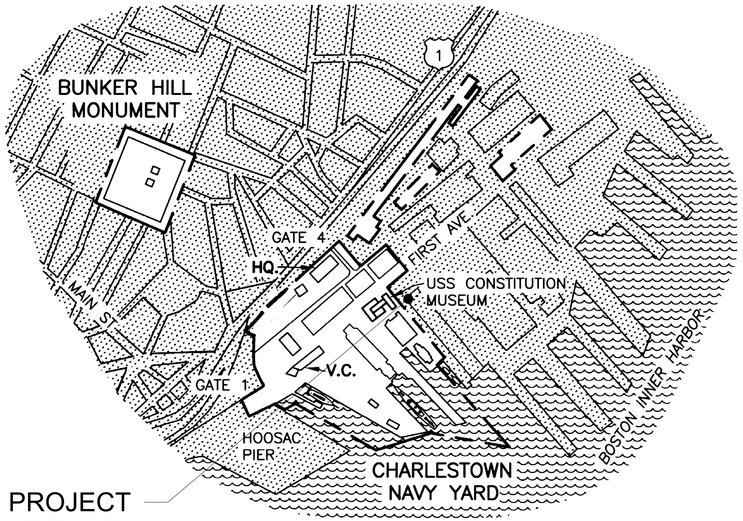
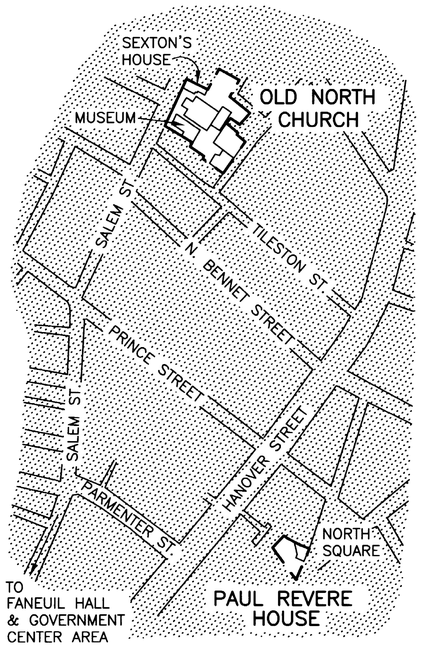
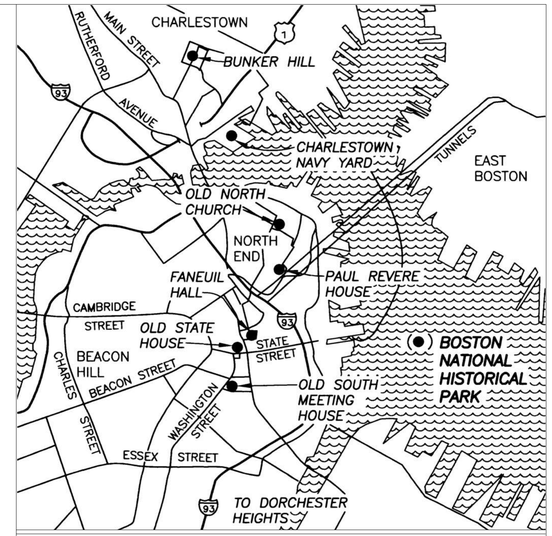



PROJECT LOCATION




LEGEND

| | |
|---|---|
| — — — | HISTORICAL PARK BOUNDARY |
| V.C. | VISITOR CENTER |
| HQ. | PARK HEADQUARTERS |



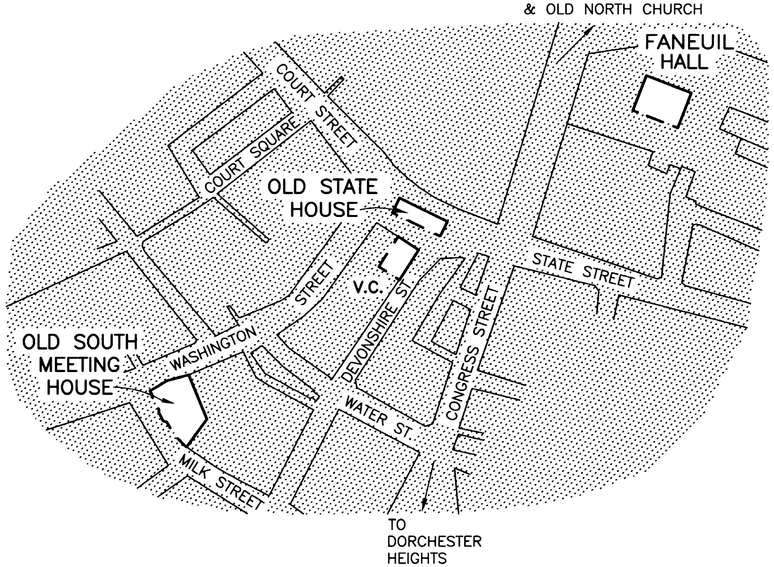

MASSACHUSETTS

## SHEET INDEX

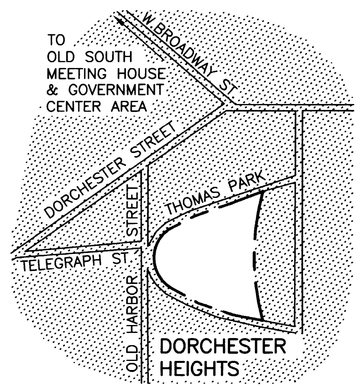

| SHEET NUMBER | SHEET NAME |
|---|---|
| S000 | COVER SHEET |
| S001 | STRUCTURAL GENERAL NOTES |
| S002 | STRUCTURAL LOADS AND ABBREVIATIONS |
| S003 | STRUCTURAL TESTS AND INSPECTIONS |
| S004 | STRUCTURAL TESTS AND INSPECTIONS |
| S005 | STRUCTURAL TESTS AND INSPECTIONS |
| S006 | EXISTING CONDITIONS AND REMOVAL |
| S100 | BUILDING 124 FLOOR AND ROOF PLANS |
| S200 | TYPICAL CONCRETE DETAILS |
| S201 | REPAIR DETAILS |


SCALE OF FEET
500 0 500
150 0 150
SCALE OF METERS

TO PAUL REVERE'S HOUSE & OLD NORTH CHURCH




TO DORCHESTER HEIGHTS




SCALE OF FEET
500 0 500
150 0 150
SCALE OF METERS

# BOSTON NATIONAL HISTORICAL PARK

COMMONWEALTH OF MASSACHUSETTS
ALEC S. ZIMMER
STRUCTURAL
No. 46095
REGISTERED
PROFESSIONAL ENGINEER
5/16/2022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5/16/2022


A/E FIRM
BBIX,LLC.
102 SOUTH STREET, UNIT 3
BOSTON, MA 02111


| Mark | Sheet | REVISION | Date | Initial |
|---|---|---|---|---|
| | | | | |

QUALITY DESIGN CERTIFICATION
- ☐ Prepared in Accordance with Design Development (Title I) — Date
- OR
- ☐ Variance from Design Development (Title I) Approved by Superintendent on — Date
- OR
- ☐ Construction Drawing Not Preceded By Design Development (Title I)
- Project Manager — Date

100% SUBMISSION

UNITED STATES
DEPARTMENT OF THE INTERIOR

NATIONAL PARK SERVICE
DENVER SERVICE CENTER

TITLE OF PROJECT
STABILIZE BUILDING 124 BUILDING STRUCTURE
LOCATION WITHIN PARK
CHARLESTOWN NAVY YARD
NAME OF PARK
BOSTON NATIONAL HISTORIC PARK

| REGION | COUNTY | STATE |
|---|---|---|
| NORTH ATLANTIC | SUFFOLK | MASSACHUSETTS |

DRAWING NO. 457 179757
PMIS/PKG NO. BOST 256875
SHEET 1 OF 10


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## PROJECT INTENT

1. This project will temporarily stabilize (preserve) the Building 124's brick masonry walls at its southeast corner to arrest further deterioration while the National Park Service (NPS) decides whether to rehabilitate or restore the building. Although the roof framing and roofing materials are in poor condition, NPS has limited this project's scope to temporarily stabilizing the masonry. The project does not include repairs of the roof framing, roofing, windows, doors, or foundations. Similarly, the project's scope does not include permanent masonry repairs such as replacing deteriorated brick or mortar. The stabilization design is intended to be miminally invasive and easily removed in the future. In addition, the stabilization structure is designed to temporarily support the gravity loads of the roof structure while the exterior masonry walls are rebuilt. Tie-rods near the eave line reduce the outward thrust of the roof framing on the walls.

