City of Milwaukee
Department of Public Works
Milwaukee Water Works

Specifications for
Official Notice No. 99-2012

HP-178 Filter Building - Roof Replacement

2012

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GENERAL REQUIREMENTS

PART 1 DEPARTMENT OF PUBLIC WORKS – GENERAL SPECIFICATIONS

The Department of Public Works General Specifications applies to all contracts. These specifications are in a separate booklet.

PART 2 SPECIFIC OFFICIAL NOTICE AND GENERAL OFFICIAL NOTICE

The Specific Official Notice as it appears in The Daily Reporter and General Official Notice is part of these Contract Documents.

PART 3 SPECIFICATIONS

HP-178; Filter Building – Roof Replacement

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JOB REQUIREMENTS

HP-178 FILTER BUILDING ROOF REPLACEMENT

JR-1 FORM OF BID Contractor shall submit a lump sum bid for furnishing the complete job in accordance with plans and specifications.

JR-2 JOB LOCATION The Howard Avenue Water Purification Plant is located at 3929 South 6th Street, Milwaukee, WI 53221.

JR-3 GENERAL DESCRIPTION OF WORK The work to be performed under the provisions of this contract and as set forth in these documents consists of the supply and installation of all materials, labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of every nature, inspection, and rentals for all work involved and described below.

JR-4 CONTRACT DRAWINGS The contract drawings upon which the proposal is to be based are listed hereunder:

HP - 178 - 01	Location Map and Drawing Index
HP - 178 - 02	Roof Plan
HP - 178 - 03	Insulation Plan
HP - 178 - 04	Roof Section and Details

The contract drawings are general in nature and are intended to indicate the relative locations of materials specified in the areas indicated. Dimensions and elevations indicated on the drawings in reference to existing structures or utilities are the best available data obtainable but are not guaranteed by the City of Milwaukee (City) and the City will not be responsible for their accuracy. Before bidding on any work dependent upon the data involved, the contractor shall field check and verify all dimensions, grades, lines, levels or other conditions of limitations at the site to avoid construction errors.

JR-5 REFERENCE DRAWINGS The following reference drawings are the original construction drawings. These are included here for general information only:

HP - 79 - 1	Filter Building Roofing Work

Dimensions and elevations indicated on the drawings in reference to existing structures or utilities are the best available data obtainable but are not guaranteed by the City and the City will not be responsible for their accuracy. Before bidding on any work dependent upon the data involved, the contractor shall field check and verify all dimensions, grades, lines, levels or other conditions of limitations at the site to avoid construction errors.

JR-6 PRE-BID MEETING A **MANDATORY** Pre-Bid Meeting for all prospective bidders will be held on Thursday, September 13, 2012 at 9:00 A.M. in the Howard Avenue Water Purification Plant, 3929 South 6th Street, Milwaukee WI, 53221. The City will **ONLY** receive bids from prospective bidders who are in attendance at the **MANDATORY** Pre-Bid Meeting. The official envelope for submitting a bid and bid bond form will be available at the **MANDATORY** Pre-Bid Meeting. All attendees are required to e-mail anthony.j.supinski@milwaukee.gov and mark.a.gremmer@milwaukee.gov at least 24 hours in advance of the Pre-Bid Meeting to be placed on the visitor list for access to the Howard Avenue Water Purification Plan.

JR-7 SITE VISIT A site visit will be available at the conclusion of the **MANDATORY** Pre-Bid Meeting.

JR-8 PRE-CONSTRUCTION MEETING After the Notice to Proceed is issued, a date shall be set for the pre-construction meeting to be held at the job site. Construction details of the project will be discussed in the meeting.

JR-9 JOB SCHEDULE Within ten (10) days after Notice to Proceed is issued; the contractor shall submit a construction schedule for approval. The schedule shall be made in sufficient detail to indicate dates of each significant operation. The schedule shall be such that the entire job will be completed within the specified completion time. Microsoft Project 2000 shall be used to create the schedule. Submit an electronic file and hard copy of the schedule.

The contractor shall place all orders for materials promptly after award of the contract. With submittal of the construction schedule, he shall include a schedule of delivery of all major material and equipment required for the job.

The contractor shall immediately notify the City, in writing, of any problems with meeting this schedule. If the construction schedule cannot be met because of materials or equipment deliveries, the contractor shall be required to submit purchase orders and confirmations of delivery, showing the date the order was placed and the promised date of delivery.

JR-10 WORK DAYS AND TIMES Work shall take place between the hours of 7:30 AM to 3:30 PM. Work shall not be allowed on Sunday or City holidays.

JR-11 START AND COMPLETION DATE Work on this project shall be complete by Friday, November 16, 2012.

JR-12 CHARGE FOR INSPECTION The contractor will be charged $350.00 per day, per inspector for each and every day inspection is required on this contract after the date allowed for completion or after such extension of time as may have been granted. This charge is further defined in Section 2.5.11 of the Department of Public Works (DPW) General Specifications.

JR-13 PROGRESS PAYMENTS Within ten (10) days after the Notice to Proceed is issued, the contractor shall submit to the City for approval a schedule showing the breakdown of the contract with quantities and prices as a basis for checking and computing progress estimates. The values shown in the approved breakdown shall be used for pay purposes only and shall not be used as a basis for additions to or deductions from contract work.

When the contractor proceeds properly and with diligence to perform and complete the work on this contract, the Commissioner of Public Works (Commissioner) may, from time to time as the work progresses, grant to the contractor an estimate of the amount already earned. In making such progress estimates, there shall be retained 5% of each progress estimate until final completion and acceptance of the work; except that after 50% of the work has been completed and the Commissioner finds that satisfactory progress is being made and all conditions complied with, he may authorize any of the remaining progress payments to be paid in full to the contractor. Progress payments are further defined in Section 2.9.14 of the Department of Public Works (DPW) General Specifications.

In accordance with Charter Ordinance 7.26 as amended June 1, 1972, payment for materials delivered to the work or storage site may be authorized by the Commissioner providing the following terms and conditions are met:

A. The work is progressing properly and such materials as specified are properly stored and suitable for permanent incorporation in the work.

B. Materials designated for pay in the next progress estimate after delivery shall be limited to fabricated or manufactured components which are assembled in final form ready for placement in the work

C. The following forms shall be submitted with requests for payment.

1. Progress Estimate and Request for Payment for Fabricated Materials or Components Properly Stored.

2. Certification of the contractor or his duly authorized representative.

Field Engineer shall verify that material is as specified and properly stored.

D. The contractor shall be responsible for the safeguarding of any such materials against loss or damage whatsoever, and in the case of any loss or damage, the contractor shall replace such lost or damaged materials at no cost to the City. The Commissioner shall reserve the right to deduct from ensuing progress estimates the value of any lost or damaged materials until such loss or damage is restored by the contractor.

E. The Commissioner may limit processing progress estimates to those cases where the amount earned in any pay period for work and materials is $5,000 or more.

F. Any materials for which payment has been made shall not be removed from the work or storage site without the specific written approval of the Commissioner.

JR-14 FORMAL CORRESPONDENCE Formal correspondence shall be addressed to:
Ms. Carrie M. Lewis, Superintendent of Milwaukee Water Works, Zeidler Municipal Building, 841 North Broadway, Room 409, Milwaukee, WI 53202.
Formal correspondence shall include:

1. Request for Change Order.
2. Request for extension of Completion Date
3. Disputes concerning Payment or Field Issues.
4. Payment Requests.
5. Submittals.

END OF SECTION

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Contract description
2. Existing and general conditions
3. Asbestos abatement
4. Protection of work and property
5. Inspection of work
6. Qualifications
7. Owner occupancy
8. Specifications and standards
9. Shop drawings
10. Warranty and guarantee

1.02 CONTRACT DESCRIPTION

A. This contract includes the furnishing of all equipment, labor, supervision, materials and appurtenances for and in connection with the demolition and replacement of the roof on the Filter Building as shown on the contract drawings and further specified herein.

B. Provide a complete, hot applied asphalt built-up roofing system. The work to be performed shall include but not be limited to the following:

1. Remove ballast, single-ply membrane roofing system and insulation, underlying built-up roofing system and insulation. After demolition, existing concrete deck shall be exposed in its entirety.

2. Remove flashings, counter-flashings, wood blocking, cant strips and tapered lightweight concrete saddles. Remove tapered saddles alongside expansion joints.

3. Evaluate the condition and slope of the concrete deck. Notify the City of all findings prior to placing order for materials. Notify City if slope of deck is below the minimum required for proper drainage.

4. Inspect existing roof drains for damage. Provide new hardware for attaching roof drain's ring to sump. Provide gravel stops for roof drains.

5. Prior to installation of built-up roof, cracks and spalling in the concrete deck shall be repaired. Cracks wider than ¼" shall be filled. Spalled concrete deeper than ¼" shall be filled.

6. Seal joints between precast concrete panels with 6" strips of asphalt coated base sheet set in asphalt mastic.

7. Provide single-ply vapor retarder set in Type III asphalt.

8. Provide insulation set in Type III asphalt.

9. Provide tapered insulation crickets and saddles set in Type III asphalt to ensure drainage.

10. Provide cover board insulation set in Type III asphalt over the bottom layers of insulation.

11. Provide cants per contract documents.

12. Provide a polyester reinforced asphalt coated base sheet set in SEBS rubber modified asphalt

13. Provide three plies of Type VI roofing felts set in SEBS rubber modified asphalt.

14. Provide two-ply flashing system of base sheet and flashing set in SEBS rubber modified asphalt.

15. Provide flood coat and fully embed roofing pea gravel to field membrane.

16. Provide fiberated aluminum coating to exposed bituminous membrane.

17. Provide metal edge flashing and metal counter flashing per contract documents.

18. Provide manufactured perimeter edge, sheet metal flashing, trim, curbs, pitch pockets and collars where necessary.

19. Clean and restore worksite to original condition.

20. Provide a thirty (30) year system guarantee.

1.03 EXISTING AND GENERAL CONDITIONS

A. The existing roofing system is a ballasted, EPDM roof installed over a built-up roof system. The roof deck is built with precast concrete panels.

B. The roofs contain internal drains which direct rainwater to the interior of the building. The roof has structural slope to the center. There are four expansion joints which will require removal and reinstallation per the contract documents.

1.04 ASBESTOS ABATEMENT

A. Materials containing asbestos have not been discovered in the existing roofing systems. A firm was retained to provide complete asbestos testing and sampling of the existing roof systems. See Appendix for a copy of Asbestos NESHAP Inspection Report.

1.05 PROTECTION OF WORK AND PROPERTY

A. All materials shall be stored in locations other than on roof surfaces except as necessary and shall then be placed on plywood or other type of material to protect the roof surface at all times. Loads placed on the roof at any point shall not exceed the safe load for which the roof is designed.

B. Before starting any work, the contractor shall protect all grounds, copings, paving and exterior of all buildings where work will be performed.

C. In those areas where materials and/or hot asphalt will be raised to the roof area, a protective covering shall be placed from the base of the wall extending up and over the top edge of the roof. This coverage shall be wide enough to assure that the exterior walls do not become stained or soiled during roofing operations.

D. Any areas of the building or grounds which have become stained or damaged in any way shall be repaired or replaced by the contractor prior to the final inspections. The method of repair used must be acceptable to the City.

E. Existing roof top equipment, walls, windows, etc. shall be completely protected by masking or other effective methods. Any mastics or asphalt must be cleaned off metal surfaces.

F. All damage to lawn areas shall be repaired to the satisfaction of the Commissioner. No vehicles larger than a four-wheel drive vehicle or a four-wheel trailer shall be allowed on the underground basins. No equipment that weighs in excess of 4,000 lbs. shall be allowed on the underground basins.

G. Provide containment for roofing kettle and liquid roofing materials that are located above underground basins. Liquid roofing materials shall not come in contact with ground.

H. The contractor shall ensure that construction activities do not damage vehicles located near the work site. The contractor shall be responsible for protecting vehicles from construction debris and roofing materials.

I. Damages caused by water infiltration resulting from the failure of the contractor to secure each day's work in a weather-tight manner, will be corrected at the contractor's expense. Included as damages will be all labor costs incurred by the City as a result of such water infiltration.

1.06 INSPECTION OF WORK

A. Where the drawings or specifications require the inspection and approval of any work in progress by the inspector, the contractor shall give the inspector ample notice to allow for scheduling the inspection, which shall be made promptly to avoid delay of work. If work has progressed without the required inspections or approval by the inspector, it shall be uncovered for inspection at the contractor's expense.

B. If directed by the City, the contractor shall cut not more than four (4) cores, of approximately 200 square inches each, from every newly constructed roof area, in order to establish the amount of materials used per square foot, and shall restore all such areas to sound and water-tight conditions as prior to the core testing.

C. In the event that such core cuts disclose any deficiency in materials, or soundness of construction, the contractor shall, at his/her own expense, apply additional materials or otherwise correct the deficiencies to the satisfaction of the City.

1.07 QUALIFICATIONS

A. The roof system shall be applied by contractors who have received approval from the material manufacturer who is issuing the system warranty for such installations.

