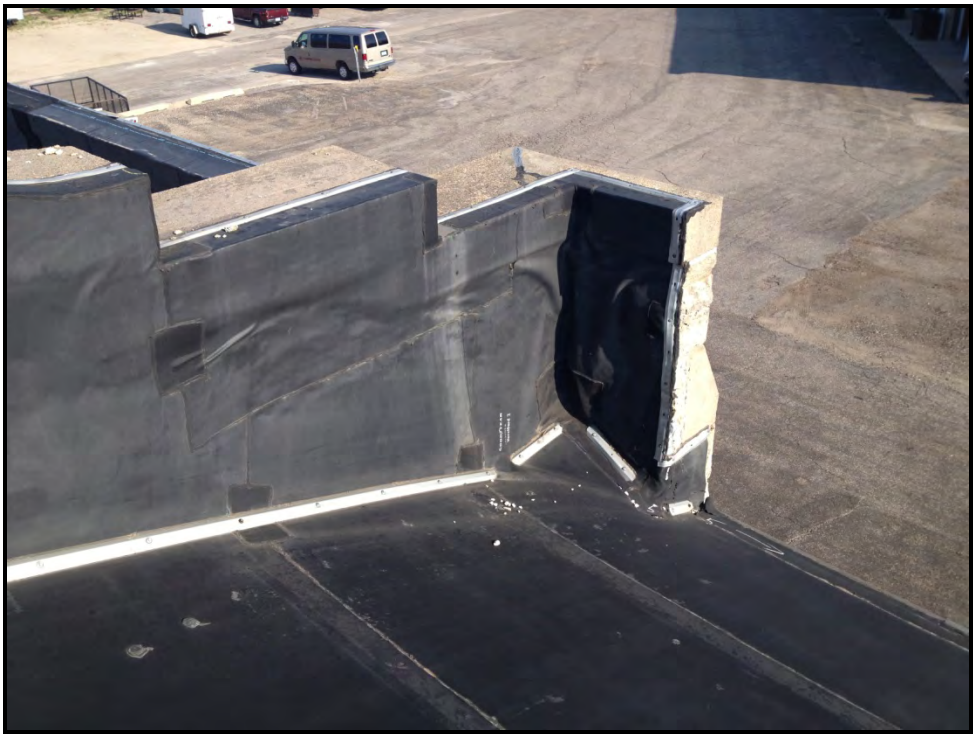


Photo #10: West wall parapet.

G. Existing Facility Photographs **East Building – 1938**

Photo #11: Addition to the west.

Photo #12: Addition to the west.

G. Existing Facility Photographs **East Building – 1938**

Photo #13: Roof perspective to the east.

Photo #14: Typical roof installation.

G. Existing Facility Photographs **East Building – 1938**

Photo #15: East parapet wall limestone condition.

Photo #16: East parapet wall limestone condition.

G. Existing Facility Photographs East Building – 1938

Photo #17: Interior elevation looking east.

Photo #18: Interior elevation looking east.

G. Existing Facility Photographs **East Building – 1938**

Photo #19: South Elevation with link addition beyond.

Photo #20: Typical window sill condition.

G. Existing Facility Photographs **West Building – 1958**

Photo #1: West Elevation – stress crack in brick veneer.

Photo #2: West Elevation – exit door and infill window unit.

G. Existing Facility Photographs **West Building – 1958**

Photo #3: North and South Elevations – roof condition at limestone pilaster.

Photo #4: North and South Elevations – window replacements and sill condition.

G. Existing Facility Photographs **West Building – 1958**

Photo #5: North and South Elevations – sill condition.

Photo #6: North and South Elevations – limestone pilaster condition.

G. Existing Facility Photographs **West Building – 1958**

Photo #7: North and South Elevations – limestone pilaster condition.

Photo #8: North Elevation – brick veneer and overhead door conditions.

G. Existing Facility Photographs **West Building – 1958**

Photo #9: North Elevation – overhead door conditions.

Photo #10: North Elevation – limestone and brick veneer condition.

G. Existing Facility Photographs **West Building – 1958**

Photo #11: North Elevation – overhead door conditions.

Photo #12: West Elevation – siding, door and window condition.

G. Existing Facility Photographs **West Building – 1958**

Photo #13: West Elevation – brick veneer condition. Needs safety barrier.

Photo #14: South Elevation – brick veneer and window sill condition.

G. Existing Facility Photographs **West Building – 1958**

Photo #15: South Elevation – limestone condition.

Photo #16: South Elevation – brick veneer condition.

G. Existing Facility Photographs **West Building – 1958**

Photo #17: South Elevation – brick veneer and parapet coping condition.

Photo #18: South Elevation – window sill condition.

G. Existing Facility Photographs **West Building – 1958**

Photo #19: West Elevation – stress crack in brick veneer.

Photo #20: West Elevation – stress crack in brick veneer.

G. Existing Facility Photographs **West Building – 1958**

Photo #21: West Elevation – stress crack in brick veneer.

Photo #22: West Elevation – stress crack in brick veneer.

H Appendices

1. Structural Condition Report – Structural Design Group 2-pages
2. Roof Inspection Report – Schwickert's Tecta America 12-pages
3. Roof Deficiencies Field Inspection – Schwickert's Tecta America 9-pages
4. Roof Test Cut Report – Schwickert's Tecta America 1-page
5. Asbestos Analysis – Schwickert's Tecta America 1-page

Structural Design Group
3270 19th Street NW STE 210
Rochester, MN 55901
(507) 529 5310
www.sdgmn.com

July 29, 2013

James Coyle
KJA Architects, Inc.
2460 HWY 63 North
Suite 100
Rochester, MN, 55906

RE: Olmsted County Building - 1407 Highway Shop Roof and Wall Repairs Study
SDG Project NO 13045

On June 26, and again on July 9, 2013 I was present with you and Rochester Park and Recreation Department Representative to review the current condition of the old County Highway Department Shop. My observations and recommendations are as follows:

Observations:

1. The building was constructed in two phases, the original built in 1938, and the addition to the west built in 1959.

2. The roof framing in both areas is of limited to view. The framing of the original building roof is presumed wood decking, and wood 2x10 joists at 24" c/c, supported on steel bow string shaped steel trusses spaced 16 ft. c/c spacing. The roof deck exposed during our roof inspection July 9th, showed the wood deck to be in good condition where inspected. No indication of deterioration of the steel truss or columns could be seen in our walk-thru.

3. The 1958 building addition roof framing is presumed to be constructed of steel decking, and steel bar joist. No sign of deterioration of the roof structure was noticed in our walk-thru. The construction documents for the addition indicated the roof as a pre-engineered steel frame structure. This appears to have been changed.

4. Moisture has entered, and continues to enter the building at the deteriorated roof membrane, exterior walls, and window sills and thru the top of the exterior stone walls.

5. The original building limestone exterior walls are deteriorating due to moisture in several locations. If un-abated, will continue to deteriorate the condition of the walls to a point of structural unstable. Hazard due to falling stone at the top of the walls is currently a reality. The condition of the original building stone parapet walls is severely deteriorated.

6. The west wall of the original building shows water staining due to water leakage.

7. The west wall of the addition is cracked in several locations, due to settlement.

8. The stone window sills are severely deteriorated.

Short Term Maintenance Recommendations:

1. Remove any loose stone in the original building parapet walls.

2. Install a metal flashing cap on the stone parapets to stop water infiltration.

3. Inspect the existing membrane roof, making repairs to all open membrane joints. Repair the roof penetration flashings at equipment and mechanical roof penetrations.

4. Provide temporary sealant to failed caulk joints at windows.

Long Term Maintenance Recommendations:

1. Replace the membrane roofing. Revise the roof edge detail.

2. Rebuild the original building stone parapet walls.

3. Rebuild the window sills.

4. Repair the flashings and glazing at all existing windows.

5. Repair cracked limestone walls.

6. Repair the deteriorated masonry west wall

The observations and recommendations here-in are limits to the noticeable deterioration of the building found at our walk-thru. No guarantee or warrantee of the building structure is given or implied.

Regards,

Alan R Hiniker P.E.

SCHWICKERT'S
TECTA AMERICA

Date: August 29, 2013

To: Olmsted County Facilities

2117 Campus Drive SE

Rochester, MN 55904

Re: 1407 Building

Attn: Helen, Scott and Daryl

Executive Summary: Schwickert's Tecta America has responded to Olmsted County Facilities request to assess the condition of the roofs at 1407 3rd Ave. SE. The roofs have had little maintenance in the recent past and are in poor condition. A reroof is recommended, but in case of budget constraints the issues detailed in the report are the most pressing concerns for water intrusion. A core cut has been taken on both roofs and wet insulation was found. Samples of unknown materials from Roof A were tested for asbestos and results are attached. Roof B contained no unknown substances.

Inspection Results

Roof A

Roof deficiency No. 1

SP-1 There are 8 locations of membrane holes. Our recommendation is to repair using compatible materials and manufacturer recommendations as outlined in **ARMA/NRCA/SPRI-***Repair Manual for Low-Slope Membrane Roof System.*

Schwickert's Tecta America LLC | P.O. Box 216 | Rochester, MN 55903-0216 | T: 507.281.0611 | F: 507.281.4209 | www.schwickerts.com

Roof deficiency No. 2

SP-9 There are 16 locations of open laps in membrane flashing. Our recommendation is to repair using compatible materials and manufacturer recommendations.

Roof deficiency No. 3

C-15 There is1 location of deteriorated or missing metal flashing sealant for 20 lineal feet. Our recommendation is to remove the deteriorated sealant and install new high quality sealant.

No Picture

Roof deficiency No. 4

C-16 There are 3 locations of loose or missing metal flashing fasteners. Our recommendation is to replace with new larger diameter screws with neoprene washers at existing screw locations.

No Picture

SCHWICKERT'S
TECTA AMERICA

Roof deficiency No. 5

SP-9 There are 2 locations of failing seams for 230 lineal feet. Our recommendation is to repair using compatible materials and manufacturer recommendations.

Roof deficiency No. 6

C-37 There is 1 location of HVAC stack that is not properly secured.

Roof deficiency No. 7

C-37 There is 1 location of exposed AC lines

Roof deficiency No. 8

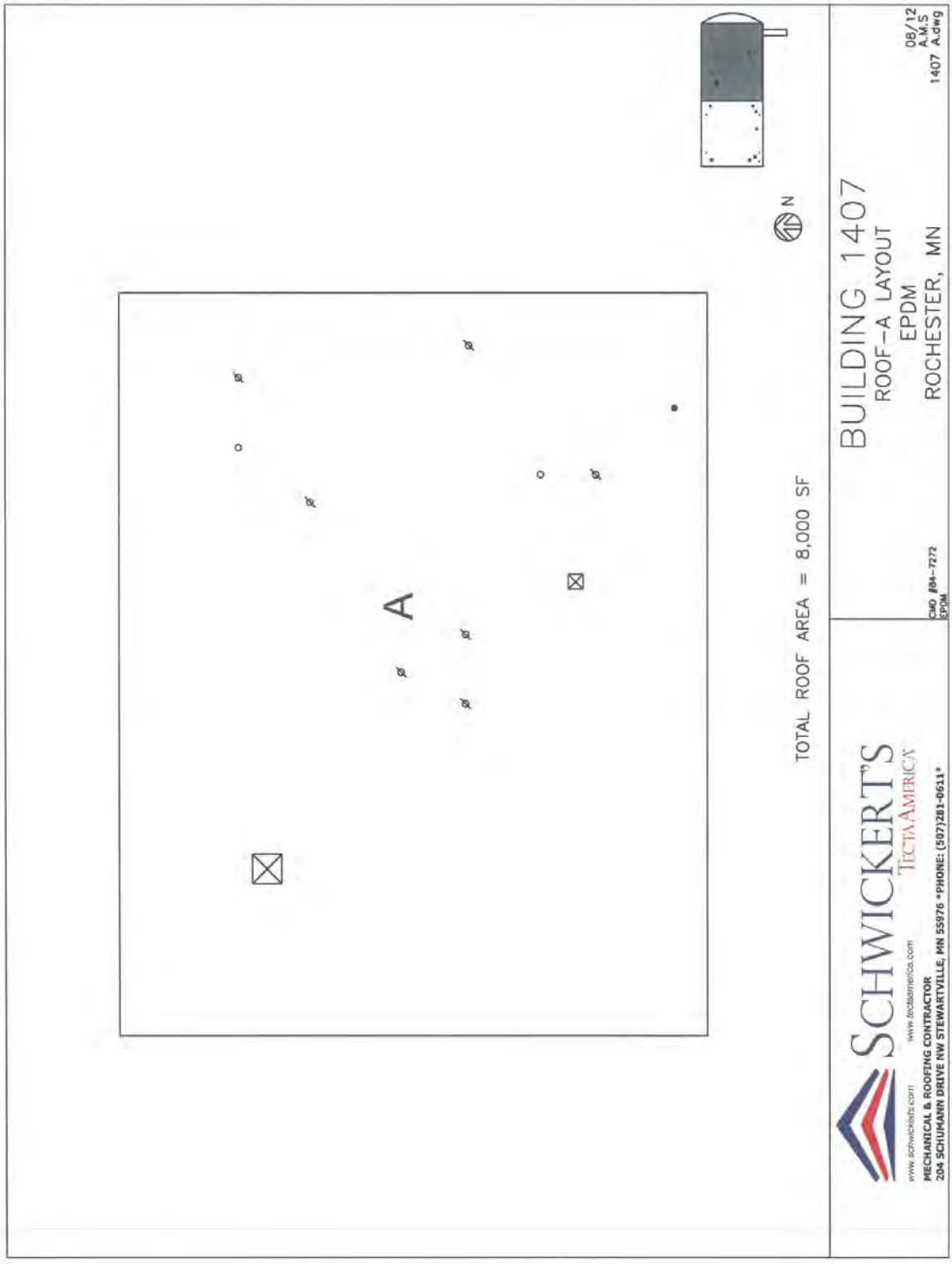
C-13There are is 1 location of metal flashing missing. Our recommendation is to replace the missing metal flashings to its original position and secure properly.