2. As described in SGH's draft report dated 21 January 2022, the foundation settlement at the southeast corner is the most likely cause of the distress in the masonry. Permanent repairs will require a new foundation system at the southeast corner.

3. The building is on the National Register of Historic Places and contributes to the Charlestown Navy Yard National Historic District.

## GENERAL

1. The authority of Architect / Engineer / SER will be delegated from NPS Contracting Officer (CO). All field communications from Contractor must be submitted to the CO. All field approvals must be issued to the Contractor through the CO or Contracting Officer's Rep (COR).

2. The intent of the structural drawings is to show the main structural features and design for the completed project. Architectural details and other components that may be necessary to construct the project are shown incidentally only and not completely; therefore all contract drawings and specifications must be used in conjunction with the structural drawings during all phases of construction. Discrepancies between structural drawings and other disciplines' drawings, if not clarified in addenda at the request of the Contractor, shall be brought to the attention of the National Park Service Contracting Officer (CO) and Architect/Engineer during construction for clarifications. The Contractor shall take this into consideration in its bid.

3. There are no structural specifications (e.g. 051200 Structural Steel) in addition to these drawings. Refer to the project manual for specifications for related work, Division 1, and the Owner's project requirements.

4. Unless otherwise noted, details, sections and notes contained in the structural contract documents shall be considered typical for all similar conditions even if not explicitly referenced.

5. Contractor shall not scale drawings to obtain any missing information or to obtain any missing information or to interpret any information not specifically dimensioned for exact detailing or construction purposes.

6. Deficient work and/or work not in conformance with the contract documents shall be repaired at the contractor's expense. The Contractor shall compensate the client for services arising from deficient work, review of modifications/contractor substitution, or expediting of submittals.

7. Cost of investigation and/or redesign incurred by the Structural Engineer of Record (SER) due to Contractor errors will be at the Contractor's expense.

8. The Contractor shall submit a single dimensioned and coordinated drawing for each area of work incorporating work of a multiple subcontractors as required for review by the SER. If work is not coordinated on the shop drawings, this will be a reason for the CO to reject the submittal.

9. Loads imposed on the base building structure and temporary conditions intended to accommodate construction means and methods are not explicitly considered in this design. The Contractor shall advise the CO and SER regarding construction loads and temporary conditions imposed on the building structure and shall compensate the SER for reviewing these conditions.

10. All work shall be inspected by an independent testing agency, retained by the Owner. Submit all inspection reports to CO, Architect, and SER for review. Refer to Program of Structural Tests and Inspections.

11. Contractor shall carefully check stability of all elements of the building before doing any work on existing structures. Brace or strengthen all portions of structure which may be weakened by removal of existing construction until new construction is in place. Contractor shall be responsible for the design of temporary bracing, shoring, and strengthening. Submit design and supporting calculations sealed by a Massachusetts Professional Engineer for review.

12. Structural scope comprises the new structural components and details in the specific area of the existing building as designated in the structural drawings. The existing structure outside of the scope of work shown is not part of this project.

13. The Contractor is completely responsible for the safety of adjacent structures, property, his workmen, and the public, as affected by the construction of this project.

14. Contractor is responsible to visit site prior to bid to observe existing, incidental conditions that may not be depicted on these drawings and affect the performance of the work.

## ELEVATIONS AND DIMENSIONS

1. All dimensions, elevations, and existing conditions shall be verified in the field by the contractors and any discrepancies shall be brought to the attention of the CO and SER for clarification before proceeding with the affected part of the work. Dimensions and elevations noted in the contract documents as (±) and all field conditions shall be verified in the field (VIF) by the contractor prior to the submissions of shop drawings. Upon receipt of shop drawings, the SER has the right to assume that all field dimensions, elevations, and existing conditions have been verified by the contractors and that the shop drawings accurately reflect such verifications unless stated otherwise on the shop drawings.

2. Existing Dimensions: Existing dimensions are from the 17 November 2021 site visit by SGH. All existing dimensions are to be verified in the field by the Contractor as appropriate prior to fabrication of members.

## BUILDING CODE

1. General Services Administration, Public Building Service PBS-P100, October 2021.

2. International Building Code 2018 (IBC).

3. International Existing Building Code 2018 (IEBC).

4. American Society of Civil Engineers, ASCE 7-16, Minimum Design Loads for Buildings and Other Structures.

## PROCEDURE

1. The Owner shall provide Special Inspections for all structural work as required by the International State Building Code and in accordance with the Statement of Special Inspections. The Contractor shall provide full and ample means and assistance for testing materials and workmanship and proper facilities for inspection of the work in the shop and in the field.

2. Structural field conditions may occur where the existing condition differs from the reference plans or where existing conditions or obstructions require modification of the work as shown on these drawings. The Contractor shall document structural field conditions with applicable sketches and photos and shall provide this documentation to the CO, Architect, and SER immediately if existing conditions vary from those shown on the drawings in a manner that precludes execution of the work as shown.

3. All elevations and dimensions shown for the new construction are based on the original architectural and structural drawings of the existing building, on field notes by SGH, and on basis of design product specifications. Verification and documentation of existing conditions and actual product specifications shall be completed prior to shop fabrication. Contractor is responsible for dimensions and fit.

4. Submit shop drawings for review by the CO, Architect, and SER. Do not fabricate until shop drawings are approved. Submit shop drawings at least 10 business days before the date when reviewed submittals will be needed. Shop drawings will bear the Contractor's stamp of approval which shall constitute certification that the Contractor has verified all field measurements, construction criteria, materials, and similar data, and has checked each drawing for completeness, coordination, and compliance with the Contract Documents. All submittals shall be made in accordance with Division 1 specifications and shall be submitted and returned in electronic (PDF) format.

5. For the work shown on these documents, submittals shall include:
   A. Contractor's qualifications
   B. Weld electrode certificates
   C. Structural steel erection drawings
   D. Structural steel detail (piece) drawings. Include: details and dimensions of all pieces; steel material designations; surface preparation and finish; all welds; details of cuts, connections, fasteners, fittings, holes, and piece marks cross-referenced to the erection drawings
   E. Mill certificates for structural steel and structural bolts
   F. Galvanizer's certificates
   G. Rebar mill certificates
   H. Post-installed anchor and dowel materials
   I. Documentation demonstrating that personnel installing post-installed anchors in concrete have been trained in proper installation procedures by the anchor manufacturer
   J. Concrete mix designs including test records substantiating mix design strength, all admixtures and dosage rates, aggregate gradation, and demonstration that aggregates are not susceptible to alkali silica reaction per ASTM C1260 or C1293
   K. Mill certificates for cement for concrete
   L. Concrete curing materials
   M. Repair sequence including schedules.

6. Approval of submittals is for general conformance with the Contract Documents and does not relieve the Contractor responsibility for dimensions, fabrications, and correct fit of structural members. The Contractor is wholly responsible for the conformity of dimensions and details of the shop drawings with the Contract Documents.

7. Unauthorized reproduction of any portion of the structural contact drawings for re-submittal as shop drawings is prohibited. Shop drawings produced in such a manner will be rejected and returned.

8. The Contractor is responsible for all construction means and methods, including maintaining temporary stability of the structure during erection. Protect the building and interior areas during the work from all risks associated with the work. All equipment used on the project shall comply with the applicable municipal and safety regulations, including OSHA guidelines. The Contractor shall provide for the safety of the general public in the vicinity of all work areas. Take adequate protection against fire during field welding, including, but not limited to, adequate fire watches. Developing and implementing job site safety and construction procedures are the sole responsibility of the Contractor.

9. Schedule a pre-construction conference not less than two weeks prior to the start of the work to discuss the Contractor's proposed means and methods, sequence of work, equipment, working hours, quality control procedures. Attendees will include a the Contractor's field superintendent, the Contractor's foreman, the CO, the Architect, and the SER.

10. The Contractor is responsible for implementing a quality control program that includes, but is not limited to, the following:
    A. Inspection of all materials to ensure that they conform to Contract requirements and that all materials are new and undamaged.
    B. Establishment of procedures for executing the work.

11. In case of conflict between the General Notes and the details, the more stringent shall govern.

## SUGGESTED SEQUENCE OF INSTALLATION

We suggest the following general sequence of installation to minimize the impact on the existing structure. This sequence does not describe every required construction activity in detail. The Contractor should review the suggested sequence of installation and provide modifications to it as part of its price and schedule proposal. The installation sequence and required equipment are the sole responsibility of the Contractor.

1. Install temporary footings
2. Drill holes for the through bolts working from the exterior toward the interior using a small diameter pilot hole and three successively larger drill bits to minimize spalling the interior face of the brick.
3. Install vertical channels
4. Install diagonal L4x4 braces.
5. Install through-bolts, strap plates, and vertical L8x8 on the exterior of the building.
6. Install W10 shoring beam with wood blocking.
7. Install horizontal tie rods near eave line.