1.08 OWNER OCCUPANCY

A. The City will occupy the premises during the entire period of construction.

B. Cooperate with City to minimize conflict, and to facilitate City’s operations.

C. Schedule the work to accommodate City occupancy.

1.09 SPECIFICATIONS AND STANDARDS

A. Materials, general design, design loads, allowable stresses, joint design, shop fabrication and field construction shall conform to the requirements of the following latest standard specifications of any technical society, organization, or association, or to codes of local or state authorities:

1. NEC, National Electric Code.
2. AWWA, American Water Works Association.
3. IEEE, Institute of Electrical and Electronic Engineers.
4. ANSI, American National Standards Institute.
5. SSPC, Society for Protective Coatings.
6. ASTM, American Society for Testing and Material.
7. Wisconsin Administrative Code.
8. OSHA, U.S. Department of Labor Occupational Safety and Health Act.
9. EPA, United States Environmental Protection Agency.

B. The contractor shall be familiar with the requirements of the above agencies. Any conflict in the contract drawings, these specifications, the contractor's design or construction methods shall result in this contractor performing in a manner which conforms to the applicable requirements. Agencies and/or associations not specified above are referenced in individual specification sections as required.

1.10 SHOP DRAWINGS

A. Within three (3) weeks after Notice to Proceed is issued, the contractor shall submit to the City for approval a minimum three (3) copies of all shop, fabrication, assembly, and other drawings required by the specifications; all drawings of equipment and devices offered by the contractor; all drawings showing essential details of any change in design or construction proposed by the contractor; and all necessary wiring, piping and appurtenance layouts. Drawings of equipment and devices shall show sufficient detail to adequately depict the construction and operation of each item.

B. Each shop drawing shall bear City of Milwaukee, the name and location of the structure, job number, the name of contractor, the date of the drawing, the date of each correction or revision and the specification numbers and plan sheet numbers applicable thereto.

C. Three (3) revised copies of each drawing shall be submitted each time a drawing is returned to the contractor for revision. The final approval of a drawing shall be included in the operation and maintenance manuals.

D. After approval by the City, all such drawings shall become a part of the contract documents and the work or equipment shown thereby shall be furnished and installed as shown unless otherwise required by the City. No work shall be performed or equipment manufactured until drawings have been approved. The approval of drawings submitted by the contractor will be for, and will cover only general conformity to the plans and specifications and will not constitute a blanket approval of all dimensions, quantities, or details of the material or equipment shown by such drawings, nor shall such approval relieve the contractor of responsibility for errors contained therein.

E. At the completion of work and prior to final payment, the contractor shall provide the City with three (3) sets of "as-built" drawings for the completed job showing all new and modified appurtenances. All conduit or similar items shall be located by dimensions and elevations. The contractor will be responsible for the accuracy of these drawings.

1.11 WARRANTY AND GUARANTEE

A. The contractor shall furnish a written two (2) year warranty from the date of official acceptance against defective materials or workmanship before the final payment is made.

B. During the period of two (2) years from and after the date of official acceptance by the City of the work embraced by this contract, the contractor shall make all needed repairs arising out of defective workmanship or materials, or both, which in the judgment of the Commissioner of Public Works (Commissioner), shall become necessary during such period. The contractor shall inspect the roof with the engineer 22 months after completion, and correct any workmanship defects before the 24th month following the date of official acceptance.

C. Whenever defective equipment or materials are replaced, the warranty period for the replacement equipment or materials shall be the remaining warranty period for the original, replaced equipment or materials.

D. If within ten (10) days after mailing of a notice in writing to the contractor, or his agent, the said contractor shall neglect to make, or undertake with due diligence to make, the aforesaid repairs, the City is hereby authorized to make such repair at the contractor's expense; providing, however, that in case of an emergency where, in the judgment of the Commissioner, delay would cause serious loss or damage, repairs may be made without notice being sent to the contractor, and the contractor shall pay the cost thereof.

E. The contractor shall also furnish written guarantees as required by each section. Length of time and requirements of guarantees are specified in each section. Each guarantee shall commence on the date of official acceptance. Final payment will not be paid until the City receives all guarantees.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01039

COORDINATION AND MEETINGS

PART 1 GENERAL

1.01 SECTION INCLUDES:

A. Coordination

B. Alterations

C. Cutting and Patching

D. Pre-construction Meeting

E. Pre-installation Meetings

F. Progress Meetings

1.02 COORDINATION

A. Coordinate scheduling, submittals, and work on the various sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements.

B. Verify that the City requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordinate space requirements and installation of appurtenance, mechanical and electrical work. Follow routing shown for pipes, and conduit, as closely as practicable; place runs parallel with line of structure. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

D. Coordinate completion and clean-up of work of separate sections in preparation for substantial completion.

E. Coordinate correction of defective work and work not in accordance with contract documents, to minimize disruption of the City's activities.

1.03 ALTERATIONS

A. Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.

C. Remove, cut and patch work in a manner to minimize damage and to provide a means of restoring products and finishes to original condition.

D. Refinish visible existing surfaces to original condition.

E. Where new work abuts or align with existing, perform a smooth and even transition. Patched work to match existing adjacent work in texture and appearance.

F. When finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to the City.

G. Patch or replace portions of existing surfaces that are damaged, lifted or discolored, or showing other imperfections.

H. Finish surfaces as specified in individual product sections.

1.04 CUTTING AND PATCHING

A. Employ skilled and experienced installer to perform cutting and patching.

B. Submit written request in advance of cutting or altering elements which affects:

1. Structural integrity of element.

2. Integrity of weather-exposed or moisture resistant element.

3. Efficiency, maintenance or safety of element.

4. Visual qualities of sight-exposed elements.

5. Work of City or separate contractor.

C. Execute cutting, fitting and patching to complete work, and to:

1. Fit the several parts together, to integrate with other work.

2. Uncover work to install or correct 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.

6. Execute work by methods which will avoid damage to other work, and provide proper surfaces to receive patching and finishing.

7. Cut rigid materials using masonry saw or core drill.

8. Restore work with new products in accordance with requirements of contract documents.

9. Fit work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

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

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

12. Identify and hazardous substance or condition exposed during the work to the City.

1.05 PRECONSTRUCTION MEETING

A. The City will schedule a pre-construction conference after Notice of Award.

B. Attendance Required: City and contractor.

C. Agenda

1. Submission of executed bonds and insurance certificates (unless previously submitted to DPW).

2. Submission of list of Subcontractor, list of products, Schedule of Values, and progress schedule.

3. Designation of personnel representing the parties in contract.

4. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, change orders and contract closeout procedures.

5. Scheduling and reports.

6. Use of premises by City and contractor.

7. Construction facilities and controls provided by City.

8. Temporary utilities and controls provided by City, if any.

9. Security and housekeeping procedures.

10. Procedures for testing.

11. Procedures for start-up of equipment.

12. Requirements for maintaining record documents.

13. Inspection and acceptance of equipment put into service during construction period.

14. Conflicts.

15. A review of contract documents shall be made and deviations or differences shall be resolved.

16. Establish which areas on-site will be available for use as storage areas and working area.

1.06 PRE-INSTALLATION MEETING

A. When determined by the City, convene a pre-installation meeting at work site prior to commencing work.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify all parties four (4) days in advance of meeting date.

D. The Milwaukee Water Work's representative will prepare agenda, preside at meetings, record minutes, and distribute copies within three (3) days after the meeting to participants.

E. Review conditions of installation, preparation and installation procedures, and coordination with related work.

1.07 PROGRESS MEETING

A. The City will schedule and administer meetings throughout progress of the work as required.

B. The City will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes, and distribute copies within three (3) days to the City, participants, and those affected by decisions made.

C. Attendance Required: Contractor's general superintendent, major subcontractors and suppliers, City, as appropriate to agenda topics for each meeting.

D. Agenda

1. Review minutes of previous meeting.
2. Review of work.
3. Field observations, problems and decisions.
4. Field observations of problems that impede planned progress.
5. Review submittal schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards of proposed changes on progress schedule and coordination.
12. Other business relating to work.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01500

JOB SITE SECURITY, UTILITES AND FACILITIES

PART 1 SCOPE

1.01 INDEX

A. Scope

B. Security and Safety

C. City of Milwaukee Permits

D. Occupancy during construction

E. Electric Power

F. Water

G. Toilet Facilities

H. Deliveries

1.02 GENERAL CONDITIONS

A. All operations shall be carried on with a minimum of damage and disturbance. All damages shall be repaired to the original condition to the satisfaction of the engineering representative.

B. All removals become the property of the contractor and shall be disposed of off the site unless otherwise specified.

1.03 TEMPORARY VENTILATION

A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

1.04 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Protect non-owned vehicular traffic stored materials, site and structures from damage.

1.05 PROGRESS CLEANING

A. Waste materials, debris, and rubbish shall be removed daily after work. Maintain site in a clean and orderly condition.

B. Clean and repair damage caused by removals or installations.

C. Restore existing facilities used during construction to original condition.

PART 2 SECURITY AND SAFETY

2.01 GENERAL

A. The Milwaukee Water Works (MWW) consists of a number of facilities to treat and deliver drinking water to the City and surrounding suburban communities. To insure the safety and security of drinking water, the MWW has instituted protocols for visitors and contractors to control entry to these facilities. It is essential that contractors strictly comply with the security policy outlined in the specification section.

B. For this project, the contractor shall continuously coordinate building and site security measures, including accessing the site, with the designated Water Engineering representative or the Water Security manager; telephone (414) 286-3465.

2.02 SCOPE

A. Any and all City agencies and contractors engaged for work at MWW facilities shall be required to attend the "Pre-Construction Meeting" before any contracted work can be initiated. At this meeting, the contractor and subcontractors shall have a detailed briefing with discussions regarding the following items:

1. MWW site security policies and procedures.

2. Contractor and subcontractor obligations.

3. Notifying City prior to commencing work that may impact MWW operations.

2.03 POLICIES

A. At the, "Pre-Construction Meeting", MWW staff shall provide the prime contractor with site polices to be reviewed by the prime and subcontractors. These documents may include:

1. Lock-out/Tag-out Policy

2. Confined Space Entry Procedures

3. Evacuation Procedure for Propane, Lox, and Ammonia Releases

4. Personal Protective Equipment Guidelines

5. No Smoking Policy

6. Prohibited Materials

B. Additionally, the contractor will be provided:

1. Contact phone numbers for MWW staff.

2. On-site parking location and designated construction entrance.

3. Site security policy and procedures.

C. The prime contractor shall be required to review these documents and is responsible for conveying the contents of these submittals to their employees, sub-contractors, and any other parties working directly or indirectly for them. These policies apply equally to all contractors. Failure to comply with established policies and procedures may result in access privileges being withdrawn.

D. MWW Staff shall provide a "walk-through" session with the contractor to review area layout and site plans as part of this orientation process and to establish the specific work areas necessary for the contractors to perform their scope of work. Topics covered in this session include: site overview with hazards, material safety data sheets, fire extinguisher placement, and the storm water protection policy.

2.04 CONTRACTOR RESPONSIBILITIES

A. Contractors shall provide the following documents <u>no less than seven (7) days prior</u> to the start of contracted work. Documents shall be sent to the Water Security manager, (414) 286-3465:

1. Scope of work to be performed;

2. Name of primary contractor's onsite representative;

3. Names of all companies subcontracted to do work on the project;

4. Completed "Contract Firm Registration Form" (see attachment A) for prime contract firm and every subcontract firm;

5. A “Contractor Employee Registration Form” completed for the contractors and every employee who needs to be granted site access (see Attachment B);

6. List of items to be stored on-site;

7. Material Safety Data Sheets for all chemicals to be used/stored on-site.

B. It is the responsibility of the primary contractor to facilitate gathering the “Contractor Employee Registration Form” for all subcontractors working on the project. A subcontractor is defined as an individual or firm hired by the primary contractor to perform a specific task as part of the overall project. This would not include an organization making deliveries of supplies or equipment to the job site; procedures for these firms are covered under Part 8, “DELIVERIES”.

C. In the event it is necessary for the prime contractor to add additional employees to the list of approved personnel, a minimum of 72 hours, or three (3) business days, must be allowed for processing of the request. Site access will be denied to the additional personnel until processing is complete.

D. Contract firms are obligated to notify the Water Security manager, (414) 286-3465 in a timely manner of any site-authorized staff that leaves the employ of the contractor.

E. Only the primary contractor should be contacting the Water Security manager with issues or access requests. If a request for site access does not come from the primary contractor, the request will not be processed.

F. During the time period that the contractor is on-site, they must agree to:

1. Notify the plant manager immediately of any significant chemical spills or leaks;

2. Maintain normal, non-toxic breathable air quality, through adequate ventilation at their work site;

3. Perform no equipment isolations or tie-ins without the signed approval of MWW;

4. Restrict movement to the specific work areas within the site to perform contractor’s scope of work.

2.05 CONTRACTOR NOTIFICATION OF CITY

A. Contractors must notify Engineering / Site Management Staff of any welding, torching, or potentially hazardous or operational impact request, prior to commencing such operations.

B. Failure to comply with the terms of the provisions that provide for MWW employee safety shall be cause for the contractor to discontinue activities at the Site.

2.06 CONTRACTOR IDENTIFICATION AND DAILY REGISTRATION

A. Every day, all contractors shall be required to show a valid ID card, to sign-in at the start of work, and sign out at the end of work. A MWW employee or designated security representative shall be on site to ensure compliance. Any identification tags or lanyards issued by MWW are to be worn while on site and returned to site management upon completion of contracted work.

2.07 CONTRACTOR GATE ACCESS AND PARKING

A. Contractors must comply with the terms of entry for the site and park only in the areas designated for parking by the MWW site representative.