No Picture

SCHWICKERT'S

Roof deficiency No. 9

C-33 There is 1 deteriorated stone wall. Our recommendation is to eliminate water entry, by installing coping cap on parapet wall, after replacing any deteriorated stone.


BUILDING 1407
ROOF-A LAYOUT
EPDM
ROCHESTER, MN
08/12
A.M.S
1407 A.dwg
CMD #84-7272
EPDM
SCHWICKERT'S
TECTAMERICA
www.schwickerts.com
www.tectaamerica.com
MECHANICAL & ROOFING CONTRACTOR
204 SCHUMANN DRIVE NW STEWARTVILLE, MN 55976 *PHONE: (507)281-0611*
TOTAL ROOF AREA = 8,000 SF
A
N

Roof B

Roof deficiency No. 1

SP-9 There are 10 locations of open laps in membrane flashing for 160 lineal feet. Our recommendation is to repair using compatible materials and manufacturer recommendations.

Roof deficiency No. 2

SP-7 There are 2 locations of membrane shrinkage which has resulted in displacement of flashing for 90 lineal feet. Our recommendation is to cut the existing membrane and allow it to relax, install new 6" russ securement strip, tie in new EPDM membrane and run it up wall and properly terminate. New sheet metal should be installed.

Roof deficiency No. 3

SP-3 There are 2 locations of unbounded membrane laps for 70 lineal feet. Our recommendation is to to repair using compatible materials and manufacturer recommendations.

Roof deficiency No. 4

SP-7 There are 3 locations of membrane shrinkage which has resulted in displacement of curb flashing for 30 lineal feet. Our recommendation is to cut the existing membrane and allow it to relax, install new 6" russ securement strip, tie in new EPDM membrane and run it up curb and properly terminate. New sheet metal should be installed.

Roof deficiency No. 5

SP-1 There are 4 locations of membrane holes. Our recommendation is to repair using compatible materials and manufacturer recommendations as outlined in **ARMA/NRCA/SPRI-***Repair Manual for Low-Slope Membrane Roof System.*

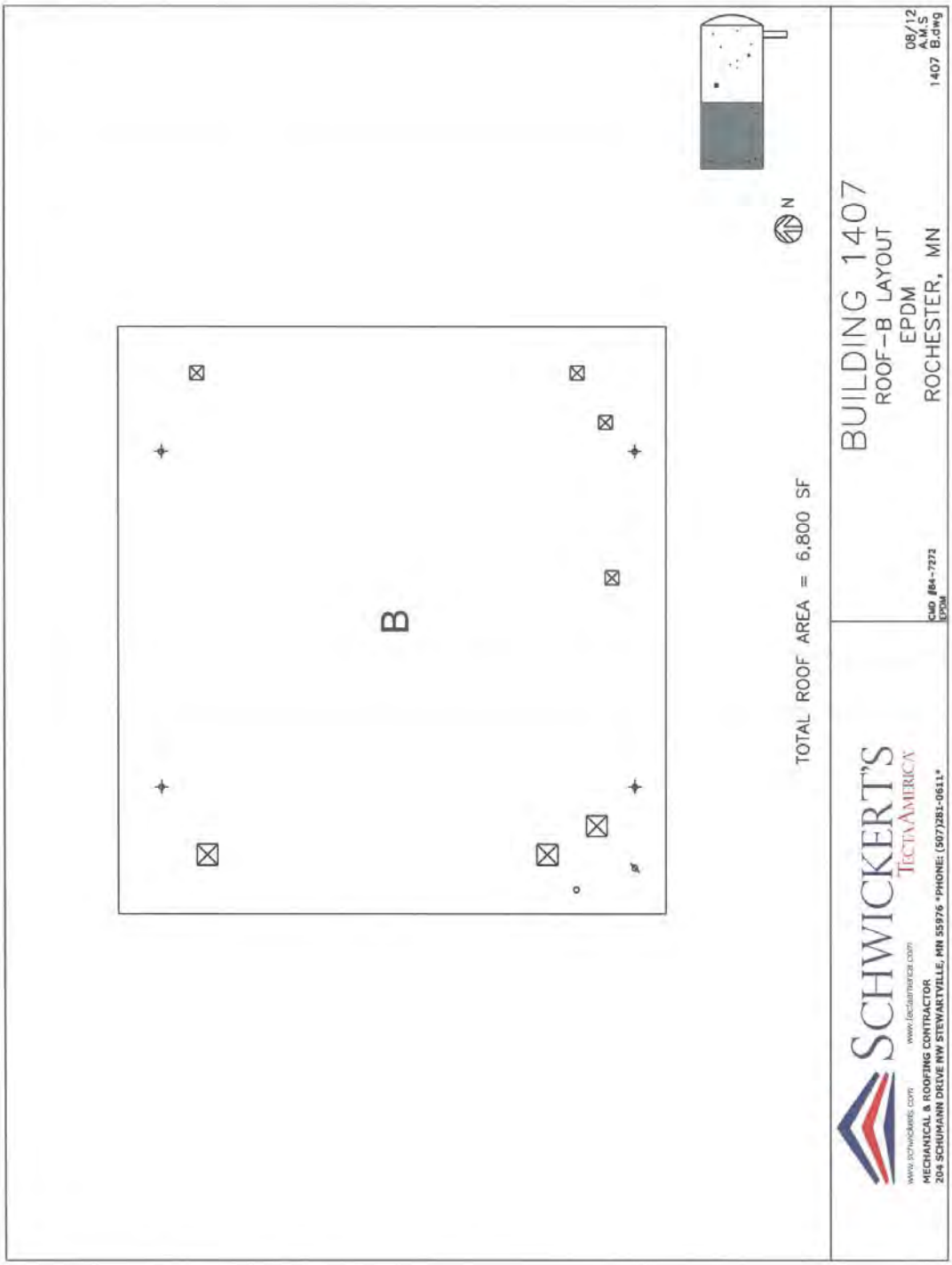
Roof deficiency No. 6

SP-1 There is 1 locations of membrane holes on roof drain. Our recommendation is to repair using compatible materials and manufacturer recommendations as outlined in **ARMA/NRCA/SPRI-***Repair Manual for Low-Slope Membrane Roof System.*

No Picture

Roof deficiency No. 7

C-33 There is 1 deteriorated stone wall.


B
N
TOTAL ROOF AREA = 6,800 SF
BUILDING 1407
ROOF-B LAYOUT
EPDM
ROCHESTER, MN
08/12
A.M.S
1407 B.dwg
SCHWICKERT'S
TECTAAMERICA
MECHANICAL & ROOFING CONTRACTOR
204 SCHUMANN DRIVE NW STEWARTVILLE, MN 55976 *PHONE: (507)281-0611*

EMSL Analytical, Inc.
14375 23rd Avenue North, Minneapolis, Mn 55447
Phone/Fax: (763) 449-4922 / (763) 449-4924
http://www.emsl.com minneapolislab@emsl.com

EMSL Order:	351304278
CustomerID:	MISC-ACCT
CustomerPO:	cc/316195
ProjectID:	

Attn: **Micah Johansen**

Schwickert's Tecta America
204 Schumann Dr.
Stewartville, MN 55976

Project: **1407**

Phone:	(507) 951-1163
Fax:	
Received:	07/16/13 11:40 AM
Analysis Date:	7/22/2013
Collected:	

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos			Asbestos	
Sample	Description	Appearance	% Fibrous	% Non-Fibrous		% Type	
1 351304278-0001	Barrel Roof Level 1, Black Fibrous Material	Brown/Black Fibrous Heterogeneous	25% Cellulose 10% Glass	65% Non-fibrous (other)		None Detected	☑
2-Silver Layer 351304278-0002	Barrel Roof Level 2, Black Fibrous Material	Black/Silver Non-Fibrous Heterogeneous		100% Non-fibrous (other)		None Detected	☑
2-Black Layer 351304278-0002A	Barrel Roof Level 2, Black Fibrous Material	Black Fibrous Heterogeneous	25% Cellulose	70% Non-fibrous (other)		5% Chrysotile	⊘

☑ No Asbestos Detected ⚠ Between Expected Limit of Detection and Federal EPA Recommended Limit ⊘ Above Federal EPA Recommended Limit

These guidance limits are typically used in most scenarios. More stringent local or project specific guidelines may apply.

Analyst(s)
Rachel Travis (3)

Rachel Travis, Laboratory Manager
or other approved signatory

EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Samples received in good condition unless otherwise noted. Estimated accuracy, precision and uncertainty data available upon request. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Reporting limit is 1%.

Samples analyzed by EMSL Analytical, Inc. Minneapolis, Mn NVLAP Lab Code 200019-0

Initial report from 07/22/2013 14:51:19

Test Report PLM(I)-7.25.0 Printed: 7/22/2013 2:51:19 PM

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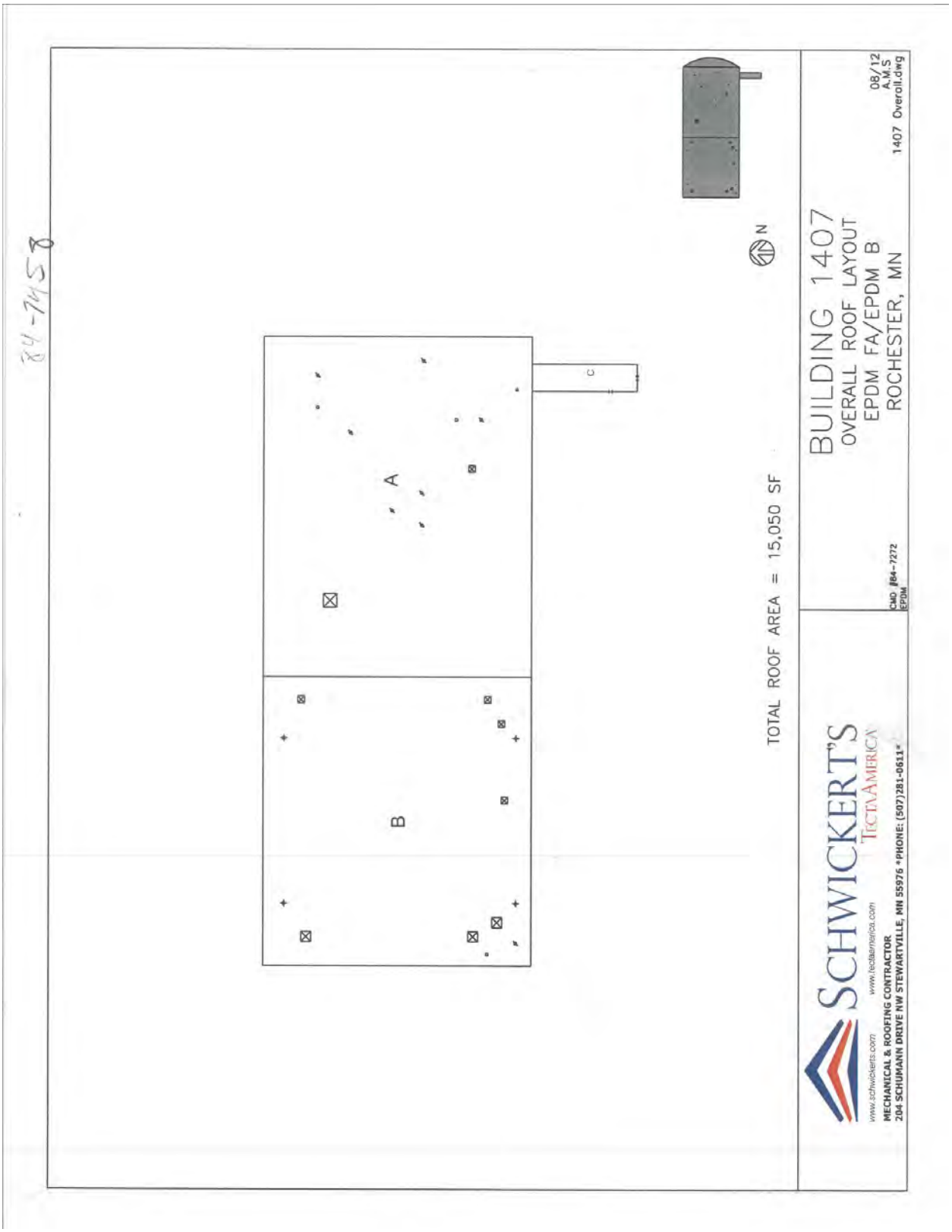
84-7458
A
B
C
N
TOTAL ROOF AREA = 15,050 SF
BUILDING 1407
OVERALL ROOF LAYOUT
EPDM FA/EPDM B
ROCHESTER, MN
08/12
A.M.S
1407 Overall.dwg
CMD #84-7272
EPDM
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204 SCHUMANN DRIVE NW STEWARTVILLE, MN 55976 *PHONE: (507)281-0611*

