**DIVISION 04**
**SECTION 04 01 20**
**MASONRY RESTORATION**

## PART I – GENERAL.

### 1.01. SUMMARY

A. The Contractor for this work is referred to the “Bid Booklet” the "Contract Drawings"; the "Specifications"; Special Notice to Contractors Summary Form" latest edition; the "Form of Proposal", and all amendments and addenda, all which govern the work of this Contract.

B. This Section includes brick restoration at the bulkhead wall, removal and rebuilding of compactor stack up to six feet high including louvers and precast cap as shown on contract document and as directed by the Authority’s Representative.

C. Bick wall repairs as shown on contract document and as directed by the Authority’s Representative.

D. Prior to submission of bid, visit the work site to verify the existing conditions, dimensions and quantities as set forth in the Contract Documents.

E. All measurements required for proper execution of the work is the Contractor’s responsibility. Before submitting bid examine all existing conditions which may impact on the work and include them in the bid price. There will be no exception.

### 1.02. ENVIRONMENTAL REQUIREMENTS

A. Construction Requirements

1. For factory packaged products, comply with manufacturer's printed limitations and instructions.
2. Salt or other chemicals for lowering the freezing temperature of the mortar shall not be used.
3. Masonry units, mortar, and grout shall be preconditioned, and masonry protected for the following cold weather conditions:
    a. Air Temperature 40$^{o}$F to 32$^{o}$F:
        i. Heat mixing water or sand to minimum of 70$^{o}$F and to maximum of 160$^{o}$F.
    b. Air Temperature 32$^{o}$F to 25$^{o}$F:
        i. Heat mixing water and sand to minimum of 70$^{o}$F and to maximum of 160$^{o}$F.
        ii. Provide heat source to maintain a minimum air temperature 32°F on each side of masonry construction.
    c. Air Temperature 25$^{o}$F to 20$^{o}$F:
        i. Heat mixing water and sand to minimum of 70$^{o}$F and to maximum of 160$^{o}$F.
        ii. Provide heat source to maintain a minimum air temperature of 32° on each side of masonry construction.
        iii. Provide wind breaks for wind in excess of 15 miles per hour.
    d. Air Temperature 20$^{o}$F and Below:
        i. Heat mixing water and sand to a minimum of 70$^{o}$F and to maximum of 160$^{o}$F.
        ii. Provide enclosures and heat source to maintain a minimum air temperature of 32$^{o}$F on each side of masonry construction during construction.
        iii. Keep temperature of masonry units a minimum of 30$^{o}$F when laid.

B. Protection Requirements

1. Mean Daily Air Temperature of 40°F to 32°F:

   a. Protect masonry from rain or snow for 24 hours.

2. Mean Daily Air Temperature of 32°F and Below:

   a. An air temperature of at least 32°F shall be maintained on each side of masonry for a period of at least 72 hours for Type N mortar and for pointing mortar.

C. Wetting of Clay Masonry Units: For units with initial rates of absorption that require their wetting before laying, follow the cold weather requirements:

1. If surface temperatures are above 32$^{o}$F, use water heated to about 70$^{o}$F.

2. If surface temperatures are below 32$^{o}$F, use water heated to about 120$^{o}$F.

**1.03. SUBMITTALS.**

See Division 01, Section 01 33 00 for specific requirements.

**PART 2 – PRODUCTS.**

**2.01. GENERAL MASONRY**

Unless otherwise noted or directed by the Authority:

A. Only the latest edition of reference standards or codes in force at the time of the bid opening shall be applicable. These shall be superseded by the N.Y.C. Building Code if in conflict with it.

B. All materials shall be Asbestos Free and shall have a flash point of over 100°F. Materials shall meet the requirements of the New York City Building Code, Board of Standard and Appeals, be grade marked and trademarked, and meet the following requirements:

C. Concrete Block

1. Portland cement, ASTM C150, Type 1, one source.

2. Aggregates, ASTM C331, 100% lightweight expanded shale, clay or slate aggregates, manufactured by the rotary kiln process equal to "Solite", “Norlite" or “Haydite" or equal.

3. Concrete Masonry Units: Load bearing 100% lightweight aggregate concrete masonry units conforming to the requirements of ASTM C-90, Grade N, Type 1 with a minimum compressive strength (fm) of 1900 psi.

a. Block behind face brick, stone and block for rated walls shall be solid.

b. All other block shall be hollow, unless otherwise noted on drawings.