## STRUCTURAL STEEL & MISC. METALS

1. STRUCTURAL SHAPES:
   A. Wide Flange: ASTM A992
   B. Angles: ASTM A36, UON
   C. Channels: ASTM A36, UON
   D. Plates: ASTM A36, UON
   E. Threaded Rods: ASTM A36 Class 2A/2B UON

2. BOLTED CONNECTIONS:
   A. Connections to Structural Steel (Steel-to-Steel):
      a. ASTM F3125 Grade A325 Bolts, 3/4" min. diameter with ASTM A563 heavy hex steel nuts and ASTM F436 hardened steel washers UON. Provide lock washers where indicated Finish to match finish of connected steel.
      b. All bolts snug-tight UON. Do not pretension threaded rods.
      c. All bolts shall be in standard holes UON. Where slotted holes are shown, slot is parallel to member axis UON.

3. WELDING ELECTRODES:
   A. Conform to AWS Specifications for electrodes based on welding process and the type and grade of steel. E70XX electrodes (70 ksi min.) for fillet welds.

4. FABRICATION:
   A. Shop fabricate to greatest extent possible by welding including beam stiffeners, column caps and bases, holes and connections.
   B. Submit complete shop drawings from field dimensions for the Architect's approval of all structural steel prior to fabrication.
   C. Cut, drill, or punch holes. Do not thermally cut holes or enlarge holes by burning.
   D. Load and store galvanized articles in accordance with accepted industry standards.

5. ERECTION:
   A. Provide expansion anchors, steel shims, steel wedges as required to erect steel. Use templates for drilling for anchors. Do not field cut or field modify any structural steel without prior written approval by architect for each specific case.

6. FINISHES:
   A. Shop prime all Structural Steel not galvanized with two coats of Zinc-Rich Primer
   B. All surfaces of slip critical connections shall be Class A

7. 7. HOT-DIP GALVANIZING:
   A. All steel, including but not limited to structural members, connection materials, and misc. metals, that is exposed to the exterior elements (weather) shall be hot-dip galvanized. All field welds, or areas where hot-dip galvanizing is damaged, shall be touched-up with a zinc-rich paint ("cold galvanizing") after steel is completely installed.
   B. Prepare steel to be galvanized using galvanizer's standard process for degreasing, pickling, and fluxing. Apply zinc coating by the hot-dip process to structural steel according to ASTM A123. Provide passivating chromate dip or similar treatment to prevent wet storage stains.
   C. Grind galvanizing from areas to be field welded and touch-up with cold galvanizing compound after welding.
   D. Seal weld all seams not otherwise welded.
   E. Load and store galvanized articles in accordance with accepted industry standards.
   F. All holes in steel members to facilitate galvanizing, including all vent holes and drain holes, shall be shown on the shop drawings. Holes shall not be cut prior to approval of shop drawings.

8. STANDARD SPECIFICATIONS AND REFERENCE STANDARDS
   A. AISC 360-16 Specification for Structural Steel Buildings
   B. AISC 303-16 Code of Standard Practice for Steel Buildings and Bridges
   C. AWS D1.1:2020 - Structural Welding Code - Steel
   D. Research Council on Structural Connections - Specification for Structural Joints Using High-Strength Bolts (2020).

## CONCRETE

1. All concrete shall be ready-mix in accordance with ASTM C94.

2. Cement: ASTM C150 Type II.

3. Aggregate: ASTM C33.

4. Mixes are to be reviewed by Owner's testing lab and submitted to the Architect/SER for approval. Do not place concrete without approval by Architect/SER. Refer to table on this sheet for mix design properties

5. Pipes and electrical conduits shall not be embedded in structural concrete, except where specifically approved by the SER.

6. Do not cut any (E) reinforcing steel without consulting SER. Coring in concrete is not permitted except as shown. Notify the CO, Architect, and SER in advance of conditions that are not shown on the drawings.

7. Reinforcing Steel and Accessories:
   A. ASTM A615 Grade 60 deformed bars in accordance with ASTM A775

8. All reinforcement shall be continuous. Stagger splices where possible. Laps shall be per typical details, unless otherwise noted.

9. Minimum clear concrete cover for reinforcement, unless otherwise noted:
   A. Interior concrete pads: 2 inch all sides
      Clearance is to closest reinforcement.

10. Steel Reinforcement Accessories:
    A. Provide standees and other accessories where not specified on the drawings in accordance with Manual of Standard Practice or Detailing Reinforcing Concrete Structures ACI 315 or CRSI-WRSI Manual of Standard Practice. Use plastic tips on all chairs placed on the sides of concrete formwork. Do not tack or spot-weld crossing bars.

11. Concrete Curing:
    A. Cure all concrete for a minimum of seven days.

12. Standard Specifications and Reference Standards:
    A. CRSI Manual of Standard Practice
    B. ACI 318-19 Building Code Requirements for Structural Concrete
    C. Follow the latest recommendations and specifications of the American Concrete Institute:
       a. ACI 301 Specifications for Structural Concrete
       b. ACI 302 Concrete Floor and Slab Construction
       c. ACI 304 Guide for Measuring, Mixing, Transporting and Placing Concrete
       d. ACI 305 Hot Weather Concreting
       e. ACI 306 Cold Weather Concreting

## WOOD CONSTRUCTION

1. SAWN LUMBER:
   A. All lumber to be Spruce-Pine-Fir (NLGA) #2 or better, kiln dried

2. FASTENERS:
   A. Bolts: ASTM A307 for all wood-to-wood and steel-to-wood connections.

3. STANDARD SPECIFICATIONS
   A. American Wood Council NDS-18 National Design Specification for Wood Construction with 2018 Supplement.

## CONCRETE MIX PROPERTIES

| Element | Density | Strength (psi / days) | Max w/cm | Entrained Air Content | ACI 318 Exposure Class | Max Type F Fyash As Percentage of CM | Max Slag Cement as Percentage of CM | Max Silica Fume as Percentage of CM | Max. Nominal Aggregate Size |
|---|---|---|---|---|---|---|---|---|---|
| Interior: | | | | | | | | | |
| Concrete Pads | 145 pcf ± 3% | 4,500 / 28 | 0.45 | 5% ±1.5% | F1 / C1 | 25% | 25% | 25% | 3/4 in. |

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ALEC S. ZIMMER
STRUCTURAL
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5/16/22

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102 SOUTH STREET, UNIT 3
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DESIGNED: REE
DRAWN: REE
TECH. REVIEW: ASZ
DATE: 5/16/22

SUB SHEET NO. S001

TITLE OF SHEET
# STRUCTURAL GENERAL NOTES

STABILIZE BUILDING 124 BUILDING STRUCTURE
BOSTON NATIONAL HISTORIC PARK

DRAWING NO. 457 179757

SHEET 2 OF 10

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# LATERAL LOAD DESIGN

2018 INTERNATIONAL BUILDING CODE / ASCE 7-16
MASSACHUSETTS STATE BUILDING CODE, NINTH EDITION

## WIND

| DESCRIPTION | SYMBOL | VALUE |
|---|---|---|
| BASIC STRENGTH DESIGN WIND SPEED (3 SEC. GUST) | $V_{ult}$ | 118 MPH (MA MIN.) |
| RISK CATEGORY | - | I |
| WIND LOAD EXPOSURE CATEGORY | - | C |
| INTERNAL PRESSURE COEFFICIENT | $GC_{pi}$ | ±0.18 |
| COMPONENTS AND CLADDING | SEE VALUES BELOW | |

## SEISMIC

| DESCRIPTION | SYMBOL | VALUE |
|---|---|---|
| SEISMIC IMPORTANCE FACTOR | $I_E$ | 1.0 |
| RISK CATEGORY | - | I |
| MAPPED SPECTRAL RESPONSE SHORT PERIOD ACCELERATION | $S_S$ | 0.217g |
| MAPPED SPECTRAL RESPONSE 1-SECOND ACCELERATION | $S_1$ | 0.069g |
| LONG-PERIOD TRANSITION PERIOD | $T_L$ | 6s |
| SITE CLASSIFICATION | - | E |
| DESIGN SPECTRAL RESPONSE SHORT PERIOD ACCELERATION | $S_{DS}$ | 0.347g |
| DESIGN SPECTRAL RESPONSE 1-SECOND ACCELERATION | $S_{D1}$ | 0.193g |
| SEISMIC DESIGN CATEGORY | SDC | C |
| ANALYSIS PROCEDURE | EQUIVALENT LATERAL FORCE | |