Building 407

Roof Section	Roof Assessor Points (RAP) Categories									ERSL / Rehab Year / Rehab Type / Cost			
	Membrane Condition	Flashing Condition	Leakage Condition	Drainage Condition	Roof Age	Present Repair Status	Insulation Condition	Rooftop Traffic	Interior Occupancy	Overall Assessment	RAP Total	ERSL	Rehab Year	Rehab Type	Rehab Cost
A	2	2	2	4	1	1	3	3	4	0	22	3-5	2016		
B	2	2	2	4	1	1	2	3	4	0	22	2-5	2015		
C	0	0	2	2	1	1	3	4	3	0	16	2-3	2015		

User Notes:

1. Choose a rehab year for each roof section, then create a RAP score.
2. Enter the corresponding ERSL from Table 1 and adjust the RAP score until the ERSL matches the rehab year.
3. **For roofs requiring immediate replacement, only the categories in yellow need to be marked.**
4. Rehab types will vary based on system type and restoration options; in some cases, multiple options will be appropriate: **R = T/O & Replace, RC = Re-Cover, SR = Skin off/Replacement, MR = Retrofit over Metal Panels, F = Flashing Rehab, CS = Coating System**
5. If replacement is within 2 years, provide hard price. Submit scope of work separately.
6. For rehab years beyond 5 years: where possible, avoid using the same year repeatedly to prevent budget spikes.
7. Table 2: List other anticipated repair costs deemed necessary for this facility, e.g., the cost of 2 leak visits per year.

Membrane Condition:
0 - Numerous Defects – Past Performance Poor
2 - Isolated Defects – Past Performance Poor
3 - No Defects – Poor Past Performance
4 - Isolated Defects – Good Past Performance
5 - No Defects – Good Past Performance

Flashing Condition:
0 - Numerous Defects – Past Performance Poor
2 - Isolated Defects – Past Performance Poor
3 - No Defects – Poor Past Performance
4 - Isolated Defects – Good Past Performance
5 - No Defects – Good Past Performance

Leakage Condition:
0 - Numerous Leaks – Many Past Leaks
2 - Isolated Leaks – Many Past Leaks
3 - Isolated Leaks – No Past Leaks
4 - No Leaks – Isolated Past Leaks
5 - No Leaks – No Past Leaks

Drainage Condition:
0 - Ponding Present Or Evident
2 - Isolated Ponding
3 - Numerous Minor Ponding
4 - Drainage Satisfactory
5 - Drainage Excellent

Roof Age:
1 - Age Past Life Expectancy
2 - Age At Life Expectancy
3 - Age Greater Than 10 Yrs
4 - Age 6 – 10 Yrs
5 - Age Less Than 5 Yrs

Present Repair Status
0 - Beyond Repair
1 - Major Repair Required
2 - Moderate Repair Required
3 - Minor Repair Required
4 - Routine Maintenance

Insulation Condition:
0 - Widespread Wet-Deck Corrosion
1 - Large Areas Wet
2 - Isolated Wet Areas
3 - One Isolated Wet Area
4 - Insulation Condition Unknown
5 - No Wet Insulation

Rooftop Traffic:
1 - Heavy – No Protection
2 - Moderate – No Protection
3 - Heavy With Protection
4 - Moderate With Protection
5 - Light Traffic

Interior Occupancy
1 - Critical
2 - High
3 - Moderate
4 - Low
5 - No Impedance

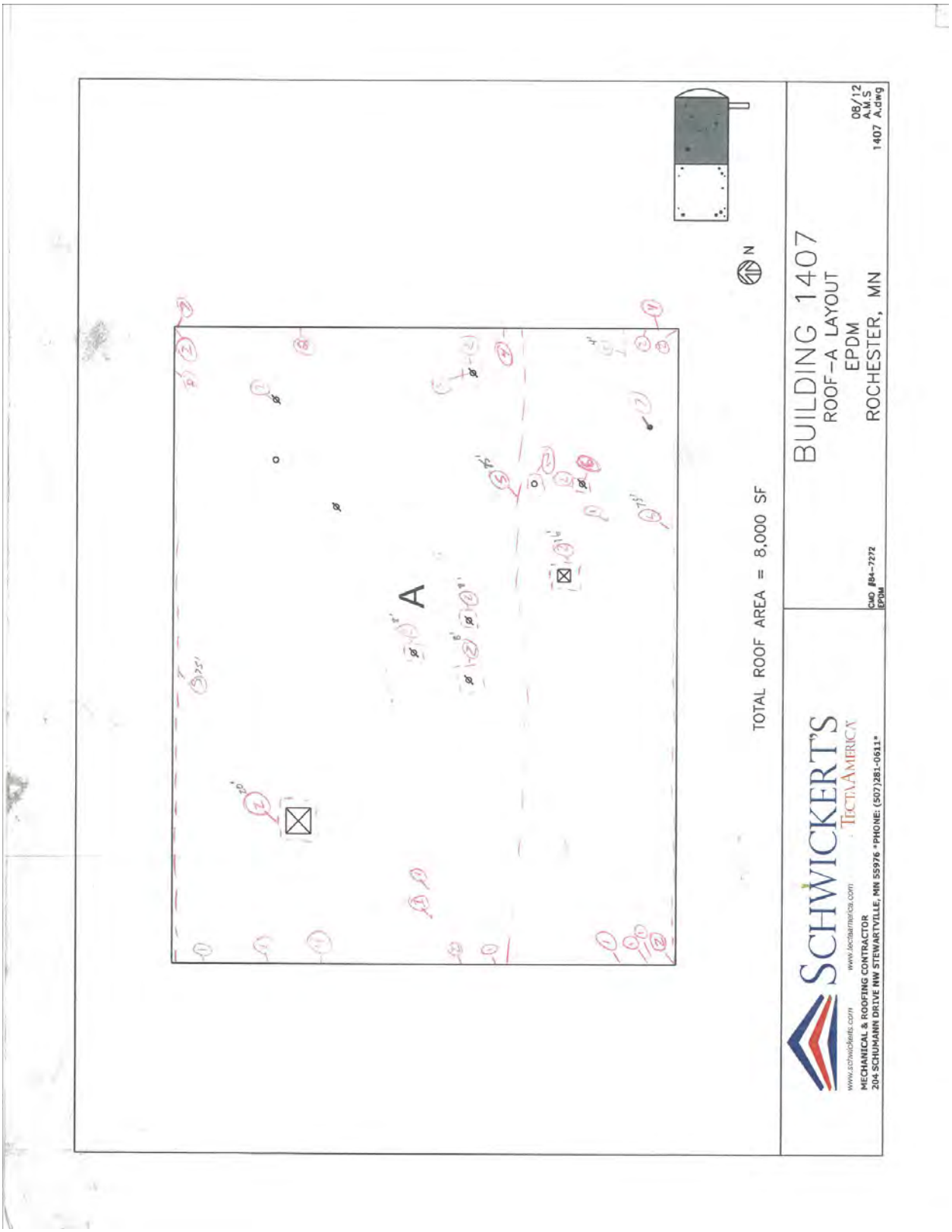
Overall Assessment
0 - Poor
2 - Fair
3 - Satisfactory
4 - Good
5 - Excellent

Table 1: RAP & ERSL Relationship

RAP Score	ERSL
5 - 15	0 - 1 Year
16 - 20	2 - 3 Years
21 - 30	3 - 5 Years
31 - 40	5 - 10 Years
41 - 50	10+ Years

Table 2: Additional Repair Costs

Year 1	Year 2	Year 3


BUILDING 1407
ROOF-A LAYOUT
EPDM
ROCHESTER, MN
08/12
A.M.S
1407 A.dwg
TOTAL ROOF AREA = 8,000 SF
A
N
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MECHANICAL & ROOFING CONTRACTOR
204 SCHUMANN DRIVE NW STEWARTVILLE, MN 55976 *PHONE: (507)281-0611*
CMO #84-7272
EPDM

Facility Name: Buildings 1407 | Roof Section ID: A | Inspection Date: 6-24-13 | Page of

Interior Use: | Client Section Name: Fully Adhered EPDM

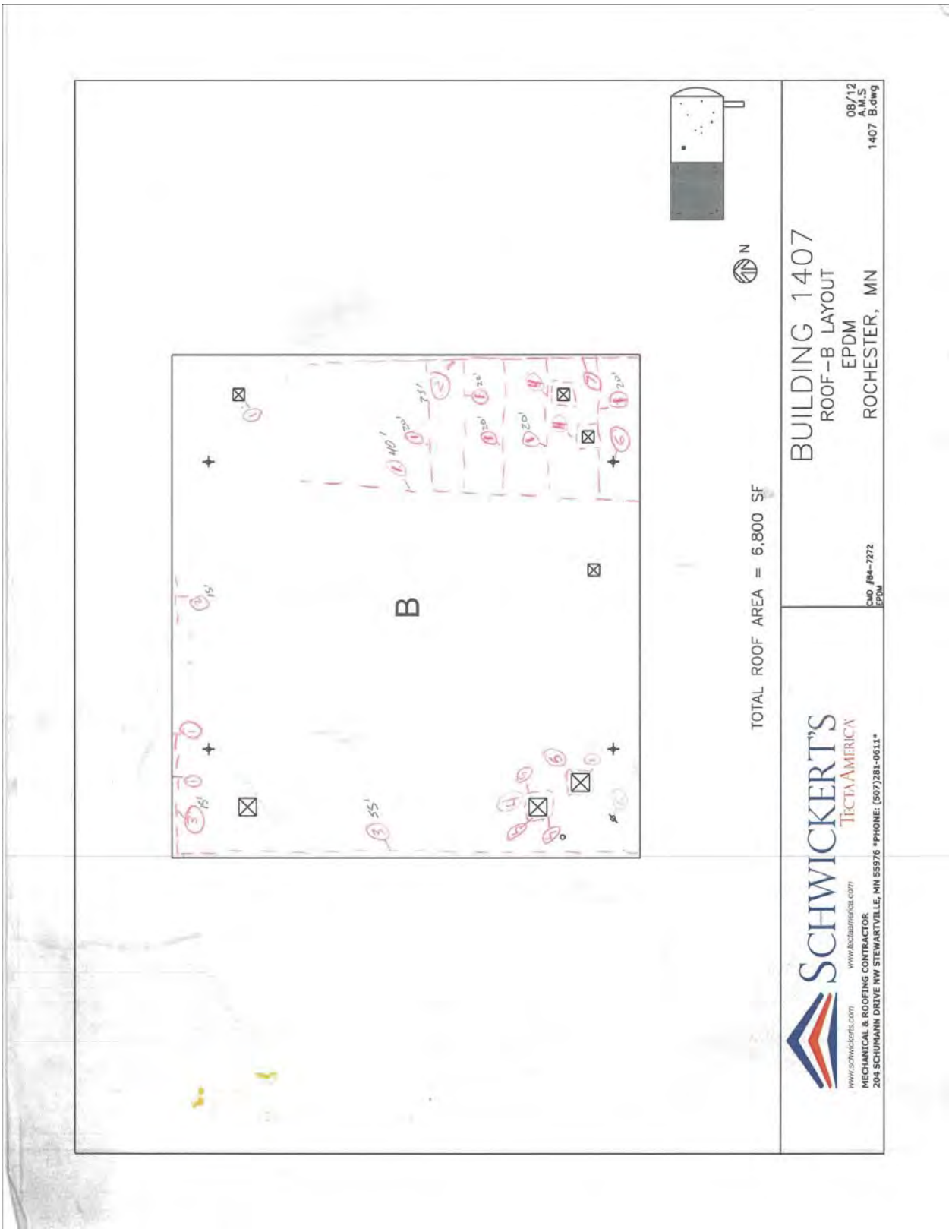
Def #	Repair Code	Quantity Ln. Ft. / Sq. Ft. / Ea	Photo No. Overview	Photo No. Before	Photo No. After	Description	ID*	Completed Work** GH/PM	Completed Work** NTE	Pending Repairs Priority	Pending Repairs Est Cost
1	SI-1	9" 15'Ln				Holes in membrane found at 8 locations	RR			A	
2	SEP	25.9" 25.9 Ln				Open splice found at 16 locations	RR			A	
3	C-15	20' Ln.				Deficient caulking at 1 locations	RR			A	
4		3 ea				Loose or missing fasteners at 3 locations	RR			C	
5		9" 230 Ln				Open seam found at 2 locations	RR			A	
6		1ea				Tipped over stack	RR			A	
7		1ea				Exposed AC lines	RR			A	
8		4" Ea				Missing drip edge	RR			A	
9		1ea.				Deteriorated stone wall	NR			B	
								$	$	$	$
								$	$	$	$
								$	$	$	$
								$	$	$	$

Note: Fill out areas shaded in blue during the inspection. Complete areas shaded in yellow when compiling paperwork at the office.