B. Parking privileges may be rescinded at any time as site operational requirements dictate.

PART 3 CITY OF MILWAUKEE PERMITS

3.01 See Chapter 2.3.0 – Necessary Notices and Permits of the Department of Public Works General Specifications for further information and requirements.

PART 4 OCCUPANCY DURING CONSTRUCTION

4.01 During the contractor's performance of the work, the City will continue to occupy the existing building. The contractor shall take precautions to prevent the spread of dust and debris, particularly where such material may sift into the building. The contractor shall provide labor and materials to construct, maintain and remove necessary temporary enclosures to prevent dust or debris in the construction area(s) from entering the building.

PART 5 ELECTRICAL POWER

5.01 Limited electrical power for construction purposes is available at the site and will be made available to the contractor. The contractor will be allowed to use the receptacles that are located outdoors around the exterior of the building. The contractor’s equipment shall not exceed the capabilities of these receptacles. The contractor shall provide additional electrical power if their equipment exceeds the capabilities of the receptacles.

5.02 Contractor shall provide and maintain all necessary power cords, electrical lighting, heat and ventilation, and shall make all necessary connections in accordance with OSHA regulations.

PART 6 WATER

6.01 Water for construction purposes is available at the site and will be made available to the contractor.

6.02 Contractor shall provide all hoses, back flow preventer, valves and connections for water from source designated by the City.

PART 7 TOILET FACILITIES

7.01 Contractor shall furnish portable facilities. Contractor shall maintain these toilet facilities in a sanitary condition throughout the duration of the project and shall remove them from site at the end of the project. The placement and location of the temporary portable toilets shall be coordinated with the plant manager and Water Engineering representative.

PART 8 DELIVERIES

8.01 Contractor shall coordinate the delivery of all equipment, material, dumpsters, portable toilets and other required items required for the contract work with the MWW staff. A minimum of twenty-four (24) hours prior notice in advance of the desired delivery date shall be transmitted to the designated Water Engineering Representative. Contractor shall provide the following information in the notification:

A. Trucking/Delivery Company

B. Driver Name

C. Truck License Plate Number

8.02 The driver of the delivery vehicle is required to display picture identification as a pre-requisite for entry to the MWW facility for the delivery. Failure to comply with the above will result in denial of project site access, requiring the contractor to reschedule delivery.

END OF SECTION

Milwaukee Water Works

Safe, Abundant Drinking Water.

HP-178
Attachment "A"

FORM A

CONTRACT FIRM REGISTRATION FORM

CONTRACTOR:_____

PLANT/SITE:_____

CONTRACT/SERVICE ORDER NO._____

WATER ENGINEERING PROJECT NO._____

PRIMARY CONTACT PERSON:_____

OFFICE PHONE NUMBER:_____

CELL PHONE NUMBER:_____

REQUESTED WORK HOURS (00am – 00pm): _____

NUMBER OF EMPLOYEES TO BE WORKING ON-SITE: _____

Signature certifies receipt of the materials outlined in Contract Section 01500, Part 2 – Security and Safety, Section C, Policies.

SIGNATURE:_____ DATE:_____
PRIMARY CONTACT PERSON

Accompanying this form should be a complete listing of all equipment to be stored on site for the duration of the project.

Milwaukee Water Works

Safe, Abundant Drinking Water.

HP-178
Attachment "B"

FORM B

CONTRACTOR EMPLOYEE REGISTRATION FORM

Contract Firm:_____

Plant/Site/Project: _____

Employee Name (Printed): _____

This certifies that I have received the building site security and safety policies.

EMPLOYEE
SIGNATURE:_____ DATE: _____
Required

ONSITE PARKING

☐ I will always be driving a Company vehicle.
☐ I will always be a passenger in a vehicle.
☐ I will be driving my personal vehicle. (If checked, complete and sign the next section.)

Contractor Personal Vehicle Liability Waiver

EMPLOYEE VEHICLE
MAKE & MODEL:_____ LICENSE PLATE: _____

I, hereby agree to hold harmless the City of Milwaukee for any and all damage, loss or injury, which may occur as a result of utilizing the contractor onsite parking area.

EMPLOYEE
SIGNATURE:_____ DATE:_____
Required

SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Products.

2. Transportation and handling.

3. Storage and protection.

4. Product options.

5. Substitutions.

1.02 PRODUCTS

A. Material, machinery, components, equipment, fixtures and system shall be new. Assure standardization and uniformity by using products from one manufacturer.

B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the contract documents.

C. Provide interchangeable components of the same manufacture for components being replaced.

1.03 TRANSPORTATION AND HANDLING

A. Transport and handle products in accordance with manufacturer's instructions.

B. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct and products are undamaged.

C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement or damage.

1.04 STORAGE AND PROTECTION

A. Store and protect products in accordance with manufacturer's instructions.

B. Store with seals and labels intact and legible.

C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

D. For exterior storage of fabricated products, place on sloped supports above ground.

E. Provide off-site storage and protection when site does not permit on-site storage or protection.

F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

G. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement or damage.

I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

J. Rolled Roofing Materials: All rolled roofing materials must be stored standing on end on a pallet or otherwise raised off of the roof. The materials are to be covered in a proper manner to assure that they will not become wet prior to application. Any materials that become wet or damaged must be removed from the job-site and replaced at the contractor’s expense.

K. The contractor is responsible for protecting all materials from the elements. If any material, such as insulation, becomes wet, it cannot be installed and must be replaced at the contractor's expense. NOTE: Insulation and rolled roofing materials must be covered with waterproof tarps at the end of each workday. Plastic wrappers supplied by the insulation manufacturer are not acceptable substitutes for tarps. The City’s representative will reject any covering method or material, which does not adequately protect roofing materials.

1.05 PRODUCT OPTIONS

A. Products specified by reference standards or by description only: Any product meeting those standards or description.

B. Products specified by naming one or more manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products specified by naming one or more manufacturers with a provision for substitutions: Submit a request for substitution for any manufacturer not named in accordance with the following article.

1.06 SUBSTITUTIONS

A. City will consider requests for substitutions only within fifteen (15) days after date established in Notice to Proceed unless otherwise specified in individual specification sections.

B. Substitutions may be considered when a product becomes unavailable through no fault of the contractor.

C. Document each request with complete data substantiating compliance of proposed substitution with contract documents.

D. A request constitutes a representation that the contractor:

1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.

2. Will provide the same warranty for the substitution as for the specified product.

3. Will coordinate installation and make changes to other work that may be required for the work to be complete with no additional cost to City.

4. Waives claims for additional costs or time extension that may subsequently become apparent.

5. Will reimburse City for review or redesign services associated with re-approval by authorities.

6. Has reviewed, taken into account and will abide by all substituted material manufacturers installation instructions regarding coverage rates or any other application/installation differences between those being submitted for substitution and those specified.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the contract documents.

F. Substitution Submittal Procedure:

1. Submit two (2) copies of request for substitution for consideration. Limit each request to one (1) proposed substitution.

2. Submit shop drawings, product data and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.

3. The City will notify contractor in writing of decision to accept or reject request.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01700
CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Closeout Procedures
2. Final Cleaning
3. Project Record Documents
4. Operation and Maintenance Data
5. Spare Parts and Maintenance Products
6. Guarantee

B. Related Sections

1. Section 01500 – Job Site Security, Utilities and Facilities: Progress cleaning

1.02 CLOSEOUT PROCEDURES

A. Submit written certification that contract documents have been reviewed, work has been inspected, and that work is complete in accordance with contract documents and ready for City's review.

B. Provide submittals to City that is required by governing or other authorities.

C. Submit final application for payment identifying total adjusted contract sum, previous payments and sum remaining due.

1.03 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

B. The contractor shall remove bitumen or adhesive from walls, windows, floors, ladders and finished surfaces.

C. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

D. Clean debris from roofs, gutters, downspouts and drainage systems.

E. Clean site; sweep paved areas, broom clean building, rake clean landscaped surfaces.

F. Remove waste and surplus materials, rubbish and construction facilities from the site.

1.04 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the work:

1. Contract Drawings

2. Specifications

3. Addenda

4. Change Orders

5. Reviewed Shop Drawings, Product Data, and Samples

6. Manufacturer's instructions for assembly, installation and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by City.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Contract Drawings and Shop Drawings: Legibly mark each item to record actual construction including:

1. Field changes of dimension and detail.

2. Details not on original drawings.

F. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:

1. Manufacturer's name and product model and number.

2. Product substitutions or alternates utilized.

3. Changes made by addenda or change orders.

G. Submit documents to City in the following manner:

1. Submit prior to final application for payment.

2. Documents shall be accompanied with a transmittal letter that includes the following:

a) Date

b) City's project title and number

c) Contractor's name and address

d) Title and number of each record document

e) Certification that each document as submitted is complete and accurate

f) Contractor's signature or authorized representative

3. Delete consultant and City's title block from documents. Delete engineer's seals from documents.

4. Submit two (2) sets of documents.

5. Submit one (1) set of reproducible "mylar" contract drawings.

1.05 OPERATION AND MAINTENANCE DATA

A. Submit data bound in 8-1/2 x 11 inch text pages, three D-side ring binders with durable plastic covers. Drawings and diagrams shall be reduced to 8-1/2" x 11" or 11" x 17". Where reduction is not practicable, large drawings shall be folded separately and placed in an envelope that is bound into the manuals. Envelope shall bear suitable outside identification.

B. Prepare binder cover and spine with printed title "OPERATION AND MAINTENANCE INSTRUCTION", title of project, project number and subject matter of binder when multiple binders are required.

C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Contents: Prepare a table of contents for each volume, with each product or system description identified, typed on 24-pound white paper, in three parts as follows:

1. Part 1: Directory, listing names, addresses, telephone numbers and e-mails of architect/engineer, contractor, subcontractors and major equipment suppliers.

2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, telephone numbers and e-mails of subcontractors and suppliers. Identify the following:

   a) Significant design criteria.

   b) List of Materials.

   c) Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

3. Part 3: Project documents and certificates, including the following:

   a) Shop drawings and product data.

   b) Asbestos “Disposal Manifest”.

   c) Certificates.

   d) Photocopies of warranties.

E. Submit one draft copy of volumes fifteen (15) days prior to final inspection. This copy will be reviewed and returned with City comments. Revise content of all document sets as required prior to final submission.

F. Submit three (3) sets of revised final volumes within ten (10) days after receipt of City’s comments.

1.06 WARRANTY AND GUARANTEE

A. Provide duplicate notarized copies.

B. Execute and assemble transferable warranty documents from subcontractors, suppliers and manufacturers.

C. Provide table of contents and assemble in binder with durable plastic cover.

D. Submit prior to final application for payment.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 06100

ROUGH CARPENTRY

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including the Conditions of the Contract and Division 01 Specification Sections apply to this section.

1.02 SUMMARY

A. Section includes requirements for the installation of miscellaneous carpentry as indicated in specification sections and on the construction drawings, including, but not limited to, rough carpentry in conjunction with other work, blocking and nailers.

1.03 SUBMITTALS

A. Submit under provisions of Section 01010 – Summary of Work.

B. Product Data:

1. Submit manufacturer’s descriptive literature and product specifications for each product.

2. Include data to indicate

1.04 DELIVERY, STORAGE AND HANDLING

A. Comply with requirements of Section 01600 – Material and Equipment.

PART 2 PRODUCTS

2.01 DIMENSIONAL LUMBER

A. Wood blocking in nominal thickness

1. Blocking shall be Grade #2 or better, complying with lumber producer's inspection agency grading rules certified as conforming to the "National Grading Rule for Dimension Lumber", by the Board of Review of the American Lumber Standards Committee (ALSQ), established under Section 10 of PS-20.

2. Dimensional lumber shall be smooth four sides (S4S), unless otherwise shown or indicated

3. Dimensional lumber shall be seasoned, with 19% maximum moisture content at time of dressing, complying with the dry size requirements of PS-20. Lumber shall be marked "S-Dry".

4. Dimensional lumber shall be:

   a) Nailers: nominal size as indicated on the construction drawings.

   b) Blocking: nominal size as indicated on the construction drawings.

   c) Plywood: thickness as indicated on the construction drawings for use as shim material beneath nailers.

2.02 PLYWOOD

A. Minimum thickness and ply: ½-inch, 4-ply.

B. Interior grade C-D or better, with exterior glue (CDX), conforming to the rating of the American Plywood Association (APA), PS 1-83.

C. Thickness as indicated on the construction drawings.

2.03 FASTENERS

A. Carpentry to wood substrate

1. Common wire nails with galvanized coating.

2. Length as necessary to penetrate the substrate by a minimum of 1-1/2”.

3. Nail sizes

   a) One-inch nominal thickness decking - 12d.

   b) Two-inch nominal thickness decking - l6d.

   c) Three-inch nominal thickness decking - 20d.

   d) Four-inch nominal thickness decking - 30d.

B. Carpentry to concrete or solid masonry substrate

1. Tapper, ¼” diameter, Phillips-head screw, by Powers Fastening, Inc., New Rochelle, NY. Length as necessary to provide a minimum of 2” embedment.

2. Tapcon ¼” diameter, Phillips-head screw by Buildex Division of ITW, Inc., Itasca, IL. Length as necessary to provide a minimum of 2” embedment.

C. Carpentry to hollow masonry substrate

1. Sleeve anchor by Hilti Fastening Systems, Tulsa, OK. Length as necessary to penetrate a minimum of 1)”inch into the interior of the hollow masonry units.