4. The producer of the concrete masonry units shall furnish certification from an independent testing laboratory confirming that all 8" or larger masonry units meet all of the UL-618 requirements for two (2) hours or better (as required), referencing full scale fire test reports (ASTM E-119). All 4" and 6" units shall conform to "National Bureau of Standards" and "National Research Council" full scale fire tests.

5. Sizes and Shapes: Nominal face size 8" x 16" by thickness as indicated on drawings, with stretcher units, jamb units, header units, square corner units (at ends and corners of exposed or painted work), sash units (at control joints within masonry wall), lintel units and other special shapes and sizes required to complete the work.

6. Finish: For exposed or painted block surfaces. In addition to ASTM requirements, block shall have uniformly dense, flat, fine grain texture, with no cracks, chips, spalls, or other defects which would impair appearance. For concealed block surfaces, free from deleterious materials that would stain plaster or corrode metal.

7. Curing: All concrete block shall be steam cured, and air dried for not less than thirty (30) days before delivery.
8. Density of concrete block shall not exceed ninety (90) lbs. per cubic foot.
9. Shrinkage: Shrinkage of concrete blocks shall not exceed .065% when tested in accordance with ASTM C426.
10. Water Content

a. At the time of delivery to the job site, concrete masonry units shall have a value, in weight of contained water, of not more than thirty (30) percent of the fully saturated content for the unit tested.

b. Ship all units from the factory, and store at the job site, with all necessary protection to prevent increase of water content from rain and other sources.

D. Masonry Units

1. Bricks shall match the existing sound brick in size, shapes, texture, color and strength and durability with adjoining bricks. Replacement brick shall be selected by the NYCHA's Architect and NYCHA's Field Representative. Provide multiple types, sizes, and colors of brick to match existing brick patterns and do a mock up brick repair.
2. In addition to #1 above, brick shall be clay or shale, ASTM C216, grade SW, solid. Brick shall be tested for efflorescence in accordance with ASTM Test Methods C67 and the rating shall be "Not Effloresced".
3. Lip brick are to be factory manufactured only. Do not use field cut lip brick.

E. Base Materials

1. Portland Cement: Type I ASTM C150
2. Sand for Mortar Mix: ASTM C144. Sand shall be natural sand matching the gradation and color of the existing mortar aggregate.
3. Hydrated Lime ASTM C207 Type "S".
4. Water - Clean, potable New York City water free of injurious materials.
5. Mortar Coloring: Provide pure mineral pigments, natural and synthetic iron oxides, and chromium oxides compounded for use in mortar mixes. Material shall conform to ASTM C979. Coloring shall not contain alkalyde salts. No liquid colorants shall be permitted.
6. Premixed sand and lime for mortar mixes is not permitted. The use of batched material by Spec-Mix and factory-packaged cement-lime-pigment by major mortar manufacturers is permitted. Each individual bag of material shall have the manufacturer's label identifying the mortar type.
7. No air-entraining admixtures or material containing such shall be permitted in the mortar. Also, no anti-freeze compounds, calcium chloride, or other compounds, unless expressly permitted otherwise, shall be permitted in the mortar.

F. Reinforcement and anchors

1. Stainless Steel: 18-8, type 304
2. All manufactured units shall be as follows:

a. Horizontal truss-reinforcement(if required) LOX-ALL #120 Truss-Mesh, 9 gauge, of proper width for the wall thickness.

b. Masonry Ties for replacement veneer brickwork shall be 3-1/2″ long and made of 3/16" dia. / 12Ga corrugated stainless steel e.g. #345 by Hohmann & Barnard Inc., #103-C

by Heckmann Building Products Inc., or equal. Authority's Representative would require different tie length based on field condition.

c. If the actual space between wythes of solid masonry limits the use of a particular anchor type, notify the Engineer of Record for an acceptable alternate anchor.

G. Anchoring system:

Provide pins and support the brickwork to remain where existing course of brick is replaced.

Face Brick Replacement: Epoxy anchor to hold on exterior brickwork to the back-up wythe prior to removal of brickwork shall be 1/2" diameter stainless steel rod, HIT HY270 by HILTI or equal.