*ID: C=Completed During Inspection, O=Completed by Owner/Others Since Last Inspection, RR=Roof Repair, NR=Non-Roofing Item, T=Temp Repair, M=Monitor, LS=Life Safety Issue

General Housekeeping & Preventive Maintenance include routine tasks such as clearing drain heads, cleaning gutter inlets and outlets, minor caulking & removing debris. This work is performed under the square foot inspection charge, ***not the NTE*. An estimated value of these completed tasks is ***required***. The total of all NTE costs across all roof sections on a facility must match the NTE invoice amount ***exactly***.

Priority Levels
A = Urgent
B = Necessary
C = Preventive


B
TOTAL ROOF AREA = 6,800 SF
N
BUILDING 1407
ROOF-B LAYOUT
EPDM
ROCHESTER, MN
08/12
A.M.S
1407 B.dwg
SCHWICKERT'S
TECTA AMERICA
MECHANICAL & ROOFING CONTRACTOR
204 SCHUMANN DRIVE NW STEWARTVILLE, MN 55976 *PHONE: (507)281-0611*

Facility Name: Building 1457 | Roof Section ID: R3 | Inspection Date: 6-24-13 | Page of

Interior Use: | Client Section Name: Ballast EPDM / Fully Adhered EPDM

Det #	Repair Code	Quantity Ln. Ft. / Sq. Ft. / Ea	Photo No. Overview	Photo No. Before	Photo No. After	Description	ID*	Completed Work** GH/PM	Completed Work** NTE	Pending Repairs Priority	Pending Repairs Est Cost
1	SP-9	9" 160'Ln				Open splice found at 10 locations	KE			A	$
2	SP-7	90'Ln				Pulled wall flashing & Rust + reflash at 2 locations	AL			B	$
3	SP-3	9" 70'Ln				Open wall flashing seen at 2 locations	AL			A	$
4	SP-7	30'Ln				Pulled curb flashing & Rust + reflash 3 locations	KE			A	$
5	SP-1	10'Ln				Holes in membrane @ 4 locations	AR			A	$
6	SP-1	1 ea				Holes around drain & Reflash drain	KE			A	$
7	O-37	1 each				Deteriorated Inside	NE			B	$
											$
											$
											$
											$
								$			$
								$			$
								$			$

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Priority Levels
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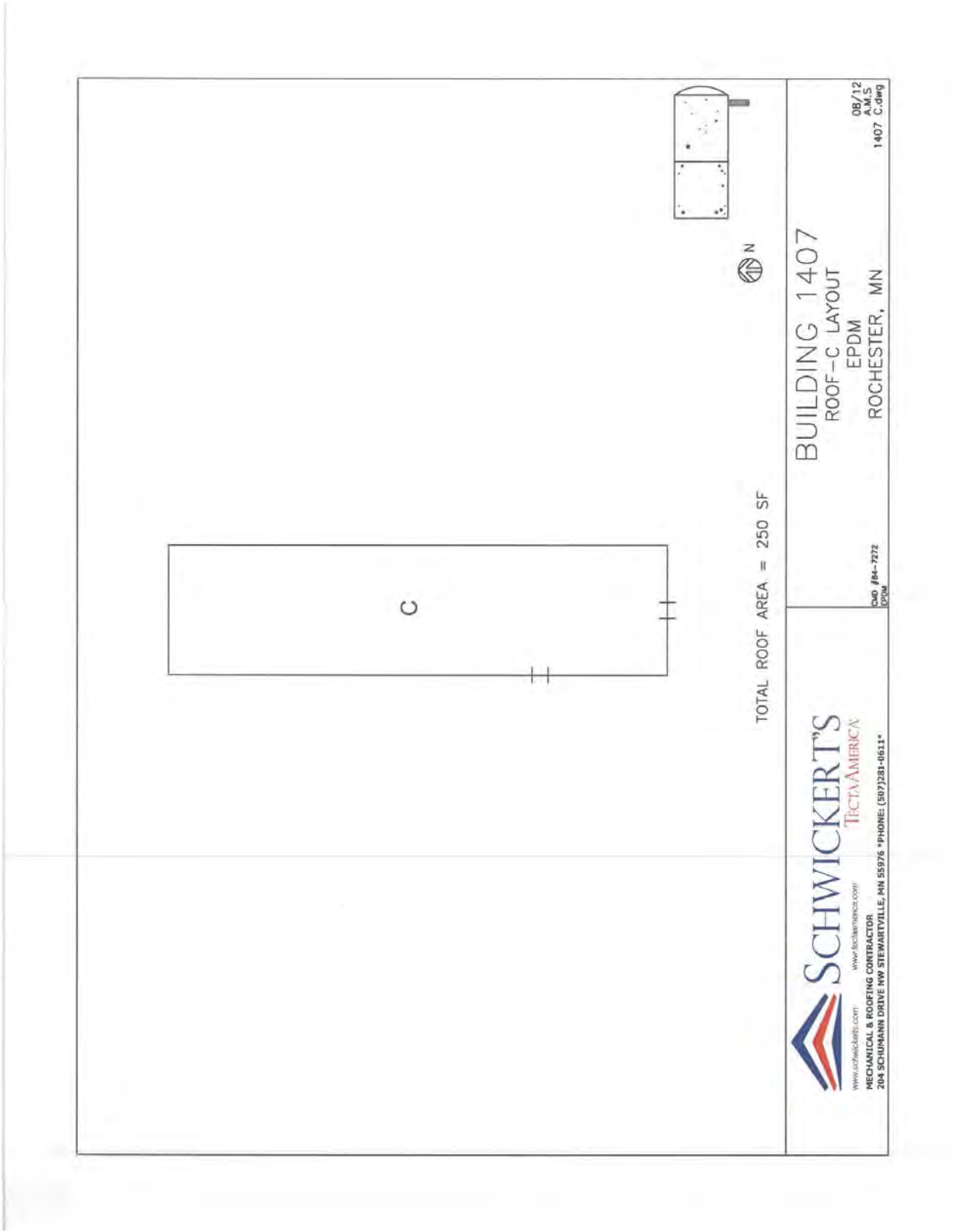
C = Preventive


C
TOTAL ROOF AREA = 250 SF
N
BUILDING 1407
ROOF-C LAYOUT
EPDM
ROCHESTER, MN
08/12
A.M.S
1407 C.dwg
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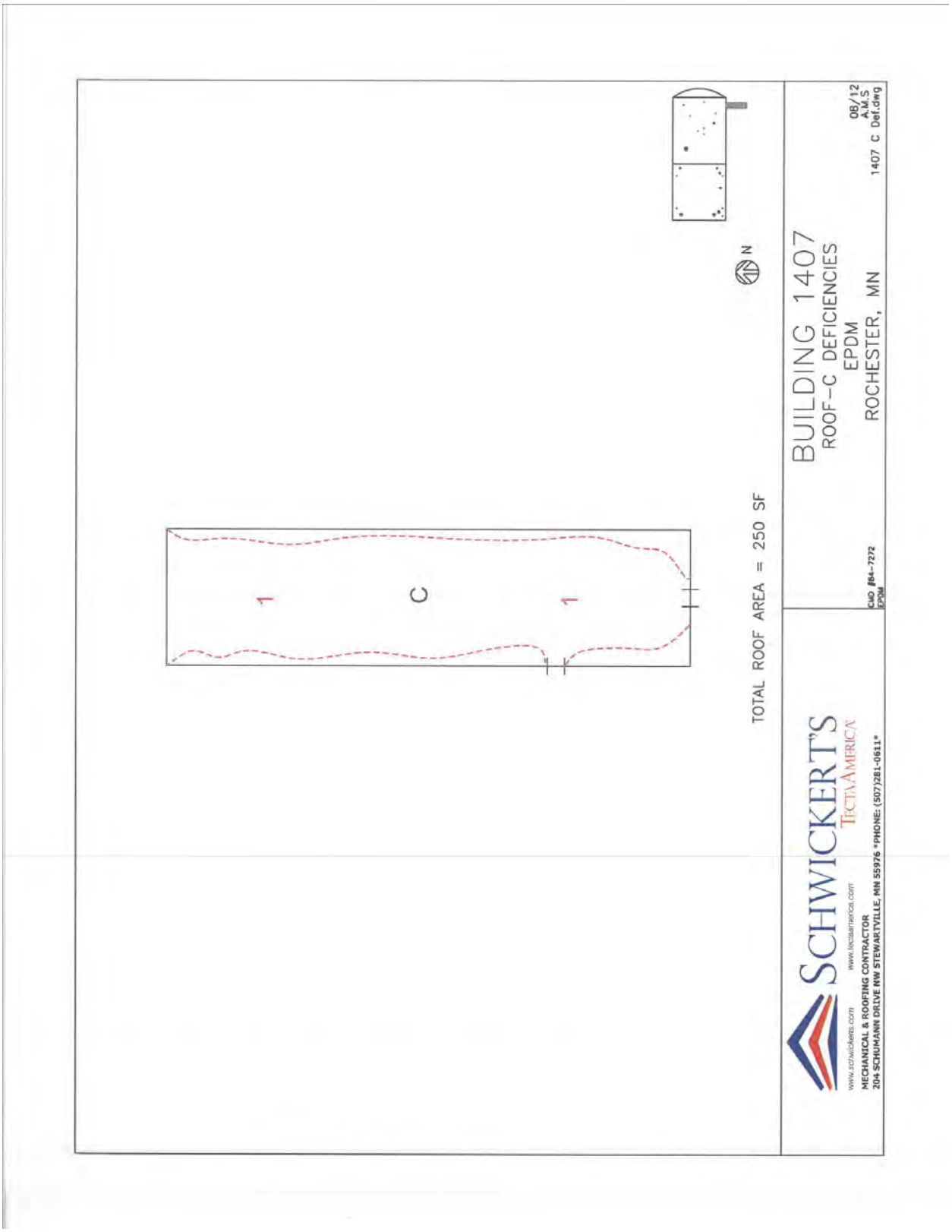
BUILDING 1407
ROOF-C DEFICIENCIES
EPDM
ROCHESTER, MN
08/12
A.M.S
1407 C Def.dwg
TOTAL ROOF AREA = 250 SF
1
C
1
N
SCHWICKERT'S
TECTAMERICA
MECHANICAL & ROOFING CONTRACTOR
204 SCHUMANN DRIVE NW STEWARTVILLE, MN 55976 *PHONE: (507)281-0611*

Facility Name: Building 1407 | Roof Section ID: C | Inspection Date: 6-24-13 | Page of

Interior Use: | Client Section Name: Full Address SPDM

Def #	Repair Code	Quantity Ln. Ft. / Sq. Ft. / Ea	Photo No. Overview	Photo No. Before	Photo No. After	Description	ID*	Completed Work** GH/PM	Completed Work** NR	Pending Repairs Priority	Pending Repairs Est Cost
						* No new deficiencies at this time					
						* Bid out for repair					
								$	X		$
								$	X		$
								$	X		$
								$	X		$

Note: Fill out areas shaded in blue during the inspection. Complete areas shaded in yellow when compiling paperwork at the office.

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Priority Levels:
A = Urgent
B = Necessary
C = Preventive

SCHWICKERT'S TECTA AMERICA

6.45 – 10

SERVICE TICKET STC070361

7/8/13 (Monday)

Schwickert's Tecta America LLC
PO Box 216 • 507-281-0611
ROCHESTER, MN 55903-021 • 888-724-9427

Customer:
THE COUNTY PUBLIC WORKS FINANC
DEPT, ACCOUNTS PAYABLE
2122 CAMPUS DRIVE SE
SUITE 200
ROCHESTER, MN 55904

Location:
CTY OF OLMSTED OLD HWY SHOP
1407 3RD AVE
3RD AVE NEXT TO 1421 BLDG
ROCHESTER, MN 55904

Salesperson: MICAH JOHANSEN
Customer ID: 850562
Assigned To:
Date Called In: 07/08/13
Call Taken By: SSTAUFFER
P.O. No.:

Project No: 847521
Region:
Service Type: RI
Contact:
Phone: 507-951-0790

Mark	Code	Description	Mfr	Type	Mfr Wrnty No.	Exp Date	Cont Wrnty No	Exp Date
____	ROOFING	GENERAL ROOFING						

Instructions
7/9/13
OLD HIGHWAY BUILDING
SCOPE:
MEET KANE & JOHNSON ARCHITECTS ON ISTE AND OPEN UP ROOF WHERE NEEDED.
MAKE PERMANENT REPAIRS WHERE NEEDED.
DOCUMENT CORE SAMPLES FOR OUR RECORDS

West Roof 4½"
① mopped down Vapor Barrier to metal deck
② ½ fiberboard
③ 3½" EPS
④ ½" polite

Barrell roof 1½"
① Vapor Barrier
② ½ hard board screwed down
③ granular roof moped to hardboard
④ second granular roof
⑤ ½" hard board screwed down
⑥ EPDM mech on top

Materials Used:	Qty.	Names:	Hours

Accepted By: Date:

I hereby acknowledge the satisfactory completion of the above described work.