# DESIGN LOADS

## DEAD LOAD (SEE NOTE 1)

| DESCRIPTION | VALUE (PSF) |
|---|---|
| ROOF ASSEMBLY | 10 |

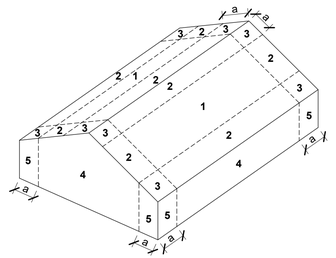
## LIVE LOAD

| DESCRIPTION | VALUE (PSF) |
|---|---|
| ROOFS | SEE SNOW PROVISIONS |

## SNOW LOAD

| DESCRIPTION | SYMBOL | VALUE |
|---|---|---|
| GROUND SNOW LOAD | $P_g$ | 40 PSF |
| RISK CATEGORY | - | I |
| IMPORTANCE FACTOR | $I_s$ | 0.8 |
| EXPOSURE FACTOR | $C_E$ | 1.0 |
| THERMAL FACTOR (UNHEATED) | $C_T$ | 1.2 |
| SLOPE FACTOR | $C_s$ | 1.0 |
| FLAT ROOF SNOW LOAD | $P_f$ | 30 PSF (MA MIN.) |

NOTES:
1. SELF-WEIGHT OF STRUCTURAL COMPONENTS IS INCLUDED SEPARATELY.




| COMPONENTS AND CLADDING | | |
|---|---|---|
| ZONE | PRESSURE | SUCTION |
| 1 | 28.3 PSF | -30.8 PSF |
| 2 | 28.3 PSF | -57.0 PSF |
| 3 | 28.3 PSF | -57.0 PSF |
| 4 | 30.9 PSF | -33.5 PSF |
| 5 | 30.9 PSF | -41.3 PSF |
| a = 3 FT UON | | |

**COMPONENTS AND CLADDING PRESSURE AND SUCTION NOTES:**
1. WIND PRESSURES AND SUCTIONS SHOWN HERE ARE ULTIMATE VALUES.
2. FOR ALLOWABLE STRESS DESIGN, ULTIMATE PRESSURES AND SUCTIONS MAY BE SCALED BY 0.6.

| ABBREVIATION | WORD OR PHRASE |
|---|---|
| & | AND |
| @ | AT |
| ACI | AMERICAN CONCRETE INSTITUTE |
| ADD'L | ADDITIONAL |
| AESS | ARCHITECTURAL EXPOSED STRUCTURAL STEEL |
| AISC | AMERICAN INSTITUTE OF STEEL CONSTRUCTION |
| ALT | ALTERNATE |
| APA | THE ENGINEERED WOOD ASSOCIATION |
| APPROX | APPROXIMATE |
| ARCH | ARCHITECT |
| ASD | ALLOWABLE STRENGTH DESIGN |
| ASTM | AMERICAN SOCIETY FOR TESTING AND MATERIALS |
| AWS | AMERICAN WELDING SOCIETY |
| BLK'G | BLOCKING |
| BM | BEAM |
| BOT | BOTTOM |
| BRG | BEARING |
| BTW | BETWEEN |
| C | CAMBER |
| CC | CENTER TO CENTER |
| CJ | CONTROL JOINT |
| CIP | CAST-IN-PLACE |
| CL | CENTER LINE |
| CLT | CROSS LAMINATED TIMBER |
| CLR | CLEAR |
| CMU | CONCRETE MASONRY UNIT |
| CO | CONTRACTING OFFICER |
| COL | COLUMN |
| CONC | CONCRETE |
| CONN | CONNECTION |
| CONT | CONTINUOUS |
| COR | CONTRACTING OFFICER'S REPRESENTATIVE |
| CJP | COMPLETE JOINT PENETRATION |
| CD | COLUMN DOWN |
| CU | COLUMN UP |
| DIA, Ø | DIAMETER |
| DIAG | DIAGONAL |
| DL | DEAD LOAD |
| DN | DOWN |
| DO | DITTO |
| DWG(S) | DRAWING(S) |
| (E) | EXISTING |
| EA | EACH |
| EF | EACH FACE |
| EJ | EXPANSION JOINT |
| EL | ELEVATION |
| EMBED | EMBEDMENT |
| EQ | EQUAL |
| ES | EACH SIDE |
| EW | EACH WAY |
| FDN | FOUNDATION |
| FF | FINISH FLOOR |
| FG | FINISH GRADE |
| FIN | FINISH |
| FLR | FLOOR |
| FRP | FIBER REINFORCED POLYMER |
| FS | FAR SIDE |
| FT OR ' | FOOT, FEET |
| FTG | FOOTING |
| GA | GAUGE |
| GALV | GALVANIZED |
| GL | GRID LINE |
| GR | GRADE |
| HDG | HOT-DIP GALVANIZED |
| HGR | HANGER |
| HORIZ | HORIZONTAL |
| HP | HIGH POINT |
| HSB | HIGH STRENGTH BOLT |
| HSS | HOLLOW STRUCTURAL SECTION |
| IBC | INTERNATIONAL BUILDING CODE |
| ICC | INTERNATIONAL CODE COUNCIL |
| IN OR " | INCH, INCHES |

| ABBREVIATION | WORD OR PHRASE |
|---|---|
| JST | JOIST |
| K | KIPS |
| KSI | KIPS PER SQUARE INCH |
| LBS | POUNDS |
| LL | LIVE LOAD |
| LLH | LONG LEG HORIZONTAL |
| LLV | LONG LEG VERTICAL |
| LONG | LONGITUDINAL |
| LP | LOW POINT |
| LW | LIGHTWEIGHT |
| LVL | LAMINATED VENEER LUMBER |
| MAX | MAXIMUM |
| MECH | MECHANICAL |
| MIN | MINIMUM |
| MISC | MISCELLANEOUS |
| MBC | MASSACHUSETTS BUILDING CODE |
| MCR | MASSACHUSETTS CODE OF REGULATIONS |
| (N) | NEW |
| NO. # | NUMBER |
| NS | NEAR SIDE |
| NTS | NOT TO SCALE |
| NW | NORMAL WEIGHT |
| OC | ON CENTER |
| OD | OUTSIDE DIAMETER |
| OH | OPPOSITE HAND |
| OPNG | OPENING |
| PART | PARTIAL |
| PCF | POUNDS PER CUBIC FOOT |
| PL | PLATE |
| PLY | PLYWOOD |
| PJP | PARTIAL JOINT PENETRATION |
| PSF | POUNDS PER SQUARE FOOT |
| PSI | POUNDS PER SQUARE INCH |
| RAD | RADIUS |
| RD | ROOF DRAIN |
| REINF | REINFORCING |
| REQ'D | REQUIRED |
| SCHED | SCHEDULE |
| SER | STRUCTURAL ENGINEER OF RECORD |
| SIM | SIMILAR |
| SOG | SLAB ON GRADE |
| SS | STAINLESS STEEL |
| STD | STANDARD |
| STIFF | STIFFENER |
| STL | STEEL |
| STRUCT | STRUCTURAL |
| T&B | TOP AND BOTTOM |
| TOC | TOP OF CONCRETE |
| TOS | TOP OF STEEL |
| TOW | TOP OF WALL |
| TYP | TYPICAL |
| UON | UNLESS OTHERWISE NOTED |
| VERT | VERTICAL |
| VIF, ± | VERIFY IN FIELD |
| W/ | WITH |
| W/O | WITHOUT |
| WP | WORK POINT |
| WWR | WELDED WIRE REINFORCING |

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ALEC S. ZIMMER
STRUCTURAL
No. 45095
REGISTERED PROFESSIONAL ENGINEER

5/16/2022

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BOSTON, MA 02111

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DRAWN: REE
TECH. REVIEW: ASZ
DATE: 5/16/22

SUB SHEET NO. S002

TITLE OF SHEET
STRUCTURAL LOADS AND ABBREVIATIONS

STABILIZE BUILDING 124 BUILDING STRUCTURE
BOSTON NATIONAL HISTORIC PARK

DRAWING NO. 457 179757

SHEET 3 OF 10

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# STATEMENT OF SPECIAL INSPECTIONS

| | |
|---|---|
| **LOCATION** | Charlestown Naval Shipyard Park, Building 124, 36 1st Ave, Boston, MA 02129 |
| **OWNER** | United States Department of the Interior, National Park Service |
| **DESIGN PROFESSIONAL IN CHARGE** | Alec S. Zimmer, P.E. |

This Statement of Special Inspections is submitted as a condition for permit issuance in accordance with the Special Inspection and Structural Testing requirements of the Massachusetts State Building Code, 9th Edition (MSBC). It includes a schedule of Special Inspection services applicable to this project as well as the name of the Special Inspection coordinator and the identity of other approved agencies to be retained for conducting these inspections and tests. This Statement of Special Inspections encompasses the following disciplines: STRUCTURAL. The Special Inspection Coordinator shall keep records of all inspections and shall furnish inspection reports to the Building Official and the Registered Design Professional in Responsible Charge (RDP). The Special Inspection Coordinator will compile and distribute all inspection reports directly to the RDP, the contractor, the CO, the building official, and any other parties designated by the owner. Discovered discrepancies shall be brought to the immediate attention of the contractor for correction. If such discrepancies are not corrected, the discrepancies shall be brought to the attention of the Building Official and the RDP. The Special Inspection program does not relieve the contractor of his or her responsibilities for quality control (QC).