H. Sealant (Caulking) shall be one component polyurethane sealant complying with Federal Specification No. TT-S00230C, Type II, Class A. It shall be one of the following or an equal. Color shall match the adjoining elements:

1) Dymonic — Tremco, 3735 Green Road, Beachwood, Ohio 44122

2) Sonolastic NP-1 Products — BASF Construction Chemicals, 23700 Chagrin Blvd, Cleveland, Ohio

3) Sikaflex No. 1-A — Sika Chemical Corp., Box 297, Lyndhurst, NJ 07071

I. Backer rod shall be closed cell polyethylene foam such as Sonolastic Soft Backer Rod by BASF Construction Chemicals or equal. Diameter of backer rod, before compression, shall be 1-1/2 times the width of the joints at the time of installation.

**2.02. MIXES**

A. Mortar Types

1. All Mortar:

a. Comply with ASTM C270 and BIA-M1-88.

b. For Masonry Joint Repairs: Shall be Type N Mortar as per ASTM C-270 consisting of a stiff mixture of one (1) part Portland Cement (ASTM C-150 Type 1), one (1) part lime putty (ASTM C-5) and five (5) parts clean white sand (ASTM C-144). Compressive strength of the mortar shall be 750 psi at 28 days. Color of mortar shall match the existing mortar. No admixtures shall be permitted. Mortar shall be accurately proportioned, and machine mixed. The Authority has the option to test the mortar at its own expense. Mortar samples will be taken at regular intervals and tested for compressive strength. If the mortar is sub-standard, remove the masonry built with the sub-standard mortar and replace the same with the new mortar. Do not use re-tempered mortar. Mortar shall be 775 Light Buff by "Spec. Mix" or equal.

c. Provide Type I Portland cement. Masonry cement shall not be used as a substitute.

d. Preconstruction testing with the proportions carefully monitored is to be used to establish the upper end of the strength range of the mortar, which should generally be near the minimum strength of the next higher strength mortar.

e. The maximum strength of each mortar shall generally not exceed the minimum strength of the next higher strength mortar type. Preconstruction testing will determine the general range of strengths to be found and may end up higher than the threshold above.

f. Air content of mortar shall be less than 12%.

2. Rebuilding Mortar:

a. Type N: 1 part Portland cement,
1 part lime,
6 parts dry sand.
Minimum compressive strength shall be 750 psi.

3. Repointing Mortar:

a. Brick and sandstone; Type O:
1 part Portland Cement.
2 parts lime.
7 parts sand.

**2.03 BRICK**

Face Brick (Unglazed): Comply with ASTM C 216.

Solid brick units (less than 25% core area) with face to fit condition indicated for common bond, headers, coining, lintels, arches, corners, and other special ground, cut, or sawed shapes where required to complete masonry restoration Work.

Provide un-cored units with all exposed surfaces finished, for sills, caps and similar applications resulting in exposure of brick surfaces which otherwise would be concealed from view.

Size to be determined as an average measurement of the existing brick in each of the brick's dimensions.

Type as required to match existing masonry: FBS (normal size and color variation)

Grade: SW (severe weathering)

Compressive Strength: 6000 psi

Concealed Brick: Comply with ASTM C 62.

Solid brick units of the same unit dimensions as face brick.

Grade: Brick Concealed in Inner Wythe or Interior of Wall: Grade MW.

Other properties shall be compatible with face brick.

FACE BRICK DISTRIBUTORS

A. Consolidated Brick and Building Supplies, Inc., N.Y., N.Y.

B. Tri-State Brick and Building Materials, Inc. N.Y., N.Y.

C. Belden-Stark Brick Corp., N.Y., N.Y.

D. Glen-Gery Corp. Somerville, N. J.

E. Brick and Block Specialties, Inc., Floral Park, NY

F. Stone Art Inc., 295B California Ave. Church Hill, TN 37642

MANUFACTURERS, OR EQUAL (Masonry Accessory)

A. Reinforcement and Ties

1. Hohmann and Barnard, Inc., Hauppage, N.Y.

2. Dur-O-Wall, Arlington Heights, IL.

3. Helifix North America Corporation (Rep.: Patrick Sweeney, 888 992-9989)
4. Blok-Lok Ltd. (Rep.: Scott Burns, 800 561-3026).

**2.04 COMPRESSIBLE FILLER (NEOPRENE)**

| | |
|---|---|
| DA 2010 Rapid Soft Joint | Dur-O-Wal |
| # NS Closed Cell Neoprene Sponge | Hohmann & Barnard |
| Or Equal | |

**PART 3 – EXECUTION.**

**3.01 EXAMINATION**

Examine all adjoining Work on which this work is in anyway dependent for proper installation and workmanship. Report to the Authority any conditions that prevent the performance of this Work.