☐ Repairs Complete
☐ Return for Additional Work
☐ Hold

EMSL Analytical, Inc.
14375 23rd Avenue North, Minneapolis, Mn 55447
Phone/Fax: (763) 449-4922 / (763) 449-4924
http://www.emsl.com minneapolislab@emsl.com

EMSL Order:	351304278
CustomerID:	MISC-ACCT
CustomerPO:	cc/316195
ProjectID:	

Attn: **Micah Johansen**

Schwickert's Tecta America
204 Schumann Dr.
Stewartville, MN 55976

Project: **1407**

Phone:	(507) 951-1163
Fax:	
Received:	07/16/13 11:40 AM
Analysis Date:	7/22/2013
Collected:	

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos	
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Type	
1 351304278-0001	Barrel Roof Level 1, Black Fibrous Material	Brown/Black Fibrous Heterogeneous	25% Cellulose 10% Glass	65% Non-fibrous (other)	None Detected	☑
2-Silver Layer 351304278-0002	Barrel Roof Level 2, Black Fibrous Material	Black/Silver Non-Fibrous Heterogeneous		100% Non-fibrous (other)	None Detected	☑
2-Black Layer 351304278-0002A	Barrel Roof Level 2, Black Fibrous Material	Black Fibrous Heterogeneous	25% Cellulose	70% Non-fibrous (other)	5% Chrysotile	⊘

☑ No Asbestos Detected ⚠ Between Expected Limit of Detection and Federal EPA Recommended Limit ⊘ Above Federal EPA Recommended Limit

These guidance limits are typically used in most scenarios. More stringent local or project specific guidelines may apply.

Analyst(s)
Rachel Travis (3)

Rachel Travis, Laboratory Manager
or other approved signatory

EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Samples received in good condition unless otherwise noted. Estimated accuracy, precision and uncertainty data available upon request. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Reporting limit is 1%.

Samples analyzed by EMSL Analytical, Inc. Minneapolis, Mn NVLAP Lab Code 200019-0

Initial report from 07/22/2013 14:51:19

Test Report: PLM(I)-7.25.0 Printed: 7/22/2013 2:51:19 PM

THIS IS THE LAST PAGE OF THE REPORT. 1

June 13, 2024

Providing Trusted
Health and Safety Solutions

Mathew Miller
Olmsted County
2118 Campus Drive Southeast
Rochester, MN 55904

RE: Olmsted County – Graham Park Old Highway Shop
2024 Asbestos and Lead Inspection
IEA Project #202410521

Dear Mr. Miller:

Enclosed please find the 2024 Asbestos and Lead Inspection Report(s) for the above-referenced location.

If you have any questions or require further assistance, please do not hesitate to contact me at 507-281-6664.

Sincerely,

IEA, Inc.

Natalie Eskew
Senior Project Manager

Enc.

ASBESTOS AND LEAD-BASED PAINT RENOVATION INSPECTION PROFILE

Graham Park Old Highway Shop
1407 3rd Avenue SE
Rochester, MN 55904

May 17, 2024

Submitted to:

Mathew Miller
Olmsted County

Submitted by:
Institute for Environmental Assessment
210 Woodlake Drive Southeast
Rochester, MN 55904

507-281-6664 / 800-233-9513

IEA Project 202410521

INDEX

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- Asbestos Summary and Inspection Report

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- Lead-Based Paint Inspection Report

SECTION VI

- Asbestos Inspector and Lead Risk Assessor License(s)

SECTION I

Asbestos Summary and Inspection Report

Asbestos Summary
Graham Park - Old Highway Shop
1407 3rd Avenue SE, Rochester, MN

On May 17, 2024, a limited inspection for asbestos-containing materials (ACM) was performed at the above-referenced location. The scope of the inspection included suspect ACM within the areas of renovation within the facility. Since this was a limited inspection, there may be additional materials not identified on the report located within wall cavities, pipe chases and/or other inaccessible locations. Suspect ACM was identified and sampled for asbestos content.

.

Identified materials confirmed to be ACM include the following:

- Interior Window Glazing (Gray/Tan) – Original Building
- Interior Window Caulk (Brown/Gray/Tan) – Original Building
- Transite Ceiling Panels – Original Building
- Expansion Joint Caulk (Gray/white) – Exterior Original Building

Specific locations of these materials, as well as those suspect materials which were analyzed and were found not to contain asbestos, are identified in the attached report.

Destructive sampling was not performed as a part of this inspection. This inspection does meet the requirements of the Minnesota Pollution Control Agency (MPCA) or Minnesota OSHA (MNOSHA) for an asbestos renovation inspection.

Bulk samples of accessible suspect material were collected and analyzed in accordance with Environmental Protection Agency (EPA) sampling and analytical procedure requirements. Sampling was conducted in a manner determined by the inspector to be sufficient to identify whether the suspect materials are asbestos containing.

Roof samples were not collected as part of this inspection. Suspect roofing materials should be handled as asbestos or sampled prior to disturbance to determine if they are ACM or not.

The purpose of the inspection was to identify all suspect materials that may contain asbestos prior to demolition. Any suspect materials not identified on the survey that are uncovered prior to or during demolition should be assumed to contain asbestos or sampled.

GENERAL COMMENTS

The report is prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted practices. Other than as provided in the preceding sentence and in our Proposal #12146 dated May 10, 2024, regarding Hazardous Materials Assessments at the Graham Park Old Highway Shop building including the General Conditions attached thereto, no warranties are extended or made.

SECTION II

Asbestos Sample Locations Drawing(s)

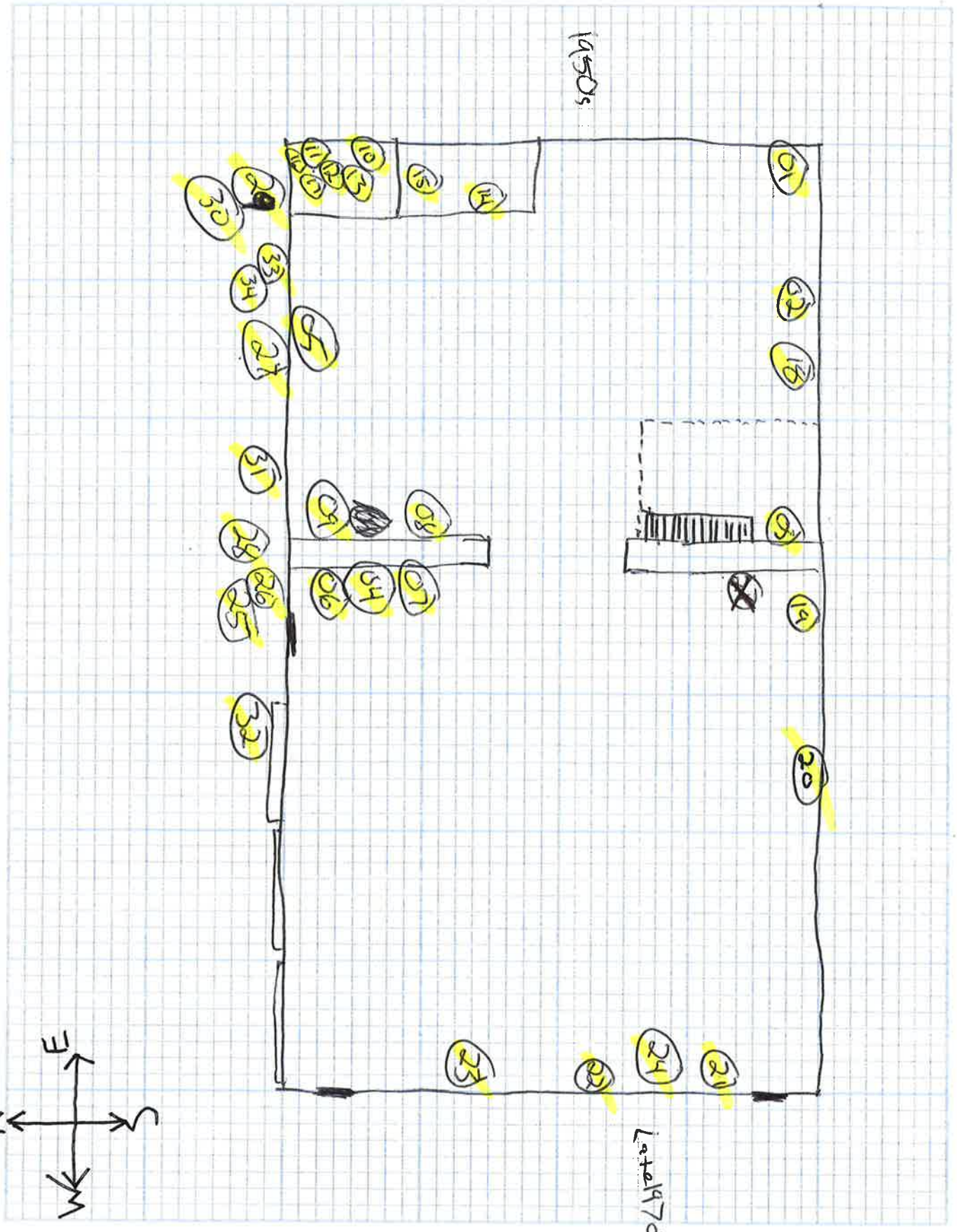
PROJECT # 202410521 DATE 5/17/24

PROJECT NAME 2024 Asbestos and Lead-Based Paint Renovation Inspection

PROJECT DESCRIPTION

SITE LOCATION Graham Park Old Highway Shop

STAFF NAME Garrett Biggs SHEET ____ OF ____



SECTION III

Asbestos Laboratory Report

EMSL Analytical, Inc.
3410 Winnetka Avenue North New Hope, MN 55427
Tel/Fax: (763) 449-4922 / (763) 449-4924
http://www.EMSL.com / minneapolislab@emsl.com

EMSL Order: 352404594
Customer ID: IFEA50
Customer PO:
Project ID:

Attention: Emma Squires-Sperling
Inst. For Environmental Assessment
9201 West Broadway
Suite 600
Brooklyn Park, MN 55445
Project: 202410521 - Graham Park Old Highway Shop

Phone: (763) 315-7927
Fax: (763) 315-7920
Received Date: 05/21/2024 10:00 AM
Analysis Date: 05/23/2024 - 05/24/2024
Collected Date: 05/17/2024

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
051724GB-01 *352404594-0001*	Black Window Caulk - SE Corner	Black Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	**None Detected**
051724GB-02 *352404594-0002*	Vermiculite - South Wall	Brown/Gray/Tan Non-Fibrous Homogeneous	10% Cellulose	90.0% Non-fibrous (Other)	**None Detected**
051724GB-03 *352404594-0003*	Window Glazing Interior - Center Walls	Red/Black Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	**None Detected**
051724GB-04 *352404594-0004*	Window Glazing Interior - Center Walls	Gray/Tan Non-Fibrous Homogeneous		96.0% Non-fibrous (Other)	**4% Chrysotile**
051724GB-05 *352404594-0005*	Vermiculite - North Wall	Brown/Gray/Tan Non-Fibrous Homogeneous	10% Cellulose	90.0% Non-fibrous (Other)	**None Detected**
051724GB-06 *352404594-0006*	Grey Window Caulk - Center Walls	Brown/Gray/Tan Non-Fibrous Homogeneous	4% Fibrous_Other	86.0% Non-fibrous (Other)	**10% Chrysotile**
051724GB-07 *352404594-0007*	Grey Window Caulk - Center Walls	Brown/Gray/Tan Non-Fibrous Homogeneous	4% Fibrous_Other	86.0% Non-fibrous (Other)	**10% Chrysotile**
051724GB-08 *352404594-0008*	Grey Window Caulk - North Walls	Brown/Gray Non-Fibrous Homogeneous	4% Fibrous_Other	86.0% Non-fibrous (Other)	**10% Chrysotile**
051724GB-09 *352404594-0009*	Grey Window Caulk - South Walls	Gray/Tan Non-Fibrous Homogeneous	4% Fibrous_Other	86.0% Non-fibrous (Other)	**10% Chrysotile**

Initial report from: 05/24/2024 15:47:38

EMSL Analytical, Inc.
3410 Winnetka Avenue North New Hope, MN 55427
Tel/Fax: (763) 449-4922 / (763) 449-4924
http://www.EMSL.com / minneapolislab@emsl.com

EMSL Order: 352404594
Customer ID: IFEA50
Customer PO:
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Attention: Emma Squires-Sperling
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Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
051724GB-10-Sheetrock *352404594-0010*	Sheetrock - East Wall	Brown/White Fibrous Homogeneous	10% Cellulose	90.0% Non-fibrous (Other)	**None Detected**
		This is a composite result of sheetrock, jt. compound, and tape			
051724GB-10-Adhesive *352404594-0010A*	Sheetrock - East Wall	Tan Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	**None Detected**
051724GB-11 *352404594-0011*	Sheetrock - East Wall	Brown/White Fibrous Homogeneous	10% Cellulose	90.0% Non-fibrous (Other)	**None Detected**
051724GB-12 *352404594-0012*	White Window Caulk - East 2nd Floor	Gray/White Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	**None Detected**
051724GB-13 *352404594-0013*	White Window Caulk - East 2nd Floor	Gray/White Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	**None Detected**
051724GB-14 *352404594-0014*	Tan/White window glazing	Tan/White Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	**None Detected**
051724GB-15 *352404594-0015*	Tan/White window glazing	Tan/White Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	**None Detected**
051724GB-16 *352404594-0016*	Transite Panels Ceiling - E 2nd Floor	Gray/White Fibrous Homogeneous		80.0% Non-fibrous (Other)	**20% Chrysotile**
051724GB-17 *352404594-0017*	Transite Panels Ceiling - E 2nd Floor	Gray/White Fibrous Homogeneous		80.0% Non-fibrous (Other)	**20% Chrysotile**