Interim reports shall be submitted to the Building Official and the RDP. Interim reports shall be submitted monthly.

A Final Report of Special Inspections documenting completion of all required Special Inspections, testing, and correction of any discrepancies noted in the inspections shall be submitted by the Special Inspection Coordinator prior to issuance of a Certificate of Use and Occupancy. The intention of the following tables is to identify the quality assurance (QA) inspection tasks as required by the 2018 International Building Code (IBC). In accordance with IBC Section 1704.2, the owner or the owner's authorized agent shall employ one or more approved testing agencies to provide special inspections. The Special Inspection Coordinator and approved agencies shall not be retained by the contractor or subcontractor whose work is to be inspected or tested. Any conflicts of interest shall be disclosed to the Authority Having Jurisdiction (AHJ) prior to commencing the work.

Job site safety and means and methods of construction are solely the responsibility of the contractor.

# SCHEDULE OF INSPECTION AND TESTING AGENCIES

| SPECIAL INSPECTION AGENCIES | FIRM | ADDRESS | TELEPHONE # |
|---|---|---|---|
| Special Inspection Coordinator | TBD | TBD | TBD |
| Inspector | TBD | TBD | TBD |
| Geotechnical Engineer | TBD | TBD | TBD |

Note: The inspectors and testing agencies shall be engaged by the Owner or the Owner's Agent in accordance with Section 1704.1 the 2015 International Building Code (IBC 2018), as referenced in MSBC and not by the Contractor or Subcontractor whose work is to be inspected or tested. Any conflict of interest must be disclosed to the Building Official prior to commencing work.

# STATEMENT OF CONTRACTOR'S RESPONSIBILITY

In accordance with IBC 2018 Section 1704.4, as referenced in MSBC, each contractor responsible for the construction or fabrication of a main wind-force resisting system or a seismic-force-resisting system or a wind- or seismic-resisting component listed in the statement of special inspections above must submit a Statement of Responsibility to the Structural Engineer of Record, the building official and the owner prior to commencement of work on the system. The contractor's statement of responsibility shall contain acknowledgement of awareness of the special requirements contained in the statement of special inspections.

# QUALIFICATIONS OF INSPECTORS AND TESTING TECHNICIANS

The qualifications of all personnel performing Special Inspection and testing activities are subject to the approval of the Building Official. The credentials of all Inspectors and testing technicians shall be provided.

Key for Minimum Qualifications of Inspection Agents:

When the Registered Design Professional in Responsible Charge deems it appropriate that the individual performing a stipulated test or inspection have a specific certification or license as indicated below, such designation shall appear below the Agency Number on the Schedule.

| | |
|---|---|
| PE/SE | Structural Engineer – a licensed PE specializing in the design of building structures |
| PE/GE | Geotechnical Engineer – a licensed PE specializing in soil mechanics and foundations |
| EIT | Engineer-In-Training – a graduate engineer who has passed the Fundamentals of Engineering examination |
| AMERICAN CONCRETE INSTITUTE (ACI) CERTIFICATION | |
| ACI-CFTT | Concrete Field Testing Technician – Grade 1 |
| ACI-CCSI | Concrete Construction Special Inspector |
| ACI-LTT | Laboratory Testing Technician – Grade 1&2 |
| ACI-CSTT | Concrete Strength Testing Technician |
| AMERICAN WELDING SOCIETY (AWS) CERTIFICATION | |
| AWS-CWI | Certified Welding Inspector |
| INTERNATIONAL CODE COUNCIL (ICC) CERTIFICATION | |
| ICC-SMSI | Structural Masonry Special Inspector |
| ICC-SWSI | Structural Steel and Welding Special Inspector |
| ICC-SFSI | Spray-Applied Fireproofing Special Inspector |
| ICC-PCSI | Prestressed Concrete Special Inspector |
| ICC-RCSI | Reinforced Concrete Special Inspector |
| NATIONAL INSTITUTE FOR CERTIFICATION IN ENGINEERING TECHNOLOGIES (NICET) | |
| NICET-CT | Concrete Technician – Levels I, II, III & IV |
| NICET-ST | Soils Technician - Levels I, II, III & IV |
| NICET-GET | Geotechnical Engineering Technician - Levels I, II, III & IV |

# REFERENCES

| CODE/STANDARD | TITLE |
|---|---|
| ACI 301-16 | Standard Specifications for Structural Concrete |
| ACI 318-14 | Building Code Requirements for Structural Concrete |
| ACI 530.1/ASCE 6/TMS 602-13 | Specifications for Masonry Structures |
| AISC 360-10 | Specification for Structural Steel Buildings |
| AISC 341-10 | Seismic Provisions for Structural Steel Buildings |
| ASTM A6-11 | Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use |
| ASTM C31-12 | Standard Practice for Making and Curing Concrete Test Specimens in the Field |
| ASTM C94-13 | Specification for Ready-Mixed Concrete |
| ASTM C109-16a | Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 in. or 50 mm Cube Specimens) |
| ASTM C138-17 | Standard Test Method for Unit Weight, Yield and Air Content (Gravimetric) of Concrete |
| ASTM C143-15 | Standard Test Method for Slump of Hydraulic Cement Concrete. |
| ASTM C172-10 | Standard Practice for Sampling Freshly Mixed Concrete |
| ASTM C 173-16 | Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method. |
| ASTM C231-17 | Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method |
| ASTM C567-14 | Standard Test Method for Determining Density of Structural Lightweight Concrete |
| ASTM C1064-17 | Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete |
| ASTM C1090-15 | Standard Test Method for Measuring Changes in Height of Cylindrical Specimens from Hydraulic Cement Grout |
| ASTM C1314-16 | Standard Test Method for Constructing and Testing Masonry Prisms |
| AWS D1.1-2015 | Structural Welding Code – Steel |
| SDI QA/QC-2011 | Standard for Quality Control and Quality Assurance for Installation of Steel Deck |
| APPLICABLE BUILDING CODE | International Building Code 2018 with Massachusetts Amendments, Ninth Edition |
| RCSC-2009 | Specification for Structural Joints Using High-Strength Bolts |

# DEFINITIONS

| | |
|---|---|
| AHJ | Authority Having Jurisdiction is the organization, political subdivision, office, or individual charged with the responsibility of administering and enforcing provisions of the applicable building code. Also referred to as the building official. |
| Continuous | Where "inspection frequency" is noted as continuous, the special inspector must be present when and where the work to be inspected is being performed. Work on the items to be inspected may not proceed unless the inspector is on the site. |
| Document | Document means that the QC or QA inspector shall prepare reports or other appropriate written documentation indicating that the work has or has not been performed in accordance with the construction documents. |
| O | O (observe) indicates structural steel items to be observed on a random basis. The work need not be delayed pending these observations. |
| P | P (perform) indicates structural steel inspection task to be performed for each welded joint, bolted connection, or member. |
| Periodic | Where "inspection frequency" is noted as periodic, the special inspector may be intermittently present where the work to be inspected has been or is being performed. Work may proceed and need not be delayed while the inspector is not on the site. |
| Quality Assurance (QA) | Quality Assurance procedures and inspections are established by this Statement of Special Inspections and are implemented by the Special Inspection Coordinator and approved testing agencies to provide the owner, the registered design professional, and the Authority Having Jurisdiction with independent, objective confirmation that the work is performed in accordance with the construction documents. |
| Quality Control (QC) | Quality Control procedures and inspections are established by the contractor to ensure that their work is performed in accordance with the construction documents. |

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TECH. REVIEW: ASZ
DATE: 5/16/22