2. Tapper, ¼” diameter, Phillips-head screw, by Powers Fastening, Inc., New Rochelle, NY Length as necessary to provide a minimum of 1” embedment.

3. Tapcon, ¼” diameter, Phillips-head screw by Buildex Division of ITW, Inc., Itasca, IL. Length as necessary to provide a minimum of 1” embedment.

D. Carpentry to sheet metal substrate

1. Self-drilling sheet metal screws, cadmium plated.
2. Length shall penetrate the substrate by a minimum of 1”.
3. 10-24 wafer-head Plymetal TEKS/3 with wings by the Buildex Division of ITW, Inc. Itasca, IL.

E. Carpentry to structural steel

1. Self-drilling sheet metal screws, cadmium plated.
2. Length shall penetrate the substrate by a minimum of 1”.
3. 12-24 flat-head TEKS/4 by Buildex Division of ITW, Inc. Itasca, IL.

F. Carpentry to gypsum or cementitious wood fiber roof decking

1. NTB- I H screw with 1” head and locking wire barbs by Olympic Manufacturing Group, Inc., Agawam, MA. Length as necessary to achieve required pull-out resistance (225 lbs.) without penetrating the underside of the roof deck.
2. Toggle Bolt assembly, ¼” diameter with flat head, Powers Fastening, Inc., New Rochelle, NY. Length as necessary for toggle wings to properly engage the bottom side of the roof deck. Note: The contractor shall request Written Approval, from the Owner, prior to using this fastener in an area where the deck is exposed.

PART 3 EXECUTION

3.01 CARPENTRY INSTALLATION

A. General Requirements

1. Do not use lumber or materials of which are unsound, warped, bowed, twisted, inadequately seasoned, or too small to fabricate the work with a minimum of joints
2. Fit carpentry work to other work. Produce joints of which are tight, true and well fastened.
3. Set carpentry accurately to required levels and lines with members plumb and true.
4. Attach carpentry to substrates in accordance with recognized standards.

a) Countersink the new fastener heads flush with top of wood members. Hollow out bottom of new wood members, if necessary, to fit over existing exposed bolt heads that are not countersunk.

b) Countersink the nail heads on exposed carpentry and fill holes.

5. Select fastener size that will not penetrate members where opposite side will be exposed to view or will receive finish materials.

6. Threaded fasteners shall be turned into place, not driven.

7. Fasteners shall be tightened at installation and re-tightened as required prior to closing in or at completion of work.

B. Install new wood nailers and blocking to achieve thickness and elevations required by the construction details.

1. Secure to substrate as shown on the construction details.

2. Install additional fasteners, as required to counteract minor warpage or variances in substrate, and to hold tight and true to lines.

3. When using multiple nailer courses, weave comers and stagger end joints a minimum of three (3) feet from underlying course.

3.02 CLEANING

A. General: Comply with requirements of Section 01500.

B. Wood chips, shavings, sawdust and other debris shall be swept up and removed from the work area daily prior to installation of subsequent roofing components.

END OF SECTION

SECTION 07220

ROOF DECK AND INSULATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including the Conditions of the Contract and Division 01 Specification Sections apply to this section.

1.02 SUMMARY

A. Section includes roof insulation over the properly prepared temporary roof/vapor barrier.

B. Related Work Specified Elsewhere:

1. Section 01010 Summary of Work
2. Section 07511 Built-up Asphalt Roofing

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A167 Standard Specification for Stainless and Heat-Resisting Chromium Nickel Steel Plate, Sheet and Strip.
2. ASTM A653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process.
3. ASTM B29 Standard Specification for Refined Lead.
4. ASTM B32 Standard Specification for Solder Metal.
5. ASTM C165 Standard Test Method for Measuring Compressive Properties of Thermal Insulation.
6. ASTM C208 Standard Specification for Cellulosic Fiber Insulating Board.
7. ASTM C209 Standard Test Method for Cellulosic Fiber Insulating Board.
8. ASTM C272 Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions.
9. ASTM C1396 Standard Specification for Gypsum Wallboard.

10. ASTM C518 Standard Test Method for Steady-State Heat Flux Measurements and Thermal. Transmission Properties by Means of the Heat Flow Meter Apparatus.
11. ASTM C578 Standard Specification for Perlite Thermal Insulation Board.
12. ASTM C728 Standard Test Methods for Fire Test of Roof Coverings.
13. ASTM C1289 Standard Specification for Faced Rigid Polyisocyanurate Thermal Insulation
14. ASTM D5 Standard Test Method for Penetration of Bituminous Materials.
15. ASTM D36 Standard Test Method for Softening Point of Bitumen (Ring and Ball Apparatus).
16. ASTM D312 Standard Specification for Asphalt Used in Roofing.
17. ASTM D412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.
18. ASTM D1621 Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
19. ASTM D1622 Standard Test Method for Apparent Density of Rigid Cellular Plastics.
20. ASTM D1863 Standard Specification for Mineral Aggregate Used on Built-Up Roofs.
21. ASTM D2126 Standard Test Method for Response off Rigid Cellular Plastics to Thermal Humid Aging.
22. ASTM D2178 Standard Specification for Asphalt Glass Felts used in Roofing and Waterproofing.
23. ASTM D2523 Standard Practice of Testing Load- Strain Properties of Roof Membranes.
24. ASTM D4601 Standard Specification for Asphalt-Coated Glass Fiber Base Sheet Used in Roofing.
25. ASTM D5147 Standard Sampling and Testing Modified Bituminous Sheet Material.

B. Cast Iron Soil Pipe Institute, Washington, D.C. (CISPI)

C. Factory Mutual Research (FM):

1. Roof Assembly Classifications.

D. National Roofing Contractors Association (NRCA):

1. Roofing and Waterproofing Manual.

E. Underwriters Laboratories, Inc. (UL):

1. Fire Hazard Classifications.

F. Warnock Hersey (WH):

1. Fire Hazard Classifications.

G. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)

H. Southern Pine Inspection Bureau, Pensacola, Florida (SPIB)

I. Insulation Board, Polyisocyanurate (FS HH-I-1972)

J. Insulation Board, Thermal (Fiberboard) (FS LLL-1-535B)

1.04 SUBMITTALS FOR REVIEW

A. Submit under provisions of Section 01010 Summary of Work.

B. Product Data: Provide manufacturer’s specification data sheets for each product.

C. Provide approval letters from insulation manufacturer for use of their insulation within this particular roofing system type.

D. Provide a sample of each insulation type.

E. Manufacturer’s Certificate: Submit roof manufacturer’s certification that insulation furnished is acceptable to roof manufacturer as a component of roofing system and is eligible for roof manufacturer’s system guarantee.

1.05 QUALITY ASSURANCE

A. Fire Classification, ASTM E-108

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site with seals and labels intact, in manufacturer's original containers, dry and undamaged.

B. Store all insulation materials in a manner to protect them from the wind, sun and moisture damage prior to and during installation. Any insulation that has been exposed to any moisture shall be removed from the project site.

C. Keep materials enclosed in a watertight, ventilated enclosure.

D. Store materials off the ground. Any warped, broken or wet insulation boards shall be removed from the site.

PART 2 PRODUCTS

2.01 GENERAL

A. Materials and performance requirements specified herein shall be regarded as the minimum standard of quality required for work of this section.

B. Substitutions: Under provisions of Section 01600

2.02 INSULATION MATERIALS

A. Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.

B. Rigid Polyisocyanurate Roof Insulation; ASTM C1289, Type II

1. Qualities: rigid, closed cell Polyisocyanurate foam core bonded to felt or glass-fiber mat facers on both major surfaces
2. Size: 4’ x 4’ x 2.0” thick
3. R-Value: Minimum 24.00 LTTR
4. Manufacturers: as recommended by Roof System Manufacturer / Warranty Provider.

C. Cellulosic-Fiber Board Roof Insulation; ASTM C208, Type II, Grade 1

1. Qualities: 6 side asphalt coated, fibrous-felted wood fiber or other cellulosic-fiber and water-resistant binders, asphalt impregnated, chemically treated for deterioration.
2. Size: 4’ x 4’ x ½-inch thick
3. Manufacturers: as recommended by Roof System Manufacturer / Warranty Provider.

D. Tapered Insulation Sumps: Install as shown on contract drawings.

E. Provide preformed crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated on contract drawings.

2.03 INSULATION ACCESSORIES

A. Cant Strips: ASTM C208, Type II, Grade 1, cellulosic-fiber insulation board.

B. Tapered Wedge Boards: ASTM C208, Type II, Grade 1, cellulosic-fiber tapered insulation board

C. Wood Nailer Strips: See Section 06100 Rough Carpentry

D. Asphalt: See Section 07511 Built-up Asphalt Roofing

E. Vapor Retarder: See Section 07511 Built-up Asphalt Roofing

F. Manufacturers of Insulation Accessories: as recommended by Roof System Manufacturer / Warranty Provider

PART 3 EXECUTION

3.01 EXAMINATION

A. Contractor shall be responsible for preparing an adequate substrate to receive insulation.

1. Verify that work which penetrates roof deck has been completed.
2. Verify that wood nailers are properly and securely installed. Add additional wood blocking as required to provide proper flashing height and per detail drawings.
3. Verify that roof drains have plugs installed in them before starting the day's work. Verify that plugs have been removed after the day's work has been completed. Plugs shall eliminate any opportunity for roofing materials or debris to enter the roof drain piping.
4. Examine surfaces for defects, rough spots, ridges, depressions, foreign material, moisture, and unevenness.
5. Do not proceed until defects are corrected.
6. Inspect existing roof drains for damage. Inform City inspector of any repairs or replacements that should be made.
7. Do not apply insulation until substrate is sufficiently dry.
8. Broom clean substrate immediately prior to application.
9. Use additional insulation to fill depressions and low spots that would otherwise cause ponding water.

3.02 BASE SHEET INSTALLATION

A. Refer to Section 07511 Built-Up Asphalt Roofing

3.03 INSULATION INSTALLATION

A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with roofing system manufacturer's written instructions for installing roof insulation.

C. Insulation Cant Strips: Install and secure preformed 45-degree wood cant strips at junctures of built-up roofing membrane system with vertical surfaces or angle changes greater than 45 degrees.

D. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding ¼” (6 mm) with insulation.

1. Cut and fit insulation within ¼” (6 mm) of nailers, projections, and penetrations

F. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water

G. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Stagger joints from joints in insulation below a minimum of 6” (150 mm) in each direction.

1. Apply hot roofing asphalt to underside and immediately bond cover board to substrate.

3.04 PROTECTION FROM WEATHER

A. Insulation shall be protected from the weather at all times.

B. Insulation that becomes wet during or after installation shall be removed and replaced with dry insulation. If roofing is in place, the roofing shall be also replaced. All replacing work shall be done at no added cost to the City.

3.05 CLEANING

A. Remove debris and cartons from roof deck. Leave insulation clean and dry, ready to receive roofing membrane.

B. Remove and properly dispose of waste products generated during installation. Comply with requirements of authorities having jurisdiction.

END OF SECTION

SECTION 07511
BUILT-UP ASPHALT ROOFING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Sheet Materials
2. Asphalt Materials
3. Accessories

B. Related Sections

1. Section 01010 – Summary of Work
2. Section 06100 – Rough Carpentry
3. Section 07220 – Roof Deck and Insulation
4. Section 07600 – Sheet Metal Flashing and Trim

1.02 REFERENCES

A. American Society of Civil Engineers (ASCE)

1. ASCE 7-02 Minimum Design Loads for Buildings and Other Structures

B. American Society for Testing and Materials (ASTM)

1. ASTM D41 Standard Specification for Asphalt Primer Used in Roofing, Dampproofing and Waterproofing.
2. ASTM D1079 Terminology Relating to Roofing and Waterproofing
3. ASTM D1227 Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing
4. ASTM D1863 Standard Specification for Mineral Aggregate Used on Built-Up Roofs
5. ASTM D2178 Standard Specification for Asphalt Glass Felts used in Roofing and Waterproofing
6. ASTM D2523 Standard Practice of Testing Load Strain Properties of Roof Membranes
7. ASTM D2824 Standard Specification for Aluminum-Pigmented Asphalt Roof Coatings, Non-fibered, Asbestos Fibered, and Fibered without Asbestos
8. ASTM D4586 Standard Specification for Asphalt Roof Cement

9. ASTM D4601 Standard Specification for Asphalt-Coated Glass Fiber Base Sheet Used in Roofing

10. ASTM E108 Standard Test Methods for Fire Tests of Roof Coverings

C. National Roofing Contractors Association (NRCA)

1. Roofing and Waterproofing Manual

1.03 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

B. Hot Roofing Asphalt: Roofing asphalt heated to its equiviscous temperature, the temperature at which its viscosity is 125 centipoise for mopping application and 75 centipoise for mechanical application, within a range of plus or minus 25°F, measured at the mop cart or mechanical spreader immediately before application.

C. One roof square shall be defined as one-hundred (100) square feet.

D. Manufacturer: Company that will be providing the warranty for the roof system.

1.04 SUBMITTALS

A. Submit under provisions of Section 01010 – Summary of Work.

B. Product and System Data

1. Submit manufacturer's descriptive literature and product specifications for each product.

2. Include data to substantiate that materials comply with specified requirements.

3. Submit drawing or written description of how roofing kettle and liquid roofing materials that are located above underground basins will be contained.