Initial report from: 05/24/2024 15:47:38

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Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
051724GB-18 *352404594-0018*	Black Window Caulk - South East	Gray/Black Fibrous Homogeneous	15% Synthetic	85.0% Non-fibrous (Other)	**None Detected**
051724GB-19 *352404594-0019*	Black Window Caulk - South	Black Non-Fibrous Homogeneous	15% Synthetic	85.0% Non-fibrous (Other)	**None Detected**
051724GB-20 *352404594-0020*	Black Window Caulk - South	Black Non-Fibrous Homogeneous	15% Synthetic	85.0% Non-fibrous (Other)	**None Detected**
051724GB-21 *352404594-0021*	White window caulk interior - West	White Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	**None Detected**
051724GB-22 *352404594-0022*	White interior window caulk - West	White Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	**None Detected**
051724GB-23 *352404594-0023*	White Vinyl Caulk - West	White Fibrous Homogeneous		100.0% Non-fibrous (Other)	**None Detected**
051724GB-24 *352404594-0024*	White Vinyl Caulk - West	White Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	**None Detected**
051724GB-25-Caulk *352404594-0025*	Grey exterior caulk - N. Exterior	Gray Non-Fibrous Heterogeneous		100.0% Non-fibrous (Other)	**None Detected**
051724GB-25-Plaster *352404594-0025A*	Grey exterior caulk - N. Exterior	Tan Non-Fibrous Heterogeneous		100.0% Non-fibrous (Other)	**None Detected**

Initial report from: 05/24/2024 15:47:38

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Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
051724GB-26 *352404594-0026*	Grey exterior caulk - N. Exterior	Gray/White Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	**None Detected**
051724GB-27 *352404594-0027*	Grey expansion caulk - N. Exterior	Gray/White Non-Fibrous Homogeneous		97.0% Non-fibrous (Other)	**3% Chrysotile**
051724GB-28 *352404594-0028*	Grey expansion caulk - N. Exterior	Gray Non-Fibrous Homogeneous	8% Glass	92.0% Non-fibrous (Other)	**None Detected**
051724GB-29 *352404594-0029*	Brown Window Caulk - NE Exterior	Brown Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	**None Detected**
051724GB-30 *352404594-0030*	Brown Window Caulk - NE Exterior	Brown Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	**None Detected**
051724GB-31 *352404594-0031*	Black Ground Caulk - N. Exterior	Black Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	**None Detected**
051724GB-32 *352404594-0032*	Black Ground Caulk - N. Exterior	Black Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	**None Detected**
051724GB-33 *352404594-0033*	White exterior window covering	White Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	**None Detected**
051724GB-34 *352404594-0034*	White exterior window covering	White Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	**None Detected**

Initial report from: 05/24/2024 15:47:38

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9201 West Broadway
Suite 600
Brooklyn Park, MN 55445
Project: 202410521 - Graham Park Old Highway Shop

Phone: (763) 315-7927
Fax: (763) 315-7920
Received Date: 05/21/2024 10:00 AM
Analysis Date: 05/23/2024 - 05/24/2024
Collected Date: 05/17/2024

The samples in this report were submitted to EMSL for analysis by Asbestos Analysis of Bulk materials via EPA/600 (0513) Method using Polarized Light Microscopy. The reference number for these samples is the EMSL Order ID above. Please use this reference number when calling about these samples.

Report Comments:

Sample Receipt Date:	05/21/2024	Sample Receipt Time:	10:00 AM
Analysis Completed Date:	05/24/2024	Analysis Completed Time:	3:38 PM

Analyst(s):

Bennett Hanson PLM (13)

Daniel Nordland PLM (7)

Nicholas Asuncion PLM (16)

Samples Reviewed and approved by:

Rachel Travis, Laboratory Manager
or other approved signatory

Initial report from: 05/24/2024 15:47:38

9201 West Broadway North, Suite 600
Brooklyn Park, MN 55445
(763) 315-7900
1-800-233-9513

352404594

CHAIN OF CUSTODY

Client # | Project # 20241052l | Building Name Graham Park Old Highway Shop

Client Olmsted County | Project Name 2024 Asbestos and Lead-Based Paint Renovation Inspection

Address 2118 Campus Dr. SE | Contact Person Mathew Miller | IEA Project Manager Natalie Eskew

Rochester MN 55904 | Other Information

Shaded Areas are for Laboratory Use Only!

Verbal results to IEA Natalie Eskew | Phone, Fax No. or E-Mail lab@ieasafety.com | TAT (circle) 6 hr 24 hr 48 hr 72 hr 96 hr Specify

Verbal results relayed to | Verbal results relayed by | Date | Time

Analysis location: ○ On Site ⊗ Lab ○ Regional Office ○ Other EMSL

Sample #	Work Area or Phase #	Sample Description/Location	Sample type or Material code	Volume	Matrix type: Air	Bulk	Dust	Analysis requested: PCM	PLM	TEM	Other	Filter type: MCE	.8 um	.45 um
051724GB-01		Black Window caulk - SE corner	B		○	⊗	○	○	⊗	○		○	○	○
-02		Vermiculite - South Wall	B		○	⊗	○	○	⊗	○		○	○	○
-03		Window Glazing Interior - Center walls	B		○	⊗	○	○	⊗	○		○	○	○
-04		Window Glazing Interior - Center walls	B		○	⊗	○	○	⊗	○		○	○	○
-05		Vermiculite - North wall	B		○	⊗	○	○	⊗	○		○	○	○
-06		Grey Window caulk - Center walls	B		○	⊗	○	○	⊗	○		○	○	○
-07		Grey Window caulk - Center walls	B		○	⊗	○	○	⊗	○		○	○	○
-08		Grey window sill caulk - North wall	B		○	⊗	○	○	⊗	○		○	○	○
-09		Grey Window sill caulk - South wall	B		○	⊗	○	○	⊗	○		○	○	○
-10		Sheetrock - East wall	B		○	⊗	○	○	⊗	○		○	○	○
-11		Sheetrock - East wall	B		○	⊗	○	○	⊗	○		○	○	○
-12		White window caulk - East 2nd Floor	B		○	⊗	○	○	⊗	○		○	○	○
-13		White window caulk - East 2nd Floor	B		○	⊗	○	○	⊗	○		○	○	○
-14		Tan/White window glazing	B		○	⊗	○	○	⊗	○		○	○	○
-15		Tan/White window glazing	B		○	⊗	○	○	⊗	○		○	○	○

The MN Department of Health Alternative Indoor Air Standard for this project is: | F/CC. | Batch Number: | Samples Acceptable? ○ Yes ○ No

Sampled by	Date	Time	Delivered by	Date	Time	Received by lab	Date	Time	Entered by	Date	Time
Garrett Boggs	05/17/24	AM	Garrett Boggs	05/17/24	AM	[illegible]	5/21/24	10:00	[illegible]		
Received by	**Date**	**Time**	**Delivered by**	**Date**	**Time**	**Analysis by**	**Date**	**Time**	**Delivered by**	**Date**	**Time**
Garrett Boggs	05/17/24	AM									

UPS 1Z E847W403969 61250

Page 1 of 3

9201 West Broadway North, Suite 600
Brooklyn Park, MN 55445
(763) 315-7900
1-800-233-9513

45794

CHAIN OF CUSTODY

Client # | Project # 20241052 1 | Building Name Graham Park Old Highway Shop | Shaded Areas are for Laboratory Use Only!

Client Olmsted County | Project Name 2024 Asbestos and Lead Based Paint Renovation Inspection

Address 2118 Campus Dr. SE | Contact Person Mathew Miller | IEA Project Manager Natalie Eskew

Rochester MN 55904 | Other Information

Verbal results to IEA Natalie Eskew | Phone, Fax No. or E-Mail labQieasafety.com | TAT (circle) 6 hr 24 hr 48 hr (72 hr) 96 hr Specify

Verbal results relayed to | Verbal results relayed by | Date | Time

Analysis location: ○ On Site ⊗ Lab ○ Regional Office ○ Other EMSL

Sample #	Work Area or Phase #	Sample Description/Location	Sample type or Material code	Volume	Matrix type: Air	Bulk	Dust	Analysis requested: PCM	PLM	TEM	Other	Filter type: MCE	.8 um	.45 um
051724GB-16		Transite Panels ceiling - E 2nd Floor	⊗		○	⊗	○	○	⊗	○		○	○	○
-17		Transite Panels ceiling - E 2nd Floor			○	○	○	○	○	○		○	○	○
-18		Black window caulk - South East			○	○	○	○	○	○		○	○	○
-19		Black window caulk - South			○	○	○	○	○	○		○	○	○
-20		Black window caulk - South			○	○	○	○	○	○		○	○	○
-21		White window caulk interior - West			○	○	○	○	○	○		○	○	○
-22		White interior window caulk - West			○	○	○	○	○	○		○	○	○
-23		White vinyl caulk - West			○	○	○	○	○	○		○	○	○
-24		White vinyl caulk - West			○	○	○	○	○	○		○	○	○
-25		Grey exterior caulk - N. Exterior			○	○	○	○	○	○		○	○	○
-26		Grey exterior caulk - N. Exterior			○	○	○	○	○	○		○	○	○
-27		Grey expansion caulk - N. Exterior			○	○	○	○	○	○		○	○	○
-28		Grey Expansion caulk - N. Exterior			○	○	○	○	○	○		○	○	○
-29		Brown window caulk - NE Exterior			○	○	○	○	○	○		○	○	○
-30		Brow window caulk - NE Exterior			○	○	○	○	○	○		○	○	○

The MN Department of Health Alternative Indoor Air Standard for this project is: | F/CC. | Batch Number: | Samples Acceptable? ○ Yes ○ No

Sampled by	Date	Time	Delivered by	Date	Time	Received by lab	Date	Time	Entered by	Date	Time
Garrett Boggs	05/17/24	AM	Garrett Boggs	05/17/24	PM	Andrew Copland			Andrew Copland		
Received by	**Date**	**Time**	**Delivered by**	**Date**	**Time**	**Analysis by**	**Date**	**Time**	**Delivered by**	**Date**	**Time**
Garrett Boggs	05/17/24	AM									

4594

CHAIN OF CUSTODY

IEA
9201 West Broadway North, Suite 600
Brooklyn Park, MN 55445
(763) 315-7900
1-800-233-9513

Client #
Project # 202410521
Building Name Graham Park Old Highway Shop
Shaded Areas are for Laboratory Use Only!
Client Olmsted County
Project Name 2024 Asbestos and Lead-Based Paint Renovation Inspection
Address 2118 Campus Dr. SE, Rochester MN 55904
Contact Person Mathew Miller
IEA Project Manager Natalie Eskew
Other Information

Verbal results to: IEA Natalie Eskew
Phone, Fax No. or E-Mail: lab@ieasafety.com
TAT (circle) 6 hr 24 hr 48 hr **72 hr** 96 hr Specify

Verbal results relayed to | Verbal results relayed by | Date | Time

Analysis location: ○ On Site ☒ Lab ○ Regional Office ○ Other EMSL

Sample #	Work Area or Phase #	Sample Description/Location	Sample type or Material code	Volume	Matrix type	Analysis requested	Filter type
051724GB-31		Black Ground caulk - N. Exterior	BE		Bulk	PLM	
-32		Black Ground caulk - N. Exterior			Bulk	PLM	
-33		White exterior window covering			Bulk	PLM	
-34		White exterior window covering			Bulk	PLM	

Matrix type: Air, Bulk, Dust. Analysis requested: PCM, PLM, TEM, Other. Filter type: MCE, .8 um, .45 um.

The MN Department of Health Alternative Indoor Air Standard for this project is: F/CC.
Batch Number:
Samples Acceptable? ○ Yes ○ No

Sampled by	Date	Time	Delivered by	Date	Time	Received by lab	Date	Time	Entered by	Date	Time
Garrett Boggs	05/17/24	PM	Garrett Boggs	05/17/24	PM	Andrew Caparl			Andrew Caparl		
Received by	**Date**	**Time**	**Delivered by**	**Date**	**Time**	**Analysis by**	**Date**	**Time**	**Delivered by**	**Date**	**Time**
Garrett Boggs	05/17/24	AM									

OrderID: 352404594

SECTION IV

Lead-Based Paint Inspection Summary

LEAD-BASED PAINT INSPECTION SUMMARY

Inspection for: Olmsted County

Performed at: Graham Park – 1407 3rd Avenue SE, Rochester, MN 55904

Performed by: Mark Clark, Institute for Environmental Assessment

Inspection Dates: May 17, 2024

Instrument Used: SciAps X-550 Pb X-Ray Fluorescence (XRF) Analyzer

Serial Number: X550-01398

Standard: 1.0 mg/cm^2

The inspection was conducted in accordance with the U.S. Department of Housing and Urban Development (HUD) Guidelines for the Evaluation and Control of Lead-Based Paint in Housing. All painted surfaces within renovation areas within the building were randomly inspected.