SUB SHEET NO. S003

TITLE OF SHEET
STRUCTURAL TESTS AND INSPECTIONS
STABILIZE BUILDING 124 BUILDING STRUCTURE
BOSTON NATIONAL HISTORIC PARK

DRAWING NO. 457 179757

SHEET 4 OF 10

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## CAST-IN-PLACE CONCRETE-IBC 2015 SECTION 1705.2

| ITEM | AGENCY | INSPECTION FREQUENCY | SCOPE |
|---|---|---|---|
| FORMWORK GEOMETRY | ACI-CCSI/ICC-RCSI | PERIODIC | Inspect formwork for shape, location, dimensions, and finishes of the concrete member being formed and for conformance to the Contract Documents and ACI 301 Section 2 and ACI 318 Section 26.11. |
| MIX DESIGN | ACI-CCSI/ICC-RCSI | CONTINUOUS | Review concrete batch tickets and verify compliance with approved mix design. Verify that water added at the site does not exceed that allowed by the mix design. |
| MATERIAL CERTIFICATION | ACI-CCSI | PERIODIC | Review in-plant all materials, manufacturer's certifications, and mill reports for conformance to Contract Documents. |
| | | PERIODIC | Maintain records of all material certificates and mill reports of all concrete mix constituent materials and steel reinforcement |
| REINFORCEMENT INSTALLATION | ACI-CCSI/ICC-RCSI | Inspect placement of all reinforcement for compliance with ACI 318 Ch. 20, Sections 25.2, 25.3 and 26.6 and ACI 301 Section 3.3. Inspect size, spacing, cover, positioning, and grade of reinforcing steel for compliance with the Contract Documents. Verify that bars are adequately tied and supported on chairs or bolsters. Inspect bar laps and mechanical splices. Verify that reinforcing bars are free of form oil or other deleterious materials. Inspection frequency as noted: | |
| | | PERIODIC | For slabs-on-grade, foundations, and walls |
| | | PERIODIC | Inspect inserts and accessories. |
| ANCHOR RODS | ACI-CCSI/ICC-RCSI | CONTINUOUS | Inspect size, grade, positioning, and embedment of anchor rods for conformance to Contract Documents prior to concrete placement. |
| | | PERIODIC | Inspect concrete placement and consolidation around anchors. |
| CONCRETE PLACEMENT | ACI-CCSI/ICC-RCSI | CONTINUOUS | Inspect placement of concrete. Verify that concrete conveyance and depositing avoids segregation or contamination. Verify that concrete is properly consolidated. |
| | | CONTINUOUS | Prior to allowing ready-mix trucks to deposit concrete, review batch-plant ticket to verify concrete mix compliance with project specifications, temperature, batching time, and number of mixing drum revolutions. Reject concrete that has been mixed for more than 90 min. or 300 drum revolutions. |
| | | CONTINUOUS | Maintain records correlating concrete batching information with location of placement in the finished work. Inspect all concrete placements for compliance with ACI 318 Section 26.5.2, and ACI 301 Sections 5 and 7.3. |
| | | CONTINUOUS | Inspect for conformance to all approved hot- and cold-weather concrete placement procedures. |
| SAMPLING AND TESTING OF CONCRETE | ACI-CFTT/ACI-STT | CONTINUOUS | Collect and test concrete samples per ACI 318 Section 26.12.2 (minimum of four cylinders for each 150 cu yd of concrete or 5,000 sq ft of slab or wall area placed), but not fewer than four cylinders for each day's pour. |
| | | CONTINUOUS | Measure slump (ASTM C143), temperature (ASTM C1064), weight, (ASTM C138), and air content (ASTM C173) for all concrete sampled for strength. For pumped concrete, measure at point of deposit into the work, not at the truck tail gate. |
| CURING AND PROTECTION | ACI-CCSI/ICC-RCSI | PERIODIC | Inspect all placements for conformance to Contract Documents, ACI 318 Sections 26.5.3, 26.5.4 and, 26.5.5 and to curing and protection procedures approved by SER.. |
| LABORATORY EVALUATION OF CONCRETE STRENGTH | ACI-LTT | CONTINUOUS | Test for conformance to specifications in accordance with ACI 318 Section 26.12.3. As a minimum, perform compression tests on one cylinder at seven days and two cylinders at twenty-eight days. |
| ADHESIVE DOWELS | ACI-CCSI/ICC-RCSI | CONTINUOUS | Verify that existing reinforcing steel is not cut when drilling holes for dowels or anchors. |
| | | CONTINUOUS | Inspect holes prior to installation of adhesive to verify that holes are free of dust and prepared in accordance with the manufacturer's instructions and have the embedment depth indicated on the Contract Documents. |
| | | CONTINUOUS | Verify that adhesive material is in accordance with the Contract Documents. Verify that the material is stored, mixed, and injected in accordance with the manufacturer's instructions. |
| | | CONTINUOUS | Verify that the dowel or anchor materials, lengths, diameters, embedments, and finishes are in accordance with the Contract Documents. |
| EXPANSION ANCHORS | ICC-SMSI | PERIODIC | Verify that existing reinforcing steel is not cut when drilling holes for anchors |
| | | PERIODIC | Inspect installation. Verify manufacturer, type, diameter, material, markings, seating of washer, embedment and torque of anchors are in accordance with the Contract Documents and manufacturer's written installation instructions. |

## POST-INSTALLED ADHESIVE ANCHORS-ACI 318 CHAPTER 17

| ITEM | AGENCY | INSPECTION FREQUENCY | SCOPE |
|---|---|---|---|
| INSTALLER QUALIFICATIONS | ACI/CRSI | PERIODIC | Review installers qualifications. Installation of adhesive anchors installed horizontally or upwardly inclined to support sustained tension loads shall be performed by personnel certified by an applicable certification program. Certification shall include written and performance test in accordance with ACI/CRSI Adhesive Anchor Installer Certification Program or equivalent. |
| ANCHOR INSTALLATION | ACI-CCSI/ICC-RCSI | CONTINUOUS | Verify that existing reinforcing steel is not cut when drilling holes for anchors. |
| | | PERIODIC | Verify drilled holes are the proper diameter and depth in accordance with manufacturer's printed installation instructions (MPII) |
| | | CONTINUOUS FOR ANCHORS INSTALLED HORIZONTALLY OR UPWARDLY INCLINED TO SUPPORT (BY CERTIFIED INSPECTOR) | |
| | | PERIODIC | Verify drilled holes are cleaned in accordance with MPII and that the holes are protected from contamination until adhesive is installed. A drilled anchor hole shall be re-cleaned assuming the hole was just drilled, if in the opinion of the RDP, Special Inspector, or Owner's Representative the hole has become contaminated after initial cleaning. |
| | | CONTINUOUS FOR ANCHORS INSTALLED HORIZONTALLY OR UPWARDLY INCLINED TO SUPPORT (BY CERTIFIED INSPECTOR) | |
| | | PERIODIC | Verify that adhesive material is in accordance with the Contract Documents. Verify that the material is stored, mixed, and injected in accordance with the manufacturer's instructions. |
| | | CONTINUOUS FOR ANCHORS INSTALLED HORIZONTALLY OR UPWARDLY INCLINED TO SUPPORT (BY CERTIFIED INSPECTOR) | |
| | | PERIODIC | Verify anchors to be installed are clean, oil-free, and free of loose rust, paint, or other coatings. |
| | | CONTINUOUS FOR ANCHORS INSTALLED HORIZONTALLY OR UPWARDLY INCLINED TO SUPPORT (BY CERTIFIED INSPECTOR) | |
| | | PERIODIC | Verify that installed adhesive anchors are securely fixed in place to prevent displacement while the adhesive cures. Unless otherwise shown on the contract drawings, anchors should be installed perpendicular to the concrete surface. Anchors displaced before full adhesive cure shall be considered damaged and replaced at the Contractor's expense. Installed reinforcing bars/threaded bars shall not be bent after being adhesively embedded in hardened, sound concrete, unless permitted by the RDP. |
| | | CONTINUOUS FOR ANCHORS INSTALLED HORIZONTALLY OR UPWARDLY INCLINED TO SUPPORT (BY CERTIFIED INSPECTOR) | |
| | | CONTINUOUS | Verify that the anchor materials, lengths, diameters, embedments, and finishes are in accordance with the Contract Documents. |

## DEFINITIONS

| | |
|---|---|
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| Continuous | Where "inspection frequency" is noted as continuous, the special inspector must be present when and where the work to be inspected is being performed. Work on the items to be inspected may not proceed unless the inspector is on the site. |
| Document | Document means that the QC or QA inspector shall prepare reports or other appropriate written documentation indicating that the work has or has not been performed in accordance with the construction documents. |
| O | O (observe) indicates structural steel items to be observed on a random basis. The work need not be delayed pending these observations. |
| P | P (perform) indicates structural steel inspection task to be performed for each welded joint, bolted connection, or member. |
| Periodic | Where "inspection frequency" is noted as periodic, the special inspector may be intermittently present where the work to be inspected has been or is being performed. Work may proceed and need not be delayed while the inspector is not on the site. |
| Quality Assurance (QA) | Quality Assurance procedures and inspections are established by this Statement of Special Inspections and are implemented by the Special Inspection Coordinator and approved testing agencies to provide the owner, the registered design professional, and the Authority Having Jurisdiction with independent, objective confirmation that the work is performed in accordance with the construction documents. |
| Quality Control (QC) | Quality Control procedures and inspections are established by the contractor to ensure that their work is performed in accordance with the construction documents. |