**3.02 PREPARATION, PROTECTION, CLEANING AND DUST CONTROL PROCEDURE.**

A. Protection:

1. Protect adjacent surfaces not being restored. Protect sills, ledges, and projections from material droppings. Also protect any painted surfaces that are not included in the Work from impact or damage.
2. Cover top of masonry wall with waterproof plastic membrane at the end of the work period and at other times when Work needs to be protected from rain and other precipitation. Extend cover down sides as needed to thoroughly protect the Work.
3. During cold weather, do not use wet masonry units and frozen masonry units.
4. Do not use frozen materials or lay masonry on frozen materials; remove frozen materials from wall. Refer to Part 1 of this Section, "Environmental Requirements" for temperature restrictions.
5. Remove excess mortar from walls as soon after laying units as practicable to prevent staining and to facilitate cleaning of wall.
6. Brace walls as needed until sufficiently set, or until intersecting walls provide lateral support.

B. Conduct all work to provide complete safety to workmen and the public and to provide access to buildings at all times.

C. While removing existing loose concrete components, take all measures necessary to protect and safeguard the facilities and exposed areas from any damage or loss. Use wet methods when demolishing loose concrete or other components that produce dust during

D. Demolition/Removals. wet all surfaces to be disturbed with a fine spray of water. Use hand held power tools where possible. Hand held power tools shall be equipped with HEPA vacuum capable of trapping and retaining 99.97% of all particles 0.3 micrometers in diameter or greater. Avoid spreading dust and debris out side the work area. Cover all windows in work areas with 6 mil plastic sheets and duct tape each day. Remove the plastic at the end of each day.

E. Do not work in the vicinity of any entrances, before clearing those areas and advising the Inspector accordingly.

F. The Contractor shall take every precaution to minimize noise generated by contract work. Contract noise shall not exceed 50 db within any occupied apartment space at any time during the work.

G. Protect all existing construction, masonry, windows, TV cables, room air conditioners, roof areas, shrubs, plants and paved areas against damage, concrete or any other material.

H. All property of the Authority and / or tenants damaged as a result of the work of this contract shall be restored or repaired by the contractor at no cost to the Authority.

I. Provide dumpster for disposal of daily debris and cart away the dumpster from the project regularly to dispose of the collected debris. At the end of each day's work, remove all debris and all materials not used during the day from all public areas to a designated storage area. Do not leave used or unused materials or equipment in the public areas after the workmen leave.

J. All areas within the range of falling material from the work of this contract but not required for public access shall be barricaded with four (4) ft. high orange vinyl fence. Place warning signs thirty feet apart on all such barricades.

K. Work Area Preparation:

Cover entrances to the work area with a single layer of 6 mil polyethylene sheets taped to the top and weighted at bottom.

Place drop cloths of 6 mil polyethylene sheets adjacent to surfaces to be disturbed. The drop cloth shall be at least 5 feet wide. The same drop cloth may be used to wrap components to be removed from the work area.

L. Surface Preparation

1. Prepare surfaces to be restored in compliance with product manufacturer's printed instructions and as specified.
2. Remove dirt, dust, and foreign material from surfaces to be restored.
3. Clean areas to be restored with compressed air or water flushing, except as otherwise recommended by the mortar manufacturer.

M. Material Preparation

1. Wet bricks that have a high initial absorption rate (greater than 20 g/min). Wet bricks until water runs off. Install bricks when surface is slightly damp.
2. Prepare exposed mortar to match the color and appearance of existing adjoining mortar.

N. Dust Control Procedures:

1. Use wet methods when demolishing/removal of loose concrete or other components that produce dust during demolition/removal. Mist all surfaces to be disturbed with a fine spray of water.
2. For demolition/removal, use only hand held power tools equipped with a HEPA vacuum collection system capable of trapping and retaining 99.97% of all particles 0.3 micrometers in diameter or greater.
3. Wrap all materials to be removed in 6 mil polyethylene bags tied with at least 5" long plastic ties. Alternatively, clean by wet methods or HEPA vacuum prior to transport from the work area.
4. Avoid spreading dust and debris outside the work area.