A total of 149 (one-hundred forty-nine) surfaces were analyzed for lead content utilizing the XRF Analyzer. All samples were given a result of positive or negative for lead (above or below 1.0 mg/cm^2), the standard established by the Minnesota Department of Health (MDH) and HUD for lead in paint. Results are located in Section V.

Positive scan results include:

Surface	Material	Color	Direction	Location	Level
Wall	Concrete	Gray	North	1930s	First
Wall	Plaster	Gray	East	1930s	First
Wall	Plaster	Beige	East	1930s	First
Wall	Concrete	Gray	South	1930s	First
Wall	Concrete	Gray	East	1930s	First
Window Sill	Concrete	Pink	North	1930s Bathroom	First
Window Sill	Concrete	Gray	North	1930s	First
Wall	Wood	Beige	West	1930s Breakroom	Second
Wall	Metal	Silver	West	1930s Breakroom	Second
Window Sill	Concrete	Black	East	1930s Breakroom	Second
Lintel	Metal	Silver	North	1930s	First Interior
Lintel	Metal	Brown	East	1930s	First Exterior

For purposes of renovation, the renovation contractor must be notified of the lead content in paint. It is the contractor's responsibility to comply with OSHA's Lead in Construction Rule 29 CFR 1926.62. OSHA does not acknowledge the standards established by MDH and HUD and regulates any amount of lead in paint.

Calibration check tests were conducted throughout the inspection using standards with a known lead content of 0.0 mg/cm^2 to 3.5 mg/cm^2.

GENERAL COMMENTS

The analysis and opinions expressed in this report are based upon data obtained from Olmsted County at the indicated locations. This report does not reflect variations in conditions that may occur across the site, property, or facility. Actual conditions may vary and may not become evident without further assessment.

The report is prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted practices. Other than as provided in the preceding sentence and in our Proposal #12146 dated May 10, 2024, regarding Hazardous Materials at the Graham Park Old Highway Shop including the General Conditions attached thereto, no warranties are extended or made.

SECTION V

Lead-Based Paint Inspection Report

Olmsted County - Graham Park
"Old Highway Shop"

Date	Test #	Serial #	Pass/Fail	Unit type	Calibration Model/ Matrix ID	Display Sigma	LOD Sigma	Pb	Pb +/-	Pb P/F	Component	Substrate	Color	Side	Room	Floor	Extra Notes
5/17/2024 10:23	2886	X550-01398	Pass	mg/cm2	PCS Cal	1	3	0.99	0.03	Positive	Calibration		Red				
5/17/2024 10:23	2887	X550-01398	Pass	mg/cm2	PCS Cal	1	3	1.03	0.03	Positive	Calibration		Red				
5/17/2024 10:23	2888	X550-01398	Pass	mg/cm2	PCS Cal	1	3	0.99	0.03	Positive	Calibration		Red				
5/17/2024 10:23	2889	X550-01398	Pass	mg/cm2	PCS Cal	1	3	1	0.02	Positive	Calibration		Red				
5/17/2024 10:27	2890	X550-01398		mg/cm2	LeadPaint	1	3	0.02	0.01	Negative	Wall	Concrete	Gray	North	1970's	First	
5/17/2024 10:29	2891	X550-01398		mg/cm2	LeadPaint	1	3	0.01	0.01	Negative	Wall	Concrete	Gray	South	1970's	First	
5/17/2024 10:33	2892	X550-01398		mg/cm2	LeadPaint	1	3	0.13	0.01	Negative	Wall	Concrete	Gray	East	1970's	First	
5/17/2024 10:33	2893	X550-01398		mg/cm2	LeadPaint	1	3	0.02	0.01	Negative	Wall	Concrete	Gray	East	1970's	First	
5/17/2024 10:36	2894	X550-01398		mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Sill	None	White	North	1970's	First	
5/17/2024 10:36	2895	X550-01398		mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Sill	None	White	North	1970's	First	
5/17/2024 10:36	2896	X550-01398		mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Frame	Wood	White	North	1970's	First	
5/17/2024 10:37	2897	X550-01398		mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Frame	Wood	White	North	1970's	First	
5/17/2024 10:38	2898	X550-01398		mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Frame	Wood	Gray	West	1970's	First	
5/17/2024 10:38	2899	X550-01398		mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Frame	Wood	Gray	West	1970's	First	
5/17/2024 10:38	2900	X550-01398		mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Sill	Wood	Gray	West	1970's	First	
5/17/2024 10:38	2901	X550-01398		mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Sill	Wood	Gray	West	1970's	First	
5/17/2024 10:39	2902	X550-01398		mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window	Wood	Gray	West	1970's	First	
5/17/2024 10:39	2903	X550-01398		mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window	Wood	Gray	West	1970's	First	
5/17/2024 10:40	2904	X550-01398		mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window	Metal	Black	West	1970's	First	
5/17/2024 10:40	2905	X550-01398		mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window	Metal	Black	South	1970's	First	
5/17/2024 10:40	2906	X550-01398		mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Frame	Metal	Black	South	1970's	First	
5/17/2024 10:41	2907	X550-01398		mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Frame	Metal	Black	South	1970's	First	
5/17/2024 10:42	2908	X550-01398		mg/cm2	LeadPaint	1	3	0.05	0.01	Negative	Window Sill	Concrete	Gray	East	1970's	First	
5/17/2024 10:42	2909	X550-01398		mg/cm2	LeadPaint	1	3	0.01	0.01	Negative	Window Sill	Concrete	Gray	East	1970's	First	
5/17/2024 10:43	2910	X550-01398		mg/cm2	LeadPaint	1	3	0.82	0.03	Negative	Window Frame	Metal	Gray	East	1970's	First	
5/17/2024 10:43	2911	X550-01398		mg/cm2	LeadPaint	1	3	0.6	0.1	Negative	Window Frame	Metal	Gray	East	1970's	First	
5/17/2024 10:44	2912	X550-01398		mg/cm2	LeadPaint	1	3	0.02	0.01	Negative	Window	Metal	Gray	East	1970's	First	
5/17/2024 10:44	2913	X550-01398		mg/cm2	LeadPaint	1	3	0.03	0.01	Negative	Window	Metal	Gray	East	1970's	First	
5/17/2024 10:46	2914	X550-01398		mg/cm2	LeadPaint	1	3	0.01	0.01	Negative	Wall	Concrete	Gray	West	1930's	First	
5/17/2024 10:46	2915	X550-01398		mg/cm2	LeadPaint	1	3	0.04	0.01	Negative	Wall	Concrete	Gray	West	1930's	First	
5/17/2024 10:47	2916	X550-01398		mg/cm2	LeadPaint	1	3	2.3	0.51	Positive	Wall	Concrete	Gray	North	1930's	First	
5/17/2024 10:47	2917	X550-01398		mg/cm2	LeadPaint	1	3	1.68	0.07	Positive	Wall	Concrete	Gray	North	1930's	First	
5/17/2024 10:48	2918	X550-01398		mg/cm2	LeadPaint	1	3	0.18	0.08	Negative	Wall	Glazed Block	Gray	North	1930's	First	
5/17/2024 10:48	2919	X550-01398		mg/cm2	LeadPaint	1	3	0.05	0.01	Negative	Wall	Glazed Block	Gray	North	1930's	First	
5/17/2024 10:49	2920	X550-01398		mg/cm2	LeadPaint	1	3	3.26	0.21	Positive	Wall	Plaster	Gray	East	1930's	First	
5/17/2024 10:49	2921	X550-01398		mg/cm2	LeadPaint	1	3	2.41	0.63	Positive	Wall	Plaster	Gray	East	1930's	First	
5/17/2024 10:49	2922	X550-01398		mg/cm2	LeadPaint	1	3	3.25	0.22	Positive	Wall	Plaster	Beige	East	1930's	First	
5/17/2024 10:50	2923	X550-01398		mg/cm2	LeadPaint	1	3	4.11	0.27	Positive	Wall	Plaster	Beige	East	1930's	First	
5/17/2024 10:50	2924	X550-01398		mg/cm2	LeadPaint	1	3	4.27	0.76	Positive	Wall	Plaster	Beige	East	1930's	First	
5/17/2024 10:52	2925	X550-01398		mg/cm2	LeadPaint	1	3	1.47	0.2	Positive	Wall	Concrete	Gray	South	1930's	First	
5/17/2024 10:52	2926	X550-01398		mg/cm2	LeadPaint	1	3	1.73	0.11	Positive	Wall	Concrete	Gray	South	1930's	First	
5/17/2024 10:53	2927	X550-01398		mg/cm2	LeadPaint	1	3	0.02	0.01	Negative	Wall	Glazed Block	Tan	South	1930's	First	
5/17/2024 10:53	2928	X550-01398		mg/cm2	LeadPaint	1	3	0.08	0.01	Negative	Wall	Glazed Block	Tan	South	1930's	First	
5/17/2024 10:53	2929	X550-01398		mg/cm2	LeadPaint	1	3	0.16	0.07	Negative	Wall	Glazed Block	Gray	South	1930's	First	

5/17/2024 10:54	2930	X550-01398	mg/cm2	LeadPaint	1	3	0.06	0.01	Negative	Wall	Glazed Block	Gray	South	1930's	First
5/17/2024 10:54	2931	X550-01398	mg/cm2	LeadPaint	1	3	0.08	0.01	Negative	Wall	Glazed Block	White	East	1930's	First
5/17/2024 10:55	2932	X550-01398	mg/cm2	LeadPaint	1	3	0.03	0.01	Negative	Wall	Glazed Block	White	East	1930's	First
5/17/2024 10:55	2933	X550-01398	mg/cm2	LeadPaint	1	3	3.92	0.79	Positive	Wall	Concrete	Gray	East	1930's	First
5/17/2024 10:55	2934	X550-01398	mg/cm2	LeadPaint	1	3	3.2	0.2	Positive	Wall	Concrete	Gray	East	1930's	First
5/17/2024 10:56	2935	X550-01398	mg/cm2	LeadPaint	1	3	0.08	0.01	Negative	Window Sill	Concrete	Gray	South	1930's	First
5/17/2024 10:56	2936	X550-01398	mg/cm2	LeadPaint	1	3	0.17	0.01	Negative	Window Sill	Concrete	Gray	South	1930's	First
5/17/2024 10:57	2937	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Frame	Metal	Black	South	1930's	First
5/17/2024 10:57	2938	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Frame	Metal	Black	South	1930's	First
5/17/2024 10:57	2939	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window	Metal	Black	South	1930's	First
5/17/2024 10:57	2940	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window	Metal	Black	South	1930's	First
5/17/2024 10:59	2941	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Wall	Drywall	White	North	1930's Bathroom	First
5/17/2024 10:59	2942	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Wall	Drywall	White	North	1930's Bathroom	First
5/17/2024 11:00	2943	X550-01398	mg/cm2	LeadPaint	1	3	1.44	0.25	Positive	Window Sill	Concrete	Pink	North	1930's Bathroom	First
5/17/2024 11:00	2944	X550-01398	mg/cm2	LeadPaint	1	3	1.79	0.37	Positive	Window Sill	Concrete	Pink	North	1930's Bathroom	First
5/17/2024 11:00	2945	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Sill	Concrete	Pink	North	1930's Bathroom	First
5/17/2024 11:01	2946	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Frame	Wood	Pink	North	1930's Bathroom	First
5/17/2024 11:01	2947	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Frame	Wood	Pink	North	1930's Bathroom	First
5/17/2024 11:02	2948	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window	Metal	Gray	North	1930's Bathroom	First
5/17/2024 11:02	2949	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window	Metal	Gray	North	1930's Bathroom	First
5/17/2024 11:03	2950	X550-01398	mg/cm2	LeadPaint	1	3	0.72	0.1	Negative	Window Sill	Concrete	Gray	North	1930's	First
5/17/2024 11:03	2951	X550-01398	mg/cm2	LeadPaint	1	3	1.76	0.15	Positive	Window Sill	Concrete	Gray	North	1930's	First
5/17/2024 11:03	2952	X550-01398	mg/cm2	LeadPaint	1	3	1.87	0.15	Positive	Window Sill	Concrete	Gray	North	1930's	First
5/17/2024 11:04	2953	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Wall	Drywall	White	East	1930's Office	First
5/17/2024 11:04	2954	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Wall	Drywall	White	East	1930's Office	First
5/17/2024 11:05	2955	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Sill	Wood	Pink	East	1930's Office	First
5/17/2024 11:05	2956	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Sill	Wood	Pink	East	1930's Office	First
5/17/2024 11:06	2957	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window	Wood	None	East	1930's Office	First
5/17/2024 11:06	2958	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window	Wood	None	East	1930's Office	First
5/17/2024 11:07	2959	X550-01398	mg/cm2	LeadPaint	1	3	0.06	0.01	Negative	Wall	Concrete	Gray	East	1930's Breakroom	Second
5/17/2024 11:07	2960	X550-01398	mg/cm2	LeadPaint	1	3	0.07	0.01	Negative	Wall	Concrete	Gray	East	1930's Breakroom	Second
5/17/2024 11:08	2961	X550-01398	mg/cm2	LeadPaint	1	3	0.03	0.01	Negative	Wall	Concrete	Gray	East	1930's Breakroom	Second
5/17/2024 11:08	2962	X550-01398	mg/cm2	LeadPaint	1	3	0.02	0.01	Negative	Wall	Concrete	Tan	North	1930's Breakroom	Second
5/17/2024 11:08	2963	X550-01398	mg/cm2	LeadPaint	1	3	0.03	0.01	Negative	Wall	Concrete	Tan	North	1930's Breakroom	Second
5/17/2024 11:09	2964	X550-01398	mg/cm2	LeadPaint	1	3	3.79	0.15	Positive	Wall	Wood	Beige	West	1930's Breakroom	Second
5/17/2024 11:09	2965	X550-01398	mg/cm2	LeadPaint	1	3	4.15	0.17	Positive	Wall	Wood	Beige	West	1930's Breakroom	Second
5/17/2024 11:10	2966	X550-01398	mg/cm2	LeadPaint	1	3	5	0.19	Positive	Wall	Metal	Silver	West	1930's Breakroom	Second
5/17/2024 11:10	2967	X550-01398	mg/cm2	LeadPaint	1	3	4.93	0.19	Positive	Wall	Metal	Silver	West	1930's Breakroom	Second
5/17/2024 11:11	2968	X550-01398	mg/cm2	LeadPaint	1	3	2.15	0.12	Positive	Window Sill	Concrete	Black	East	1930's Breakroom	Second
5/17/2024 11:11	2969	X550-01398	mg/cm2	LeadPaint	1	3	2.29	0.44	Positive	Window Sill	Concrete	Black	East	1930's Breakroom	Second
5/17/2024 11:12	2970	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Wall	Drywall	White	East	1930's Breakroom	Second
5/17/2024 11:12	2971	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Wall	Drywall	White	East	1930's Breakroom	Second
5/17/2024 11:12	2972	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Sill	Wood	Varnish	East	1930's Breakroom	Second
5/17/2024 11:12	2973	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Sill	Wood	Varnish	East	1930's Breakroom	Second
5/17/2024 11:14	2974	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Frame	Metal	Gray	East	1930's Breakroom	Second
5/17/2024 11:14	2975	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Frame	Metal	Gray	East	1930's Breakroom	Second
5/17/2024 11:15	2976	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window	Wood	Varnish	East	1930's Breakroom	Second