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TECH. REVIEW: ASZ
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SUB SHEET NO. S004

TITLE OF SHEET
# STRUCTURAL TESTS AND INSPECTIONS
STABILIZE BUILDING 124 BUILDING STRUCTURE
BOSTON NATIONAL HISTORIC PARK

DRAWING NO. 457 179757

SHEET 5 OF 10

# STRUCTURAL STEEL-IBC 2018 SECTION 1705.2.1

Structural Steel inspections listed below are based on the requirements of AISC 360-10 Chapter N "Quality Control and Quality Assurance." Quality Assurance inspections of structural steel fabricators are not required if the fabricator is registered and approved in accordance with IBC Section 1704.2.5.1 to perform such work without Special Inspections, provides evidence of approval (such as an appropriate AISC Certification), and certifies compliance with the approved construction documents.

| | | | | |
|---|---|---|---|---|
| INSPECTOR QUALIFICATIONS | Welding Inspectors shall have the AWS-CWI credential | | | |
| | Bolting and Framing inspectors shall have the ICC-SWSI credential or shall provide documented training and experience in structural steel inspection. | | | |
| VERIFICATION AND INSPECTION | | QC | QA | AISC 360 REFERENCE |
| PLACEMENT OF ANCHOR RODS AND OTHER EMBEDMENTS SUPPORTING STRUCTURAL STEEL | Document acceptance or rejection of inspected items | P | P | Tables N5.4.3, N5.6-3, N6.1 |
| | Verify diameter grade, type and length of the anchor rod or embedded item | P | P | Section N5.7 |
| | Verify extent or depth of embedment into concrete prior to concrete placement. | P | P | Section N5.7 |
| | Verify that washer plates on anchor rods are welded to column base plates. | P | O | Section N5.7 |
| STRUCTURAL FRAMING, DETAILS AND ASSEMBLIES | Inspect member sizes, milled surfaces, and installation and connection details for compliance with approved shop drawings and with Construction Documents. | P | O | Section N5.7 |
| | Verify columns are plumb within AISC tolerances. | P | O | Section N5.7 |
| | Verify columns and beams have correct piece marks and located and oriented per appropriate drawings. | P | O | Section N5.7 |
| STRUCTURAL FRAMING, DETAILS AND ASSEMBLIES | Review mill test reports, certifications, and identification markings of all structural steel for compliance with the ASTM specifications required by the contract documents and by AISC 360-10 Section A3 | P | O | Section N5.7 |
| | Inspect member sizes, milled surfaces, and installation and connection details for compliance with approved shop drawings and with Construction Documents. | P | O | Section N5.7 |
| | Verify columns are plumb within AISC tolerances. | P | O | Section N5.7 |
| | Verify columns and beams have correct piece marks and located and oriented per appropriate drawings. | P | O | Section N5.7 |
| INSPECTION OF STEEL FRAME JOINT DETAILS FOR COMPLIANCE WITH CONSTRUCTION DOCUMENTS | Observe details such as bracing & stiffening | P | O | Section N5.7 |
| | Member locations | P | O | Section N5.7 |
| | Application of joint details at each connection | P | O | Section N5.7 |
| | Observe details such as bracing & stiffening | P | O | Section N5.7 |
| WELDING INSPECTION - GENERAL | Perform all weld inspections and tests per Chapter 6 of AWS D1.1 | O | O | Section 4 |
| | Perform visual inspections of all welds for conformance with the construction documents and erection drawings with the applicable visual inspection requirements of AWSD1.1. | O | O | Section 4 |
| | Obtain a copy of the welders' certifications prior to the start of work | O | O | Section 5.4-1 |
| PRIOR TO WELDING | Verify that welding procedure specifications (WPSs) are available. Inspect pre-heat, post-heat, and surface preparation. | P | P | Table N5.4-1 |
| | Verify that manufacturer certifications for welding consumables are available and verify compliance with construction documents | P | P | Table N5.4-1 |
| | Verify material Identification (Type/Grade) | O | O | Table N5.4-1 |
| | Observe fit-up of groove welds (including joint geometry)<br>• Observe joint preparation<br>• Dimensions (alignment, root opening, root face, bevel)<br>• Cleanliness (condition of steel surfaces)<br>• Tacking (tack weld quality and location)<br>• Backing type and fit (if applicable) | O | O | Table N5.4-1 |
| | Observe configuration and finish of access holes | O | O | Table N5.4-1 |
| | Observe fit-up of fillet welds<br>• Dimensions (alignment, gaps at root)<br>• Cleanliness (condition of steel surfaces)<br>• Tacking (tack weld quality and location) | O | O | Table N5.4-1 |
| | Check welding equipment | O | - | Table N5.4-1 |
| DURING WELDING | Confirm use of qualified welders | O | O | Table N5.4-2 |
| | Observe control and handling of welding of welding consumables<br>• Observe packaging<br>• Exposure control | O | O | Table N5.4-2 |
| | Confirm no welding over cracked tack welds | O | O | Table N5.4-2 |
| | Document environmental condition<br>• Wind speed within limits<br>• Precipitation and temperature | O | O | Table N5.4-2 |
| | Confirm that WPS is followed:<br>• Settings on welding equipment<br>• Travel speed<br>• Selected welding materials<br>• Shielding gas type/flow rate<br>• Preheat applied<br>• Interpass temperature maintained<br>• (Min./Max.) proper position (F, V, H, OH) | O | O | Table N5.4-2 |
| | Observe welding techniques<br>• Interpass and final cleaning<br>• Each pass within profile limitations<br>• Each pass meets quality requirements | O | O | Table N5.4-2 |

# STRUCTURAL STEEL-IBC 2018 SECTION 1705.2.1 CONTINUE

Structural Steel inspections listed below are based on the requirements of AISC 360-10 Chapter N "Quality Control and Quality Assurance." Quality Assurance inspections of structural steel fabricators are not required if the fabricator is registered and approved in accordance with IBC Section 1704.2.5.1 to perform such work without Special Inspections, provides evidence of approval (such as an appropriate AISC Certification), and certifies compliance with the approved construction documents.

| | | | | |
|---|---|---|---|---|
| INSPECTOR QUALIFICATIONS | Welding Inspectors shall have the AWS-CWI credential | | | |
| | Bolting and Framing inspectors shall have the ICC-SWSI credential or shall provide documented training and experience in structural steel inspection. | | | |
| VERIFICATION AND INSPECTION | | QC | QA | AISC 360 REFERENCE |
| AFTER WELDING | Observe that welds have been cleaned | O | O | Table N5.4-3 |
| | Verify that size, length, and location of welds are in compliance with construction documents | P | P | Table N5.4-3 |
| | Confirm welds meet visual acceptance criteria<br>• Crack prohibition<br>• Weld/base-metal fusion<br>• Crater cross section<br>• Welds profile<br>• Weld size<br>• Weld length<br>• Undercut<br>• Porosity | P | P | Table N5.4-3 |
| | Inspect ARC strikes | P | P | Table N5.4-3 |
| | Inspect K-area at doubler plates, continuity plates, or stiffener plates | P | P | Table N5.4-3 |
| | Confirm backing removed and weld tabs removed (if required) | P | P | Table N5.4-3 |
| | Observe repair activities | P | P | Table N5.4-3 |
| WELDING INSPECTION NON-DESTRUCTIVE TESTING | All non-destructive testing (NDT) shall be documented and include identifying information as to the location. When a weld is rejected based on the results of NDT, the record shall indicate the location of the defect and basis for rejection. Where the fabricator's QC staff performs the NDT in the shop, the Special Inspector shall review the reports. | P | P | Section 5 |
| | Test at least 5% of all partial penetration welds | O | O | Section 5 |
| | Test 100% of complete joint penetration welds, multi-pass fillet welds, and single-pass fillet welds larger than 5/16 in. | - | P | Section 4 |
| | Test 100% of all re-made welds | - | P | Table 5.4-1 |
| PRIOR TO BOLTING | Verify that manufacturer's certifications and mill test reports are available for fasteners materials (nuts, bolts, washers) and verify compliance with construction documents | O | P | Table N5.6-1 |
| | Verify that fasteners are marked in accordance with ASTM requirements | O | O | Table N5.6-1 |
| | Verify that proper fasteners are selected for the joint detail (grade type bolt length if threads are to be excluded from shear plane) | O | O | Table N5.6-1 |
| | Verify that proper bolting procedure is selected for joint detail | O | O | Table N5.6-1 |
| | Verify that connecting elements, including the appropriate faying surface condition and hole preparation, if specified, meet applicable requirements | O | O | Table N5.6-1 |
| | Observe pre-installation verification testing by installation personnel. Document test results for each fastener assembly and record method used | P | O | Table N5.6-1 |
| | Field test no fewer than three complete fastener assemblies of each combination of diameter, length, grade, and lot with a tension calibrator. Testing shall follow the procedure to be used in the work. Verify that the pretensioning method develops a pretension that is equal to or greater than 1.05 times the pretension specified in Table 8.1 of the RCSC bolt specification. The number of tests required may be increased at the discretion of the SER or inspector. | P | O | Section 6 |
| | Inspect wrench calibration procedures on daily basis (if applicable) | P | O | Section 6 |
| | Inspect proper storage provided bolts, nuts washers, and other fastener components | P | O | Table N5.6-1 |
| DURING BOLTING | Verify that fastener assemblies of suitable condition, placed in all holes and washers (if required) are positioned as required | O | O | Table N5.6-2 |
| | For pretensioned bolts, verify that joint is brought to the snug-tight condition prior to the to pretensioning operation | O | O | Table N5.6-2 |
| | Verify that fastener component not turned by the wrench is prevented from rotating | O | O | Table N5.6-2 |
| | Verify that pretensioning is in accordance with RCSC specification, progressing systematically from the most rigid point toward the free edges | O | O | Table N5.6-2 |
| INSPECTION AFTER BOLTING | Inspect a random sample of at least 25% of all bolts in bearing-type, snug-tightened connections. Verify that the piles of the connections are in firm contact. | O | O | Section 6 |
| | Inspect a random sample of at least 25% of all bolts in pretensioned coonections using twist-off type bolts or turn-of-nut method with matchmarking. The quantity of bolts to be inspected may be modified by the SER. | O | O | Section 6 |
| | Inspect a random sample of at least 25% of all bolts in pretensioned connections using the calibrated wrench method or turn-of-the-nut method without matchmarking. The quantity of bolts to be inspected may be modified by the SER. | P | P | Section 6 |