C. Shop Drawings: Include plans, elevations, sections, details and attachments to other Work.

1. Base flashing, cants and membrane terminations

2. Tapered insulation saddles and crickets.

D. Samples

1. Base Ply Sheet, 12" x 8"

2. Flashing Sheet, 12" x 8", specified color

3. Pull sample of rubberized asphalt material

4. 1 lb. sample of roofing aggregate

E. Performance Requirements: see Paragraph 1.05 for requirements

1. Certificate of material compatibility
2. Certificate of FMG 4450 and FMG 4470 compatibility
3. Certificate of compliance with Fire/Windstorm classification
4. Certificate of compliance with Wind Speed requirements

F. Quality Assurance: see Paragraph 1.06 for requirements

1. Manufacturer’s Qualifications
2. Contractor’s Qualifications
3. Approval of secondary components by Manufacturer.
4. Fire-Test-Response Characteristics

G. Warranty

1. Provide an unexecuted copy of the warranty specified for this project, identifying the terms and conditions required of the manufacturer and the City.

1.05 PERFORMANCE REQUIREMENTS

A. Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Provide materials for roofing system that are chemically and physically compatible with one another under conditions of service and application required. Compatibility shall be demonstrated by roofing manufacturer with test reports and documented field experience.

C. Provide roofing membrane, base flashings, and component materials that comply with requirements in Factory Mutual Global Research (FMG) 4450 and FMG 4470 as part of a roofing system and that are listed in FMG's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FMG markings. Roofing systems shall comply with the following:

1. Fire/Windstorm Classification: Class 1A-90
2. Wind Speed: 74 MPH peak gust measured at 33 feet above ground

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Proof of ISO 9001 quality certification for roof manufacturer providing warranty for the roof system and components for a minimum of ten (10) years.

B. Contractor Qualifications: Signed by manufacturer that installer is approved, authorized, or licensed by manufacturer to install specified roofing system and eligible to receive manufacturer's warranty.

C. Source Limitations: Obtain components for roofing system from or approved by roofing system manufacturer providing the roof warranty. Secondary components shall be approved in writing by the roofing system manufacturer. The performance of secondary components shall be fully covered under the roof warranty.

D. Infrared Testing of the Complete Membrane: Prior to issuance of the warranty, the manufacturer shall provide an infrared testing analysis of the new roofing system to verify no presence of moisture in the roofing system.

E. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency

1. Exterior Fire-Test Exposure: Class A; ASTM E108, for application and roof slopes indicated.

2. Fire-Resistance Ratings: ASTM E119, for fire-resistance-rated roof assemblies of which roofing system is a part.

F. Field Supervision: Contractor shall maintain a full-time supervisor/foreman on job site during all phases of roofing work while roofing work is in progress.

1.07 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 01700 – Contract Closeout.

B. Provide copy of manufacturer's inspection report of completed roofing installation.

C. Provide copy of manufacturer’s infrared testing analysis.

1.08 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Section 01700 – Contract Closeout.

B. Maintenance Data: Include instructions for maintenance of installed roofing system.

1.09 INSPECTIONS

A. Manufacturer's Technical Representative: As part of the project warranty, the contractor shall engage a qualified manufacturer's technical representative for a minimum of one (1) work day per 3,000 square feet to perform roof specification review, inspections of the work in progress and to provide reports to the City. One (1) work day shall be equivalent to eight (8) hours. The manufacturer's technical representative shall have a minimum of ten (10) years' experience with the particular roof system installation and provide a non-sales function for the manufacturer.

If the manufacturer doesn't employ a qualified technical representative, an engineering firm may be enlisted by the manufacturer at their expense to provide technical installation inspections for equal assistance/inspection time at the approval of the City.

B. The manufacturer's technical representative shall provide the following:

1. Report progress and quality of the work as observed.

2. Report to City in writing any failure or refusal of the contractor to correct unacceptable practices called to the contractor's attention.

3. Confirm after completion that manufacturer has observed no application~~s~~ procedures in conflict with the specifications other than those that may have been previously reported and corrected.

4. Verify that bulk roofing asphalt materials delivered to site comply with requirements. Document quantity of materials delivered to site on a daily basis.

5. Document time and temperature for each load of bulk asphalt, indicating date obtained from manufacturer, where held, and how transported before final heating and application on roof.

C. Contractor shall stop work at the following "stop points". Work shall only resume after the inspection has been made and approved by the manufacturer's representative.

1. After the vapor barrier has been installed and prior to installing the insulation.

2. After the built-up roof has been applied and prior to installing the floodcoat.

1.10 PRE-INSTALLATION MEETING

A. Conduct pre-installation meeting in accordance with Section 01039.

B. Convene pre-installation meeting one week prior to commencing work of this Section.

C. Objectives of meeting include:

1. Meet with City, contractor, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review contract documents pertaining to this section.
5. Review required submittals both completed and yet to be completed.
6. Establish set up and mobilization areas for stored material and work area.
7. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
8. Review structural loading limitations of roof deck during and after roofing.
9. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
10. Review governing regulations and requirements for insurance and certificates if applicable.
11. Review temporary protection requirements for roofing system during and after installation.
12. Review roof observation and repair procedures after roofing installation.
13. Review notification procedures for weather or non-working days.

1.11 DELIVERY, STORAGE AND HANDLING

A. Comply with requirements of Section 01600 – Material and Equipment.

B. Deliver roofing materials to project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage.

C. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

D. Store and handle roofing sheets in a dry, well ventilated, weather-tight place to prevent moisture exposure. Store rolls of felt and other sheet materials on pallets or other raised surface. Stand all roll materials on end. Cover rolled goods with a canvas tarpaulin or other breathable material.

E. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation

F. Do not leave unused materials on the roof overnight or when roofing work is not in progress unless protected from weather and other moisture sources.

G. Secure all material and equipment on the job site. If any material or equipment is stored on the roof, assure that the integrity of the deck is not compromised at any time. Damage to the deck caused by the contractor’s actions will be the sole responsibility of the contractor and will be repaired or replaced at his expense.

1.12 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.13 WARRANTY

A. Comply with provisions of Section 01010 – Summary of Work.

B. Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.

1. Special warranty includes roofing membrane, base flashings, roofing membrane accessories, roof insulation, fasteners, cover boards and other components of roofing system.

2. Warranty Period: Thirty (30) years from date of substantial completion with no dollar limit.

3. Peak Wind Coverage: Up to 74 miles per hour.

PART 2 PRODUCTS

2.01 GENERAL

A. Materials and performance requirements specified herein shall be regarded as the minimum standard of quality required for work of this section.

B. Substitutions: Under provisions of Section 01600.

2.03 DESCRIPTION OF SYSTEM AND PERFORMANCE REQUIREMENTS

A. Modified bituminous roofing work including but not limited to:

1. Vapor Retarder: single-ply, adhere with Type III asphalt

2. Insulation: two layers, adhere with Type III asphalt

3. Cover Board: one layer, adhere with Type III asphalt
4. Membrane Plies: Three-plies over base-ply, adhere with SEBS rubber modified asphalt
5. Flashing: one-ply of backer sheet beneath one ply of flashing sheet
6. Surfacing: flood coat of cold or hot process coal tar pitch bitumen and roofing aggregate consisting of pea gravel and white spar

B. Performance Requirements

1. Tensile Strength @ 0°F shall be 484 lbf/in MD per ASTM D2523.
2. Tensile Strength @ 0°F shall be 428 lbf/in XMD per ASTM D2523.

2.04 BASE-SHEET

A. Base Sheet (Roof Membrane and Vapor Barrier): Trilaminate reinforced ply sheet, complying with ASTM D 4601-91; ASTM 228-90A and ASTM 146-90 with the following properties:

1. Thickness: 1.2 mm
2. Breaking strength: 220 lbf/in MD. 235 lbf/in XMD
3. Elongation: 6.5% MD/XMD
4. Tear Strength: 345 lbf MD. 330 lbf XMD minimum
5. Mass of desaturated polyester/glass/polyester mat, min.: 3.5 lb/100ft
6. Recycled Content: Minimum 10%
7. Asphalt: 10.0 lb/100 ft minimum

2.05 MEMBRANE PLIES

A. Ply Sheet: ASTM D 2178, Type VI, asphalt-impregnated, glass-fiber felt

2.06 FLASHING MATERIALS

A. Backer Sheet: ASTM D2178, Type VI, asphalt-impregnated, glass-fiber felt

B. Flashing Sheet: Elastomeric sheeting blend of EPDM and SBR thermoset elastomers. Sheet shall be reinforced with polyester woven scrim.

C. Glass-Fiber Fabric: ASTM D1668, Type I, woven glass cloth, treated with asphalt

D. Flashing Adhesive: Hot applied - SEBS modified rubberized asphalt

E. Stripping Ply: 6” polyester woven felt or 6” fiberglass woven mesh

F. Termination Bar Tape: Flexible, butyl based sealant tape. 1/8” thick X 1”

G. Termination Bar Sealant: Polyurethane sealant

H. Flashing Surfacing: ASTM 2824, Type III, fibrated aluminum coating

2.07 ASPHALT MATERIALS

A. Asphalt Primer: ASTM D41

B. Roofing Asphalt: ASTM D312, Type III, steep asphalt, shall be used to adhere insulation

C. Polymer Modified Roofing Asphalt: SEBS polymer modified rubberized asphalt, shall be used to adhere base sheet, 3-ply membrane and perimeter base flashings

D. Final Surfacing Adhesive: SEBS polymer modified, coal tar pitch adhesive

2.08 AUXILIARY ROOFING MEMBRANE MATERIALS

A. Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with built-up roofing.

B. Asphalt Roofing Cement: ASTM D4586, asbestos-free, shall be consistency required by roofing system manufacturer for application

C. Mastic sealant: Polyisobutylene, plain or modified bitumen, non-hardening, non-migrating, non-skinning, and non-drying.

D. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FM 4470; designed for fastening roofing membrane components to substrate; tested by manufacturer for required pullout strength; and acceptable to roofing system manufacturer.

E. Metal Flashing Sheet: See Section 07600 Sheet Metal Flashing and Trim.

F. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.

G. Final Gravel surfacing: ASTM D 1863, 3/8” to 5/8” gravel

2.09 ROOF INSULATION

A. See Section 07220 Roof Deck and Insulation

2.10 INSULATION ACCESSORIES

A. See Section 07220 Roof Deck and Insulation

2.11 BITUMINOUS MATERIALS

A. Asphalt Roofing Mastic: ASTM D2822, Type II, VOC compliant

B. Asphalt or Bitumen: ASTM D312, Type III

1. Softening Point: 185°F - 205°F

2. Flash Point: 500°F

3. Penetration @ 77°F: 15-35 units

4. Ductility @ 77°F: 2.5 cm

2.02 SHEET MATERIALS

A. Vapor Barrier: ASTM D4601, Type II

B. Base Ply: ASTM D4601-91

C. Base Flashing Ply: ASTM D4601-91

1. Tri-laminate base sheet, double coated polyester-fiberglass-polyester scrim.

2. Tensile Strength (ASTM D2523); 2 in/min @ 73.4 ± 3.6°F; MD 250 lbf/in; CMD 250 lbf/in.

3. Tear Strength (ASTM D4073); 2 in/min. @ 73.4 ± 3.6°F; MD 370 lbf; CMD 370 lbf.

4. Elongation at Maximum Tensile (ASTM D2523); 2 in/min. @ 73.4 ± 3.6°F; MD 6.0%; CMD 6.0%.

2.03 SURFACING MATERIALS

A. Flashing

1. Fibered aluminum coating

2. Flash Point: 100°F min

3. Weight/Gallon: 8.2 lbs./gal

4. Viscosity (75°F): 100 - 125 K.U.

B. Roof Membrane Coating

1. Coal tar roof coating, heavy-bodied, fiber reinforced, cold or hot process polymer modified.

2. Weight/Gallon: 9.0 lbs./gal

3. Solids by weight: 87%

C. Roof Membrane Aggregate: ASTM D1863, pea gravel

2.04 RELATED MATERIALS

A. Insulation: See Section 07220 Roof Deck and Insulation

B. Nails and Fasteners

1. Non-ferrous metal or galvanized steel; aluminum or stainless steel nails shall be used with aluminum; stainless steel nails shall be used with stainless steel.

2. Nails and fasteners shall be flush-driven through flat metal discs of not less than 1” diameter. Omit metal discs when one-piece composite nails or fasteners with heads not less than 1” diameter are used.

C. Metal Discs

1. Flat discs or caps of zinc-coated sheet metal not lighter than twenty-eight (28) gauge and not less than 1” in diameter.

2. Discs shall be formed to prevent dishing. Bell or cup shaped caps are not acceptable.

D. Urethane Sealant

1. One part, non-sag sealant as recommended and furnished by the membrane manufacturer for moving joints.

2. Tensile Strength (ASTM D412): 250 psi

3. Elongation (ASM D412): 950%

4. Hardness, Shore A (ASTM C920): 35

5. Adhesion-in-Peel (ASTM C920): 30 pli

E. Butyl Tape

1. 100% solids, asbestos-free and compressive tape designed to seal as recommended and furnished by the membrane manufacturer.