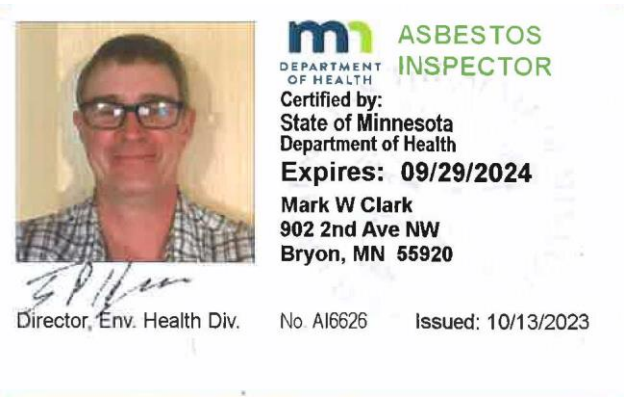
5/17/2024 11:15	2977	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window	Wood	Varnish	East	1930's Breakroom	Second	
5/17/2024 11:16	2978	X550-01398	mg/cm2	LeadPaint	1	3	0.09	0.06	Negative	Window Sill	Wood	White	West	1930's Breakroom	Second	
5/17/2024 11:16	2979	X550-01398	mg/cm2	LeadPaint	1	3	0.03	0.03	Negative	Window Sill	Wood	White	West	1930's Breakroom	Second	
5/17/2024 11:16	2980	X550-01398	mg/cm2	LeadPaint	1	3	0.05	0.01	Negative	Window Frame	Wood	White	West	1930's Breakroom	Second	
5/17/2024 11:16	2981	X550-01398	mg/cm2	LeadPaint	1	3	0.14	0.07	Negative	Window Frame	Wood	White	West	1930's Breakroom	Second	
5/17/2024 11:17	2982	X550-01398	mg/cm2	LeadPaint	1	3	0.05	0.01	Negative	Window	Wood	White	West	1930's Breakroom	Second	
5/17/2024 11:17	2983	X550-01398	mg/cm2	LeadPaint	1	3	0.05	0.05	Negative	Window	Wood	White	West	1930's Breakroom	Second	
5/17/2024 11:17	2984	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Baseboard	Wood	Varnish	East	1930's Breakroom	Second	
5/17/2024 11:18	2985	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Baseboard	Wood	Varnish	East	1930's Breakroom	Second	
5/17/2024 11:20	2986	X550-01398	mg/cm2	LeadPaint	1	3	0.15	0.06	Negative	Wall	Plaster	Cream	West	1930's Breakroom	Second	
5/17/2024 11:20	2987	X550-01398	mg/cm2	LeadPaint	1	3	0.23	0.08	Negative	Wall	Plaster	Cream	West	1930's Breakroom	Second	
5/17/2024 11:25	2988	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Door	Metal	Cream	North	1970's	First	Exterior
5/17/2024 11:25	2989	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Door	Metal	Cream	North	1970's	First	
5/17/2024 11:26	2990	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Door Frame	Metal	Gray	North	1970's	First	
5/17/2024 11:26	2991	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Door Frame	Metal	Gray	North	1970's	First	
5/17/2024 11:26	2992	X550-01398	mg/cm2	LeadPaint	1	3	0.06	0.01	Negative	Lintel	Metal	Gray	North	1970's	First	
5/17/2024 11:27	2993	X550-01398	mg/cm2	LeadPaint	1	3	0.01	0.01	Negative	Lintel	Metal	Gray	North	1970's	First	
5/17/2024 11:28	2994	X550-01398	mg/cm2	LeadPaint	1	3	0.01	0.01	Negative	Window Apron	Metal	Beige	North	1970's	First	
5/17/2024 11:28	2995	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Apron	Metal	Beige	North	1970's	First	
5/17/2024 11:28	2996	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Apron	Concrete	Black	North	1970's	First	
5/17/2024 11:28	2997	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Apron	Concrete	Black	North	1970's	First	
5/17/2024 11:29	2998	X550-01398	mg/cm2	LeadPaint	1	3	0.11	0.05	Negative	Door Frame	Metal	Gray	North	1970's	First	
5/17/2024 11:29	2999	X550-01398	mg/cm2	LeadPaint	1	3	0.14	0.06	Negative	Door Frame	Metal	Gray	North	1970's	First	
5/17/2024 11:30	3000	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Door Frame	Metal	White	North	1970's	First	
5/17/2024 11:30	3001	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Door Frame	Metal	White	North	1970's	First	
5/17/2024 11:31	3002	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Frame	Metal	Gray	West	1970's	First	
5/17/2024 11:32	3003	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Frame	Metal	Gray	West	1970's	First	
5/17/2024 11:32	3004	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window	Metal	Gray	West	1970's	First	
5/17/2024 11:32	3005	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window	Metal	Gray	West	1970's	First	Exterior
5/17/2024 11:33	3006	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Casing	Metal	Black	South	1970's	First	Exterior
5/17/2024 11:33	3007	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Casing	Metal	Black	South	1970's	First	
5/17/2024 11:34	3008	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Frame	Metal	Black	South	1970's	First	
5/17/2024 11:34	3009	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Frame	Metal	Black	South	1970's	First	
5/17/2024 11:40	3010	X550-01398	mg/cm2	LeadPaint	1	3	0.04	0.01	Negative	Lintel	Metal	Silver	West	1970's	First	
5/17/2024 11:40	3011	X550-01398	mg/cm2	LeadPaint	1	3	0.05	0.01	Negative	Lintel	Metal	Silver	West	1970's	First	
5/17/2024 11:41	3012	X550-01398	mg/cm2	LeadPaint	1	3	0.03	0.01	Negative	Lintel	Metal	Silver	West	1970's	First	
5/17/2024 11:41	3013	X550-01398	mg/cm2	LeadPaint	1	3	0.03	0.01	Negative	Lintel	Metal	Silver	West	1970's	First	
5/17/2024 11:43	3014	X550-01398	mg/cm2	LeadPaint	1	3	0.05	0.04	Negative	Lintel	Metal	Silver	North	1970's	First	
5/17/2024 11:43	3015	X550-01398	mg/cm2	LeadPaint	1	3	0.01	0.01	Negative	Lintel	Metal	Silver	North	1970's	First	
5/17/2024 11:44	3016	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Frame	Metal	Brown	North	1970's	First	
5/17/2024 11:44	3017	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Frame	Metal	Brown	North	1970's	First	
5/17/2024 11:44	3018	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window	Metal	Brown	North	1970's	First	
5/17/2024 11:44	3019	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window	Metal	Brown	North	1970's	First	
5/17/2024 11:45	3020	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Casing	Metal	Black	North	1970's	First	
5/17/2024 11:45	3021	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Casing	Metal	Black	North	1970's	First	
5/17/2024 11:45	3022	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Frame	Metal	Black	North	1970's	First	
5/17/2024 11:45	3023	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window Frame	Metal	Black	North	1970's	First	

5/17/2024 11:46	3024	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window	Metal	Black	North	1970's	First	
5/17/2024 11:46	3025	X550-01398	mg/cm2	LeadPaint	1	3	0	0.01	Negative	Window	Metal	Black	North	1970's	First	
5/17/2024 11:47	3026	X550-01398	mg/cm2	LeadPaint	1	3	3.26	0.15	Positive	Lintel	Metal	Silver	North	1930's	First	
5/17/2024 11:47	3027	X550-01398	mg/cm2	LeadPaint	1	3	4.93	0.21	Positive	Lintel	Metal	Silver	North	1930's	First	
5/17/2024 11:49	3028	X550-01398	mg/cm2	LeadPaint	1	3	4.6	0.22	Positive	Lintel	Metal	Silver	North	1930's	First	Interior
5/17/2024 11:50	3029	X550-01398	mg/cm2	LeadPaint	1	3	4.47	0.21	Positive	Lintel	Metal	Silver	North	1930's	First	
5/17/2024 11:54	3030	X550-01398	mg/cm2	LeadPaint	1	3	3.43	0.18	Positive	Lintel	Metal	Brown	East	1930's	First	Exterior
5/17/2024 11:54	3031	X550-01398	mg/cm2	LeadPaint	1	3	3.12	0.17	Positive	Lintel	Metal	Brown	East	1930's	First	
5/17/2024 11:56	3032	X550-01398	mg/cm2	LeadPaint	1	3	1.02	0.03	Positive	Calibration	None	None	A		None	
5/17/2024 11:56	3033	X550-01398	mg/cm2	LeadPaint	1	3	1.15	0.04	Positive	Calibration	None	None	A		None	
5/17/2024 11:57	3034	X550-01398	mg/cm2	LeadPaint	1	3	1.07	0.03	Positive	Calibration	None	None	A		None	

SECTION VI

Asbestos Inspector and Lead Assessor License(s)

Asbestos Inspector State Certification/Accreditation



Inspector

I have completed an EPA-approved training course and all appropriate refresher courses and am licensed as an Asbestos Inspector by the Minnesota Department of Health.

Signature	May 17, 2024 Date of Inspection
Mark Clark Print Name	AI6626 State Certification/Accreditation Number

Asbestos Inspector State Certification/Accreditation

Inspector

I have completed an EPA-approved training course and all appropriate refresher courses and am licensed as an Asbestos Inspector by the Minnesota Department of Health.

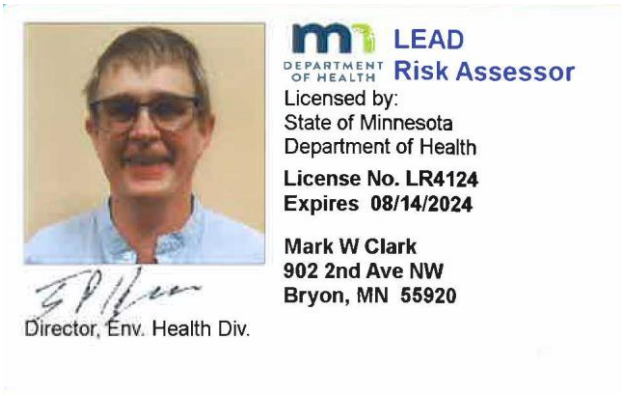
Signature

May 17, 2024
Date of Inspection

Garrett Boggs
Print Name

AI15356
State Certification/Accreditation Number

Lead Risk Assessor Certification/Accreditation



Risk Assessor

I have completed an approved training course and all appropriate refresher courses and am licensed as a Lead Risk Assessor by the Minnesota Department of Health.

Signature

May 17, 2024
Date of Inspection

Mark Clark
Print Name

LR4124
State Certification/Accreditation Number