O. Provide 6 mil polyethylene sheeting to completely cover all windows where work is scheduled to be done at the beginning of each day, and remove at the end of each day. Use 5/8" thick plywood to protect window glass when condition permit in the field as directed by the Inspector.

## 3.03 MASONRY WORK

A. General -Replacing Masonry Units

1. The Contractor is responsible for performing Work in a safe manner. Provide temporary shoring or other supports as required to prevent displacement of existing masonry that is to remain. Perform the removal work with such care as may be required to prevent failure of the masonry or damage to adjoining masonry that is to remain. Follow method of operation and/or bracing scheme required to be provided in Article 1.04 titled "Submittals".
2. Remove the deteriorated and damaged masonry units to their full depth, including the surrounding joint mortar. Remove dust. Install helical masonry ties at perimeter of replacement prior to removal. Wherever possible without damaging masonry, use a rotary power masonry saw for cutting Work. Masonry saw shall have a vacuum attachment to reduce dust.
3. Dampen contact surfaces slightly before application of mortar, making sure there is no free water. Install matching masonry units with Type N mortar. Install units to match and align with existing masonry. Maintain bonding and coursing pattern of existing masonry. Use presoaked wood wedges where necessary to properly set the units and maintain uniform matching joints. Backpack and fill joints full of mortar. Finish joints to match existing adjoining joints as described in Art. 3.05- Re-pointing Joints. Fill open joints in backup. In solid masonry construction, ensure that entire collar joint is filled between the backup and the face masonry. Collar joint is likely to vary substantially, up to 3” in locations.
4. Install accessories as indicated on Drawings. In cavity wall construction, provide mortar mesh directly on flashing, such as at base of wall, and at relieving angles and lintels, with flashing extending at least 6” above top of mortar mesh.
5. Area Face Brick Replacement
    a. Prior to brick removal to replace brick or install 2 piece through wall cap flashing: 8 millimeter Stainless Steel helical pins minimum 8-3/4” long to embed into back up 3”- by HILTI or equal.
    b. Single wythe of brick shall be replaced in 4 foot lengths maximum unless indicated otherwise by the "methods of operation" submitted by the Contractor's Engineer as required to be submitted in the Article 1.06 titled "Submittals".
    c. Provide masonry ties fastened to back up every 4 courses. Install reinforcement every 16" each way and secure it to backup masonry as with masonry ties.
6. Replacement by Brick Stitching: Remove and replace existing brick to their full depth with new face brick, one brick each on both sides of crack in masonry. Also, remove and replace all existing pushed-out, missing, split or otherwise defective face bricks to match the adjoining existing good sound masonry. If the existing masonry work has a solid masonry common-bond pattern, existing sound header bricks shall remain. However, any cracked, defective or loose header brick shall be replaced. All new brick work shall be toothed into existing good work. At horizontal and diagonal cracks, the replacement of bricks shall be done in 4-foot lengths maximum unless indicated otherwise by the "methods of operation" submitted by the Contractor's Engineer as required to be submitted in Article 1.04 titled "Submittals". Existing mortar bed for replaced brick shall be thoroughly removed and the back parged with a coat of new mortar to fill the collar joint.

B. Brickwork Replacement

1. In areas as designated by NYCHA for the removal and replacement of brickwork, the contractor shall carefully remove the damaged bricks by saw cutting the joints without damaging adjacent sound brick. Cut the joints by HEPA vacuum attached saw only. To ensure that no internally damaged bricks remain, the contractor shall inspect the side of adjacent sound brick for cracks and shall replace all cracked bricks as directed by NYCHA.
2. New abutting brick surfaces shall be thoroughly wetted and inserted in full bed of fresh mortar. Immerse new brick in water so as to be damp when laid. Tie new brickwork to the

back-up walls and columns with masonry ties and anchors and toothed into existing brickwork.

3. Wet all bricks thoroughly before use. No bricks shall be laid in temperature below 40 degrees F. unless adequate means are provided for heating the materials and protecting the work as per chapter 14 Exterior Walls and Chapter 21 Masonry of NYC Building Code.
4. Replacement Brick shall be toothed or headier (soldier) to match existing brick pattern and maintain a running bond.
5. Where replacing the inside wythe of brick provide ties to the center/backup course of brick.
6. Anchorage to Structural Members:

   Anchor masonry to structural members where masonry abuts or faces new or existing structural members.

   Provide an open space not less than 1 inch in width between masonry and structural member, unless otherwise indicated.

END OF SECTION