2. When used with a termination bar, the butyl tape shall be the same width as the termination bar.

F. Roof Drain

1. Flashing: 4-lbs per square foot; sheet lead; formed and rolled

G. Plumbing Stacks: 4-lbs per square foot; sheet lead; formed and rolled

H. Cants: standard 4” and shape unless otherwise noted in contract drawings.

1. Preformed lengths with similar material properties as high-density fiberboard roof insulation.

2. Cut from dimensional lumber.

I. Flashings, counter-flashings, edge metal, reglets and flashing accessories

1. Polyvinylidene fluoride (PVDF) coated metal, 24-gauge

2. The color shall be selected by the City from the manufacturer’s standard color chart.

PART 3 EXECUTION

3.01 GENERAL

A. Install built-up roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations of ARMA/NRCA's "Quality Control Guidelines for the Application of Built-up Roofing.”

B. Start installation of built-up roofing membrane in presence of roofing system manufacturer's technical personnel.

C. Cooperate with testing and inspecting agencies engaged or required to perform services for installing built-up roofing system.

D. Coordinate installing roofing system components so insulation and roofing membrane sheets are not exposed to precipitation or left exposed at the end of the workday or when rain is forecast.

1. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation with a course of coated felt set in roofing cement or hot roofing asphalt with joints and edges sealed.

2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.

3. Remove and discard temporary seals before beginning work on adjoining roofing.

E. Asphalt Heating: Heat roofing asphalt and apply within plus or minus 25°F (14°C) of equiviscous temperature unless otherwise required by roofing system manufacturer. Do not raise roofing asphalt temperature above equiviscous temperature range more than one (1) hour before time of application. Do not exceed roofing asphalt manufacturer's recommended temperature limits during roofing asphalt heating. Do not heat roofing asphalt within 25°F (14°C) of flash point. Discard roofing asphalt maintained at a temperature exceeding finished blowing temperature for more than four (4) hours.

F. Asphalt Heating: Heat and apply SEBS-modified roofing asphalt according to roofing system manufacturer's written instructions.

G. Flood Coat Heating

1. Satisfy the requirements of OSHA Standard, 29 CFR 1910.1000 Subpart Z, Table Z-1.

2. Provide a fume recovery system on kettle to reduce fume evolution.

3. Use thermostatically controlled and circulating tankers.

4. Position kettles and tankers downwind from roofing operations and well away from building air intakes.

H. Substrate-Joint Penetrations: Prevent roofing asphalt from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

I. Pumping equipment shall be located on the ground at a safe distance from building; the location being subject to the approval of the City. The contractor shall be responsible for guarding against fires, and shall provide suitable fire extinguishers conveniently located at the site.

3.02 DEMOLITION

A. Remove existing roofing ballast, membrane, insulation, expansion joints, perimeter edge system, flashings, counter flashings, cants and roofing systems hidden beneath the existing top roof system and expose the concrete deck.

3.03 EXAMINATION

A. Examine substrates, areas, and conditions, with contractor present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.

2. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

3. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch (1.6 mm) out of plane relative to adjoining deck.

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

3.04 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Apply asphalt based primer to all horizontal and vertical substrates that will be receiving roofing materials.

D. Adhere strips of asphalt coated base sheet set in asphalt mastic over all deck joints and gaps between projections and decking to prevent asphalt bleed-through into the facility.

3.05 BASE SHEET INSTALLATION

A. Install one lapped course of base sheet, extending sheet over and terminating beyond cants. Attach base sheet as follows:

1. Adhere to substrate in a solid mopping of hot applied Type III asphalt.

2. Seal all projections with asphalt mastic and reinforcement mesh.

3. Lap ply sheet ends 8". Stagger end laps 12” minimum. Extend plies 2” beyond top edges of cants at wall and roof projections and equipment bases.

B. Install an envelope strip of base sheet that shall extend from the horizontal vapor barrier vertically and sealed onto the top of the roof insulation a minimum of 12”.

1. Adhere to substrate in a solid mopping of Type III asphalt adhesive.

3.06 INSULATION INSTALLATION

A. Refer to Section 07220 Roof Deck and Insulation.

3.07 ROOFING MEMBRANE INSTALLATION

A. Install one lapped course of base sheet, extending sheet over and terminating beyond cants. Attach base sheet as follows:

1. Adhere to substrate in a solid mopping of hot SEBS modified asphalt.

2. Lap ply sheet ends 8”. Stagger end laps 12” minimum. Extend plies 2” beyond top edges of cants at wall and roof projections and equipment bases.

B. Install three-ply sheets starting at low point of roofing system. Align ply sheets without stretching. Shingle side laps of ply sheets uniformly to achieve required number of plies throughout thickness of roofing membrane. Shingle in direction to shed water. Extend ply sheets over and terminate beyond cants.

1. Embed each ply sheet in a solid mopping of hot rubberized asphalt applied at rate required by roofing system manufacturer, to form a uniform membrane without ply sheets touching.

3.08 FLASHING AND STRIPPING INSTALLATION

A. Install base flashing over cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to roofing system manufacturer's written instructions and as follows:

1. Prime substrates with asphalt primer if required by roofing system manufacturer.

2. Backer Sheet Application: Install backer sheet and adhere to substrate in a solid mopping of hot roofing asphalt or polyurethane mastic adhesive.

3. Flashing Sheet Application: Adhere flashing sheet to substrate in a solid mopping of hot rubberized asphalt applied at not less than 425°F (218°C). Apply hot rubberized asphalt or polyurethane adhesive to back of flashing sheet and substrate surface if recommended by roofing system manufacturer.

B. Extend base flashing up walls or parapets a minimum of 8” above roofing membrane and 4” onto field of roofing membrane.

C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing. Utilize the aluminum termination bar and masonry anchors:

1. Install butyl tape between flashing and wall, compressed by the termination bar.

2. Seal termination bars of the base flashing with polyurethane sealant.

D. Roof Drains: Set 30” x 30” (760 x 760-mm) metal flashing in bed of asphalt roofing cement on completed roofing membrane. Cover metal flashing with stripping and extend a minimum of 4” (100 mm) beyond edge of metal flashing onto field of roofing membrane. Clamp roofing membrane, metal flashing, and stripping into roof-drain clamping ring.

1. Install flashing-sheet stripping by same method as installing base flashing.

E. Three Course: Seal all vertical laps of flashing membrane with a three-course application of asphalt roofing mastic and fiberglass mesh. The three-course application shall be applied in the following manner:

1. First, apply a minimum 3/16” thick and 8” wide layer of asphalt roofing mastic as recommended by manufacturer.

2. Second, fully imbed one layer of woven fiberglass mesh into asphalt roofing mastic. Woven fiberglass mesh shall be a minimum of 6” wide.

3. Finally, apply a minimum 3/16” thick and 8” wide layer of asphalt roofing mastic. After the final layer of asphalt roofing mastic has been applied, no fiberglass mesh shall be visible.

3.09 AGGREGATE SURFACE INSTALLATION

A. Promptly after installing and testing roofing membrane, base flashing, and stripping, coat roof surface with SEBS modified hot or cold applied coal tar pitch applied at a rate of approximately 60 lbs. per 100 square feet or 7 gallons per 100 square feet (cold applied).

B. Immediately following the flood coat of the roof, broadcast new gravel into the flood coat asphalt at a rate of 450–500 lbs. per 100 square feet.

3.10 COATING INSTALLATION

A. Adhere splash pad to roof at outlet for Penthouse roof drain.

3.11 COATING INSTALLATION

A. Apply coatings to base flashings, projections and surfaces that do not have an aggregate surface. Apply according to manufacturer's written instructions, by roller, brush, or other suitable application method.

3.12 FIELD QUALITY CONTROL

A. Testing Agency: City reserves the right to engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.

B. Test Cuts: Before flood coating and surfacing built-up roofing membrane, the City reserves the right to test specimens to be removed to evaluate problems observed during quality-assurance inspections of roofing membrane as follows:

1. Approximate quantities of components within roofing membrane will be determined according to ASTM D 3617.

2. Test specimens will be examined for interply voids according to ASTM D 3617 and to comply with criteria established in Appendix 3 of ARMA/NRCA's "Quality Control Guidelines for the Application of Built-up Roofing."

C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to City.

D. Repair or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements.

E. Additional testing and inspecting, including infrared analysis, at contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.13 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to the City.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of substantial completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

D. Remove bitumen adhesive drippings from all walls, windows, floors, ladders and finished surfaces.

END OF SECTION

SECTION 07600

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Metal Flashing
2. Perimeter Metal Edge Fascia

B. Related Sections

1. Section 07511 – Built-Up Asphalt Roofing

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM)

B. Warnock Hersey International, Inc., Middleton, WI (WH)

C. Factory Mutual Research Corporation (FMRC)

D. Underwriters Laboratories (UL)

E. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)

1. Architectural Sheet Metal Manual

F. National Roofing Contractors Association (NRCA)

1. Roofing and Waterproofing Manual

G. American National Standards Institute and Single Ply Roofing Institute (ANSI/SPRI)

1. Wind Design Guide for Use with Low Slope Roofing.

1.03 SUBMITTALS

A. Submit under provisions of Section 01010 – Summary of Work.

B. Product Data:

1. Submit manufacturer's descriptive literature and product specifications for each product.
2. Submit manufacturer's standard color chart.

C. Shop Drawings:

1. Submit for manufactured and shop fabricated sheet metal.
2. Submit drawings of profile, joints, fastening methods and terminations.

D. Samples

1. Submit sections of perimeter metal edge fascia, counter flashing and expansion joint.

E. Performance Requirements: see Paragraph 1.04 for requirements

1. UL 1897 Test Report
2. FM 4470 Test Report
3. Certificate of compliance with fire/windstorm classification.
4. Certificate of compliance with wind speed requirements.

F. Quality Assurance: see Paragraph 1.05 for requirements

1. Roof manufacturer's certification of fasteners.
2. Roof manufacturer's certification of metal.
3. Contractor's certification of a properly installed roof.
4. Manufacturer's certification that materials are from a single source.
5. Manufacturer's certification of steel stock.

G. Warranty

1. Provide an unexecuted copy of the warranty specified for this project, identifying the terms and conditions required of the manufacturer and the City.

1.04 PERFORMANCE REQUIREMENTS

A. Certify that sheet metal has a Class A Fire Resistance per ASTM E108.

B. Factory Mutual Research Corporation's (FMRC) wind uplift resistance classification: The roof perimeter flashing as defined in the FMRC Loss Prevention Data Sheets 1-7 and 1-49 shall be classified under an FM rating as FM 1A-90.

C. Wind Speed: 74 MPH peak gust measured at 33 feet above ground.

D. Completed metal edge flashing system shall be capable of withstanding expansion and contraction of components caused by changes in temperature without buckling and producing excess stress on structure, anchors or fasteners. The design temperature differential shall be not less than 200°F.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing Products specified in this section with minimum five (5) years' experience.

B. Fabricator Qualifications: Company specializing in fabricating work specified in this section with minimum five (5) years' experience.

C. Installer Qualifications: Acceptable to manufacturer with experience on at least five (5) projects of similar nature in past five (5) years.

D. Provide roof manufacturer's certification stating that metal fasteners furnished are acceptable to roof manufacturer.

E. Provide roof manufacturer's certification that metal furnished is acceptable to roofing manufacturer as a component of roofing system and is eligible for roof manufacturer's system warranty.

F. Maintain a full-time supervisor/foreman who is on the job-site at all times during installation. Foreman must have a minimum of five (5) years experience with the installation of similar system to that specified.

G. Manufacturer shall furnish written documentation that all roof material, flashing, trim, seam attachment devices, framing members, weather-exposed accessories, tape, caulking, and sealants were furnished by said single-source manufacturer.

H. Manufacturer shall furnish mill production documentation of specifications for steel coil stock used in the fabrication of the roof system, without organic coating per ASTM A446, ASTM A525, ASTM A527, or ASTM A792.

I. Installing contractor shall certify that the edge metal system has been installed per the manufacturer's printed details and specifications.

1.06 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 01700 – Contract Closeout.

1.07 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Section 01700 – Contract Closeout.

1.08 DELIVERY, STORAGE AND HANDLING

A. Comply with requirements of Section 01600 – Material and Equipment.

B. Deliver materials in manufacturer's original, unopened containers or packages with labels intact and legible.

C. Stack pre-formed and pre-finished material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

D. Prevent contact with materials which may cause discoloration or staining.

1.09 WARRANTY

A. Comply with provisions of Section 01010 – Summary of Work.

B. Pre-finished metal shall require a written twenty (20) year minimum, non-prorated warranty covering fade, chalking and film integrity. The finish shall not show a color change greater than 5 NBS color units per ASTM D2244 or chalking in excess of 8 units per ASTM D659. If either occurs material shall be replaced per warranty, at no cost to the City.

C. The contractor shall provide the City with a notarized written warranty assuring that all sheet metal work including caulking and fasteners to be watertight and secure for a period of two (2) years from the date of final acceptance of the building. Warranty shall include all materials and workmanship required to repair any leaks that develop, and make good any damage to other work or equipment caused by such leaks or the repairs thereof.

D. One manufacturer shall provide a single warranty for all accessory metal for flashings, metal edges and copings, along with the warranty for metal roof areas.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:

1. Pac-Clad, Peterson Aluminum Company
2. Uni-Clad, Firestone Building Products

B. Substitutions: Under provisions of Section 01600

2.02 MATERIALS

A. Counterflashing Metal for penthouse wall

1. 24-gauge pre-finished galvanized steel

B. Expansion Joint Covers

1. 0.040 thick, mill finished, sheet aluminum

2.03 FINISH

A. Steel Finish

1. Fluorocarbon finish. Epoxy primer baked both sides, .2-.25 mils thickness as approved by finish coat manufacturer.
2. Weathering finish as referred by National Coil Coaters Association (NCCA).
3. Material properties of finish.

PROPERTY	TEST METHOD	FLUOROCARBON
Pencil	ASTM D3363	HB-H
Hardness	NCCA II-2	
Bend	ASTM D-4145 & NCCA II-19	O-T
Cross-Hatch Adhesion	ASTM D3359	no loss of adhesion
Gloss (60° angle)	ASTM D523	25+/-5%
Reverse Impact	ASTM D2794	no cracking or loss of adhesion
Nominal Thickness	ASTM D1005	
Primer		0.2 mils
Topcoat		0.8 mils

B. Exposed and unexposed surfaces for mill finish flashing, fascia, and expansion joint cover, shall be as shipped from the mill.

C. Finish: Color and finish as selected by City from manufacturer's standard samples.

2.04 RELATED MATERIALS AND ACCESSORIES

A. Metal Primer: Zinc chromate type

B. Plastic Cement: ASTM D 4586

C. Sealant: Specified in Section 07900 or on drawings

D. Underlayment: Conforming to ASTM D1970, water and ice shield underlayment

E. Fasteners:

1. Corrosion resistant screw fastener as recommended by metal manufacturer. Finish exposed fasteners same as flashing metal.

2. Fastening shall conform to factory mutual requirements or as stated on section details, whichever is more stringent.

PART 3 EXECUTION

3.01 GENERAL

A. Immediately correct roof leakage during construction. If the contractor does not respond within twenty-four (24) hours, the City will exercise its right to correct the work under the terms of the conditions of the contract.

3.02 PROTECTION

A. Isolate metal products from dissimilar metals, masonry or concrete with bituminous paint, tape, or slip sheet. Use gasketed fasteners where required to prevent corrosive reactions.

B. Fastening of metal to walls shall comply with building code standards.

C. All accessories or other items essential to the completeness of sheet metal installation, whether specifically indicated or not, shall be provided and of the same material as item to which applied.

D. Allow sufficient clearances for expansion and contraction of linear metal components. Secure metal using fasteners as required by the system. Exposed face fastening of coping cap will be rejected

3.03 INSPECTION

A. Perform field measurements prior to fabrication.

B. Coordinate work with work of other trades.

C. Verify that substrate is dry, clean and free of foreign matter.

D. Commencement of installation shall be considered acceptance of existing conditions.

3.04 MANUFACTURED SHEET METAL SYSTEMS

A. Furnish and install manufactured fascia systems in strict accordance with manufacturer's printed instructions.

B. Provide factory-fabricated accessories including, but not limited to, fascia extenders, miters, scuppers, joint covers, etc.

3.05 SHOP FABRICATED SHEET METAL

A. Metal work shall be shop fabricated to configurations and forms in accordance with recognized sheet metal practices.

B. Hem exposed edges.

C. Angle bottom edges of exposed vertical surfaces to form drip.

D. Lap corners with adjoining pieces fastened and set in sealant.

E. Form joints for gravel stop fascia system, coping cap with a 3/8" opening between sections. Back the opening with an internal drainage plate formed to the profile of fascia piece.

F. Install sheet metal to comply with referenced SMACNA and NRCA standards.

3.06 CLEANING

A. Clean as recommended by manufacturer. Do not use materials or methods, which may damage finish or surrounding construction.

B. Replace damaged work that cannot be restored by normal cleaning methods.

3.07 FINAL INSPECTION

A. At completion of installation and associated work, meet with contractor, installer of associated work, City, roofing system manufacturer's representative and other representatives directly concerned with performance of roofing system.

B. Inspect work and flashing of roof penetrations, walls, curbs and other equipment. List all items requiring correction or completion and furnish copy of list to each party in attendance.

C. Repair or replace deteriorated or defective work found at time above inspection as required to a produce an installation which is free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

D. Notify the City upon completion of corrections.

E. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.

END OF SECTION

SECTION 07700
PREFORMED FASCIAS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Preformed Aluminum Fascias

B. Related Sections

1. Section 06100 – Rough Carpentry
2. Section 07511 – Built-Up Asphalt Roofing
3. Section 07600 – Sheet Metal Flashing and Trim

1.02 PERFORMANCE CRITERIA

A. Thermal Movement

1. Completed system shall be capable of withstanding expansion and contraction of components caused by changes in temperature without buckling, producing excess stress on structure, anchors or fasteners.
2. Interface between flat coping and anchor plate shall provide for an unrestrained thermal movement in the longitudinal direction with no penetration of roofing membrane.

B. Uniform wind load capacity

1. Factory Mutual Engineering and Research (FM), Loss Prevention Data 1-49, Perimeter Flashing, June 1985.

C. Capacities for gauge, span or loading other than those tested may be determined by interpolation of test results within the range of test data.

1.03 SUBMITTALS

A. Submit under provisions of Section 01010 – Summary of Work.

B. Product Data:

1. Indicate product description, finishes and installation instructions, including interface with adjacent materials and surfaces.

C. Shop Drawings:

1. Indicate material types, sizes, shapes, thicknesses, finishes, fabrication details, anchors, connections and relation to adjacent work. Draw details and profiles at appropriate scale.

D. Samples

1. Anodized aluminum: 6" x 6" samples of anodized aluminum, indicating full range of color to be expected in finish work.

2. Manufactured components, l'-0" length in style and finish specified, including flashing, cant, anchor plate and gutter/splice plate assembly.

E. Intent to Warrant

1. Submit an intent to warrant, executed by authorized representative of system manufacturer, indicating that manufacturer has reviewed drawings, specifications and conditions affecting the work, and proposes to provide warranties as referenced herein without further stipulation

1.04 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 01700 – Contract Closeout.

1.05 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Section 01700 – Contract Closeout.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing Products specified in this Section with minimum five years experience.

B. Installer Qualifications: Acceptable to manufacturer.

C. Applicable Standards

1. Aluminum Association, Design System for Aluminum Finishes (AA)

2. American Architectural Manufacturers Association (AAMA), standards as referenced herein

3. Factory Mutual Engineering and Research (FM), Loss Prevention Data 1-49, Perimeter Flashing, June 1985

4. Single Ply Roofing Institute (SPRI), Wind Design Guide for Edge Systems used With Low Slope Roofing Systems, 1995 Edition

1.07 DELIVERY, STORAGE AND HANDLING

A. Comply with requirements of Section 01600 – Material and Equipment.

B. Store materials off ground under cover. Protect from damage and deterioration.

C. Handle materials to prevent damage to surfaces, edges and ends of sheet metal items. Reject and remove damaged material from site.

1.08 WARRANTY

A. Comply with provisions of Section 01010 – Summary of Work.

B. Provide installers warranty warranting system to be free of defects in materials and workmanship and to be installed in strict accordance with manufacturer's shop drawings and/or installation instructions. Warranty period shall be (5) five years.

C. Provide a comprehensive manufacturer’s roof system warranty. Warranty shall state edge system to be free of defects in materials and workmanship, to resist blow-off and to be leak tight, due to conditions within stated design limits. Provide comprehensive system warranty based on certified testing for design and performance criteria specified herein. Edge system warranty period shall be (30) thirty years.

D. A joint warranty combining items A and B into a single document is acceptable in lieu of separate material and installation warranties.

E. Provide manufacturer s warranty warranting anodized coatings to be free from defects including checking, peeling or fading for a period of one (1) year.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:

1. Tremco Inc.

B. Substitutions: Under provisions of Section 01600

2.02 ALUMINUM FASCIA

A. TremLock Fascia System

1. Material: Smooth surfaced formed aluminum alloy. Thickness shall be determined by manufacturer to comply with specified performance, however minimum thickness shall be 0.050".

2. Finish: Anodized coating, as specified herein

3. Face height: 9.25-inches

4. Lengths: 10'-0" minimum

5. Joints: Splice plates, concealed, in accordance with manufacturer's product data

2.03 ACCESSORIES

A. Splice plates: Minimum 0.032" thickness aluminum sheet, 6" minimum length, continuous with front and rear legs and with extruded butyl seal for concealed installation. Finish shall match copings.

B. Anchor plate: Galvanized steel of manufacturer's FM approved, standard design. Molded plastic or polystyrene shall not be acceptable.

C. Fasteners: 1.5” ring shank nails. Fasteners shall be as provided or recommended by fascia system manufacturer. In no case shall structural adhesive be used without mechanical fastening devices.

D. Prefabricated sections: Factory-assembled, continuously welded, mitered corners, and continuously welded transitions shall match fascia in design and finish.

E. Elastomeric Flashings: Elastomeric sheeting blend of EPDM and SBR thermoset elastomers. Sheet must be reinforced with polyester woven scrim.

2.04 FINISH

A. Anodized coating: Meeting Aluminum Association Designation AA-C22A44, Class I, mill finished.

2.05 FABRICATION

A. Prefabricate system in manufacturer s plant to greatest extent possible.

B. Miter and weld joints in tops and faces of corners and transitions or bend outside corner and weld joint in top and inside corner. Perform welding prior to finishing.

C. Pop rivets, interlocking discontinuities and other exposed fasteners exposed in finished work are not acceptable.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine conditions and proceed with work in accordance with Section 01700

3.02 INSTALLATION

A. Install fascia system in accord with manufacturer's product data and approved shop drawings, except where more stringent requirements are specified, to achieve an FM Zone 1 wind uplift classification.

B. Starting in corners, install pre-fabricated galvanized cant and secure to wood nailer with 1 ½” ring shank nails spaced every 12” o.c. Do not nail through the overlap joints. Install nails through the vertical surfaces first.

C. Extend roofing felts to the top of the cant. Elastomeric flashing shall extend up the cant and over the face of the cant a minimum of 3”.

D. When installing the fascia and retainer, maintain ¼” joints at fascia and 1.0” overlap at joints of retainer with these joints a minimum of 6” apart. When flashing has been completed install the retainer.

E. Start in corner locations and working towards the center, fasten the retainer through each pre-punched nail hole with 1 ½” ring shank nails. Leave ¼” gap between sections of retainer for thermal movement. Make weather-tight fit, allowing for expansion and contraction.

3.03 CLEANING

A. Clean as recommended by manufacturer. Do not use materials or methods, which may damage finish or surrounding construction.

END OF SECTION

APPENDIX

Asbestos NESHAP Inspection Report

Delahey Industries, Inc.

13000 W. Bluemound Rd.
Elm Grove, WI 53122
(262) 821-9296
Fax: (262) 821-1709

Asbestos Response Specialists • Inspections • EPA Certified

June 25, 2012

Mr. Mark Gremmer
Milwaukee Water Works
Frank P. Zeidler Municipal Building
841 North Broadway, Room 409
Milwaukee, WI 53202

Re: Howard Avenue Purification Plant – ***Filter Building roof sampling***
Delahey Industries, Inc. Project #12047

Dear Mr. Gremmer:

Per your request, a client task specific NESHAP protocol inspection was performed on June 14, 2012 at the Howard Avenue Purification Plant, Milwaukee, Wisconsin. The purpose of this inspection was to determine the presence of asbestos within ***roofing materials on the filter building roof only*** as designated by the owner's representative. A minimum of three samples of each homogeneous material was collected for this inspection. In order to keep sample analysis costs to a minimum, testing of the minimum three (3) samples of each homogeneous material collected was performed until a sample "positive" was achieved. Additional samples of this material are not analyzed once a positive result is determined.

The 38,000 square foot roof (approximately) was separated into five separate sections (see drawing). The following sampled materials analyzed negative for asbestos.

- Flat built-up roof with membrane (15 samples collected)
- Black brick flashing (3 samples collected)
- Black metal flashing (3 samples collected

Attached are the sample log field sheets and the laboratory analytical documents, which indicate the results of the analysis. If you have any questions concerning the results, feel free to call me at (262) 821-9296.

Regards,
Delahey Industries, Inc.

David Muhar

David A. Muhar
Inspector I.D. #AII-156

Howard Avenue Purification Plant – Filter Building, Milwaukee, WI
Delahey Industries Project #12047
Sampled on June 14, 2012
David Muhar Inspector I.D. #AII-156

Room #/Location	Sample I.D. #	Material Description	Results
Section A	HA-01A	Built-up flat roof	Negative
Section A	HA-01B	Built-up flat roof	Negative
Section A	HA-01C	Built-up flat roof	Negative
Section B	HA-02A	Built-up flat roof	Negative
Section B	HA-02B	Built-up flat roof	Negative
Section B	HA-02C	Built-up flat roof	Negative
Section C	HA-03A	Built-up flat roof	Negative
Section C	HA-03B	Built-up flat roof	Negative
Section C	HA-03C	Built-up flat roof	Negative
Section D	HA-04A	Built-up flat roof	Negative
Section D	HA-04B	Built-up flat roof	Negative
Section D	HA-04C	Built-up flat roof	Negative
Section E	HA-05A	Built-up flat roof	Negative
Section E	HA-05B	Built-up flat roof	Negative
Section E	HA-05C	Built-up flat roof	Negative
Section A	HA-06A	Black brick flashing	Negative
Section A	HA-06B	Black brick flashing	Negative
Section A	HA-06C	Black brick flashing	Negative
Section B & C	HA-07A	Black metal flashing	Negative
Section B & C	HA-07B	Black metal flashing	Negative
Section B & C	HA-07C	Black metal flashing	Negative

AmeriSci Richmond
13635 GENITO ROAD
MIDLOTHIAN, VIRGINIA 23112
TEL: (804) 763-1200 • FAX: (804) 763-1800

PLM Bulk Asbestos Report

Delahey Industries, Inc.
Attn: John Hey
13000 W. Bluemound Road

Elm Grove, WI 53122-2650

Date Received 06/15/12
Date Examined 06/18/12

AmeriSci Job # 112061700
P.O. #

RE: 12047; Howard Ave Plant; Filter Building Roof

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
HA-01A 1	112061700-01 **Location:** Built-Up Flat Roof	*No*	NAD [1] (by CVES) by C. David Mintz on 06/18/12
Analyst Description: Black, White, Heterogeneous, Non-Fibrous, Core Sample **Asbestos Types:** **Other Material:** , Cellulose 2 %, Fibrous glass 2 %, Non-fibrous 96 % **Comment:** Black Tar, White Styrofoam, and Black Rubber Membrane			
HA-01B 1	112061700-02 **Location:** Built-Up Flat Roof	*No*	NAD [1] (by CVES) by C. David Mintz on 06/18/12
Analyst Description: Black, White, Heterogeneous, Non-Fibrous, Core Sample **Asbestos Types:** **Other Material:** Cellulose 2 %, Fibrous glass 2 %, Non-fibrous 96 % **Comment:** Black Tar, White Styrofoam, and Black Rubber Membrane			
HA-01C 1	112061700-03 **Location:** Built-Up Flat Roof	*No*	NAD [1] (by CVES) by C. David Mintz on 06/18/12
Analyst Description: Black, White, Heterogeneous, Non-Fibrous, Core Sample **Asbestos Types:** **Other Material:** Cellulose 2 %, Fibrous glass 2 %, Non-fibrous 96 % **Comment:** Black Tar, White Styrofoam, and Black Rubber Membrane			
HA-02A 2	112061700-04 **Location:** Built-Up Flat Roof	*No*	NAD [1] (by CVES) by C. David Mintz on 06/18/12
Analyst Description: Black, White, Heterogeneous, Non-Fibrous, Core Sample **Asbestos Types:** **Other Material:** Cellulose 4 %, Fibrous glass 2 %, Non-fibrous 94 % **Comment:** Black Tar, White Styrofoam, and Black Rubber Membrane			

See Reporting notes on last page

PLM Bulk Asbestos Report

12047; Howard Ave Plant; Filter Building Roof

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
HA-02B 2	112061700-05 **Location:** Built-Up Flat Roof	*No*	NAD [1] (by CVES) by C. David Mintz on 06/18/12
Analyst Description: Black, White, Heterogeneous, Non-Fibrous, Core Sample **Asbestos Types:** **Other Material:** Cellulose 4 %, Fibrous glass 2 %, Non-fibrous 94 % **Comment:** Black Tar, White Styrofoam, and Black Rubber Membrane			
HA-02C 2	112061700-06 **Location:** Built-Up Flat Roof	*No*	NAD [1] (by CVES) by C. David Mintz on 06/18/12
Analyst Description: Black, White, Heterogeneous, Non-Fibrous, Core Sample **Asbestos Types:** **Other Material:** Cellulose 4 %, Fibrous glass 2 %, Non-fibrous 94 % **Comment:** Black Tar, White Styrofoam, and Black Rubber Membrane			
HA-03A 3	112061700-07 **Location:** Built-Up Flat Roof	*No*	NAD [1] (by CVES) by C. David Mintz on 06/18/12
Analyst Description: Black, White, Heterogeneous, Non-Fibrous, Core Sample **Asbestos Types:** **Other Material:** Cellulose 4 %, Fibrous glass 2 %, Non-fibrous 94 % **Comment:** Black Tar, White Styrofoam, and Black Rubber Membrane			
HA-03B 3	112061700-08 **Location:** Built-Up Flat Roof	*No*	NAD [1] (by CVES) by C. David Mintz on 06/18/12
Analyst Description: Black, White, Heterogeneous, Non-Fibrous, Core Sample **Asbestos Types:** **Other Material:** Cellulose 5 %, Fibrous glass 2 %, Non-fibrous 93 % **Comment:** Black Tar, White Styrofoam, and Black Rubber Membrane			
HA-03C 3	112061700-09 **Location:** Built-Up Flat Roof	*No*	NAD [1] (by CVES) by C. David Mintz on 06/18/12
Analyst Description: Black, White, Heterogeneous, Non-Fibrous, Core Sample **Asbestos Types:** **Other Material:** Cellulose 5 %, Fibrous glass 2 %, Non-fibrous 93 % **Comment:** Black Tar, White Styrofoam, and Black Rubber Membrane			

See Reporting notes on last page

PLM Bulk Asbestos Report

12047; Howard Ave Plant; Filter Building Roof

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
HA-04A 4	112061700-10 **Location:** Built-Up Flat Roof	***No***	NAD [1] (by CVES) by C. David Mintz on 06/18/12
Analyst Description: Black, White, Heterogeneous, Non-Fibrous, Core Sample **Asbestos Types:** **Other Material:** Cellulose 5 %, Fibrous glass 2 %, Non-fibrous 93 % **Comment:** Black Tar, White Styrofoam, and Black Rubber Membrane			
HA-04B 4	112061700-11 **Location:** Built-Up Flat Roof	***No***	NAD [1] (by CVES) by C. David Mintz on 06/18/12
Analyst Description: Black, White, Heterogeneous, Non-Fibrous, Core Sample **Asbestos Types:** **Other Material:** Cellulose 5 %, Fibrous glass 2 %, Non-fibrous 93 % **Comment:** Black Tar, White Styrofoam, and Black Rubber Membrane			
HA-04C 4	112061700-12 **Location:** Built-Up Flat Roof	***No***	NAD [1] (by CVES) by C. David Mintz on 06/18/12
Analyst Description: Black, White, Heterogeneous, Non-Fibrous, Core Sample **Asbestos Types:** **Other Material:** Cellulose 8 %, Fibrous glass 2 %, Non-fibrous 90 % **Comment:** Black Tar, White Styrofoam, and Black Rubber Membrane			
HA-05A 5	112061700-13 **Location:** Built-Up Flat Roof	***No***	NAD [1] (by CVES) by C. David Mintz on 06/18/12
Analyst Description: Black, White, Heterogeneous, Non-Fibrous, Core Sample **Asbestos Types:** **Other Material:** Cellulose 8 %, Fibrous glass 2 %, Non-fibrous 90 % **Comment:** Black Tar, White Styrofoam, and Black Rubber Membrane			
HA-05B 5	112061700-14 **Location:** Built-Up Flat Roof	***No***	NAD [1] (by CVES) by C. David Mintz on 06/18/12
Analyst Description: Black, White, Heterogeneous, Non-Fibrous, Core Sample **Asbestos Types:** **Other Material:** Cellulose 8 %, Fibrous glass 2 %, Non-fibrous 90 % **Comment:** Black Tar, White Styrofoam, and Black Rubber Membrane			

See Reporting notes on last page

PLM Bulk Asbestos Report

12047; Howard Ave Plant; Filter Building Roof

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
HA-05C 5	112061700-15 **Location:** Built-Up Flat Roof	***No***	NAD [1] (by CVES) by C. David Mintz on 06/18/12
Analyst Description: Black, White, Heterogeneous, Non-Fibrous, Core Sample **Asbestos Types:** **Other Material:** Cellulose 8 %, Fibrous glass 2 %, Non-fibrous 90 % **Comment:** Black Tar, White Styrofoam, and Black Rubber Membrane			
HA-06A 6	112061700-16 **Location:** Black Brick Flashing	***No***	NAD (by CVES) by C. David Mintz on 06/18/12
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass Trace, Non-fibrous 100 %			
HA-06B 6	112061700-17 **Location:** Black Brick Flashing	***No***	NAD (by CVES) by C. David Mintz on 06/18/12
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
HA-06C 6	112061700-18 **Location:** Black Brick Flashing	***No***	NAD (by CVES) by C. David Mintz on 06/18/12
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
HA-07A 7	112061700-19 **Location:** Black Metal Flashing	***No***	NAD (by CVES) by C. David Mintz on 06/18/12
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			

See Reporting notes on last page

PLM Bulk Asbestos Report

12047; Howard Ave Plant; Filter Building Roof

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
HA-07B 7	112061700-20 **Location:** Black Metal Flashing	*No*	NAD (by CVES) by C. David Mintz on 06/18/12
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
HA-07C 7	112061700-21 **Location:** Black Metal Flashing	*No*	NAD (by CVES) by C. David Mintz on 06/18/12
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			

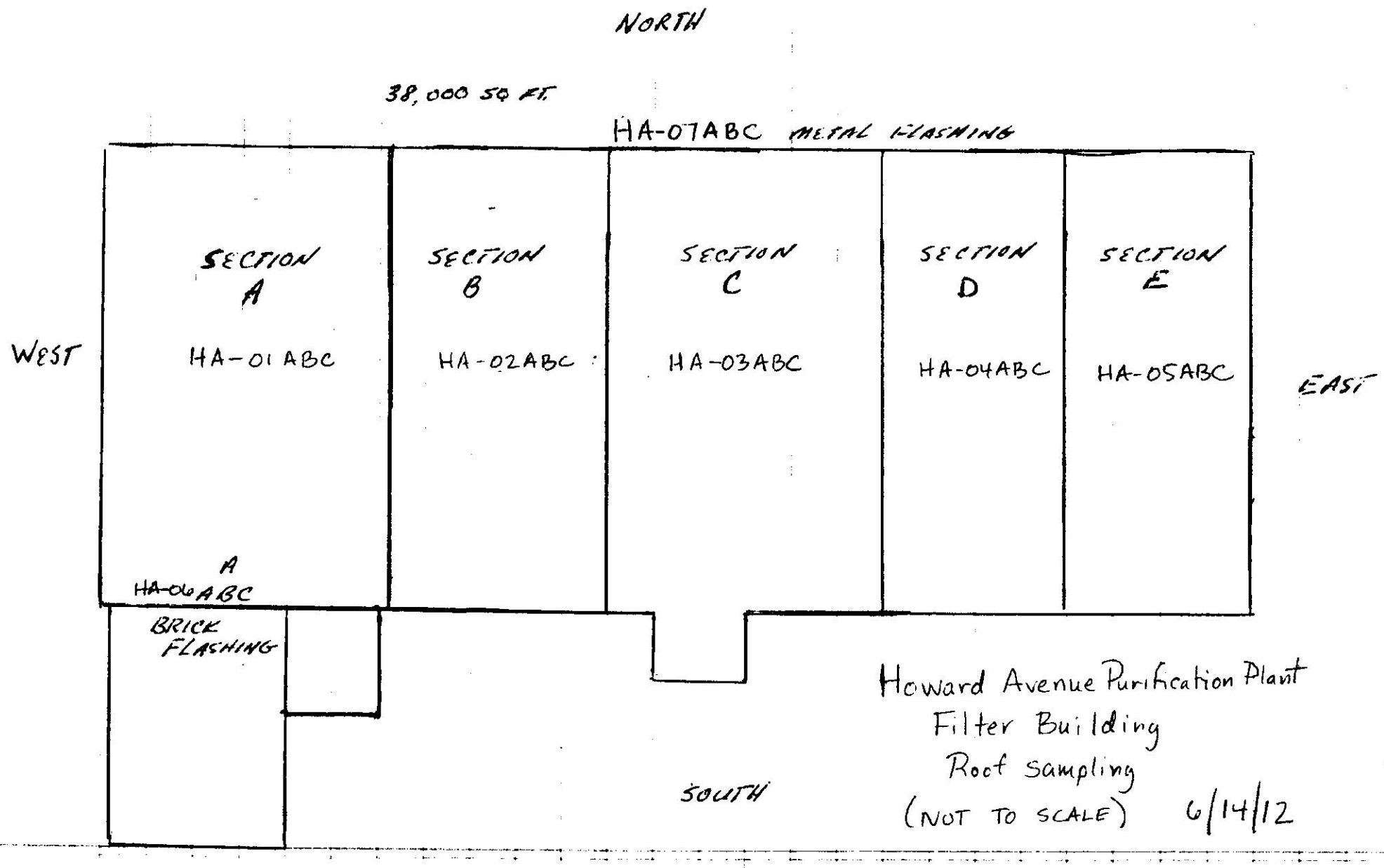
Reporting Notes:

(1) Physically inseparable layers in sample - sample composited for analysis

Analyzed by: C. David Mintz _____ Date 6/18/12

*NAD = no asbestos detected. Detection Limit <1%, Reporting Limits: CVES = 1%, 400 Pt Ct = 0.25%, 1000 Pt Ct = 0.1%; "Present" or NVA = "No Visible Asbestos" are observations made during a qualitative analysis: NA = not analyzed; NA/PS = not analyzed / positive stop; PLM Bulk Asbestos Analysis by EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab Code 101904-0) and ELAP PLM Analysis Protocol 198.1 for New York friable samples (198.6 for NOB samples)(NYSDOH ELAP Lab # 10984); CA ELAP Lab # 2508; Note: PLM is not consistently reliable in detecting asbestos in floor coverings and similar NOB materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos-containing in New York State (also see EPA Advisory for floor tile, FR 59, 146, 38970, 8/1/94). NIST Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested.

Reviewed By: _____



Howard Avenue Purification Plant
Filter Building
Roof sampling
(NOT TO SCALE) 6/14/12