# DEFINITIONS

| | |
|---|---|
| AHJ | Authority Having Jurisdiction is the organization, political subdivision, office, or individual charged with the responsibility of administering and enforcing provisions of the applicable building code. Also referred to as the building official. |
| Continuous | Where "inspection frequency" is noted as continuous, the special inspector must be present when and where the work to be inspected is being performed. Work on the items to be inspected may not proceed unless the inspector is on the site. |
| Document | Document means that the QC or QA inspector shall prepare reports or other appropriate written documentation indicating that the work has or has not been performed in accordance with the construction documents. |
| O | O (observe) indicates structural steel items to be observed on a random basis. The work need not be delayed pending these observations. |
| P | P (perform) indicates structural steel inspection task to be performed for each welded joint, bolted connection, or member. |
| Periodic | Where "inspection frequency" is noted as periodic, the special inspector may be intermittently present where the work to be inspected has been or is being performed. Work may proceed and need not be delayed while the inspector is not on the site. |
| Quality Assurance (QA) | Quality Assurance procedures and inspections are established by this Statement of Special Inspections and are implemented by the Special Inspection Coordinator and approved testing agencies to provide the owner, the registered design professional, and the Authority Having Jurisdiction with independent, objective confirmation that the work is performed in accordance with the construction documents. |
| Quality Control (QC) | Quality Control procedures and inspections are established by the contractor to ensure that their work is performed in accordance with the construction documents. |

COMMONWEALTH OF MASSACHUSETTS
ALEC S. ZIMMER
STRUCTURAL
No. 46095
REGISTERED
PROFESSIONAL ENGINEER
5/16/2022

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A/E FIRM
BBIX,LLC.
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DESIGNED: REE
DRAWN: REE
TECH. REVIEW: ASZ
DATE: 5/16/22

SUB SHEET NO. S005

TITLE OF SHEET
STRUCTURAL TESTS AND INSPECTIONS
STABILIZE BUILDING 124 BUILDING STRUCTURE
BOSTON NATIONAL HISTORIC PARK

DRAWING NO. 457 179757

SHEET 6 OF 10

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(E) WINDOW TO REMAIN

RELOCATE (E) JERSEY BARRIERS AS REQUIRED TO COMPLETE WORK. COORDINATE TEMPORARY AND FINAL PLACEMENT OF JERSEY BARRIERS WITH NATIONAL PARK SERVICE.

## BUILDING 124 NORTHEAST CORNER

(E) BUILDING 24 OWNED BY US NAVY. DO NOT DISTURB (E) BUILDING

DECOMMISSION AND REMOVE (E) CONDUIT AND LIGHTING FIXTURE.

(E) WINDOW TO REMAIN

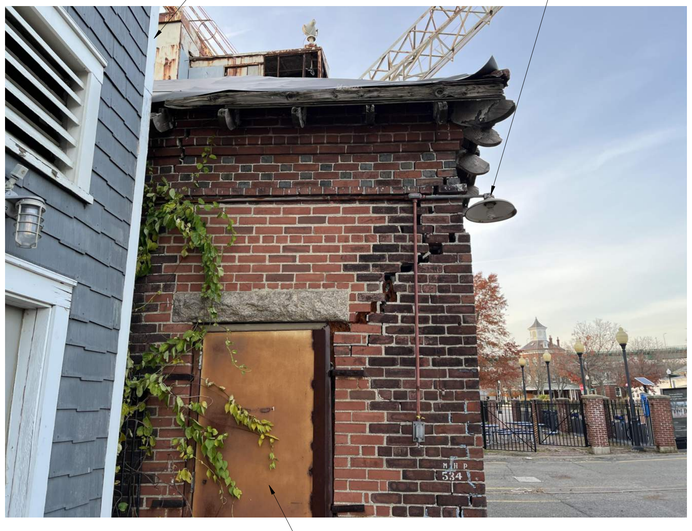
RELOCATE (E) JERSEY BARRIERS AS REQUIRED TO COMPLETE WORK. COORDINATE TEMPORARY AND FINAL PLACEMENT OF JERSEY BARRIERS WITH NATIONAL PARK SERVICE.

## BUILDING 124 EAST FACADE

## BUILDING 124 SOUTHEAST CORNER

(E) BUILDING 24 OWNED BY US NAVY. DO NOT DISTURB (E) BUILDING

DECOMMISSION AND REMOVE (E) CONDUIT AND LIGHTING FIXTURE.




(E) DOOR AND HARDWARE TO REMAIN

## BUILDING 124 SOUTH FACADE (PORTION)

REMOVE (E) PIPE AND PATCH PENETRATION IN ROOFING

CUT AND CAP (E) PIPE BELOW ELBOW

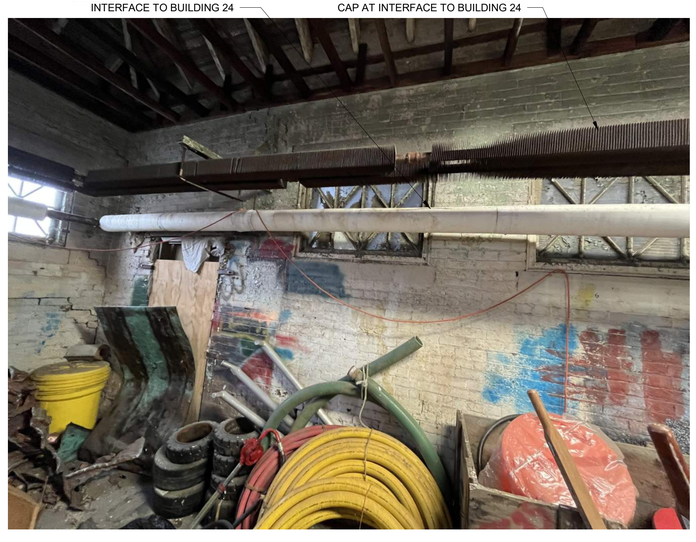
REMOVE (E) FIN TUBE HEATING THROUGHOUT BUILDING 124. CUT AND CAP AT INTERFACE TO BUILDING 24

REMOVE (E) PIPES THROUGHOUT BUILDING 124. CUT AND CAP AT INTERFACE TO BUILDING 24

## BUILDING 124 EAST FACADE INTERIOR

REMOVE (E) PIPES THROUGHOUT BUILDING 124. CUT AND CAP AT INTERFACE TO BUILDING 24

REMOVE (E) FIN TUBE HEATING THROUGHOUT BUILDING 124. CUT AND CAP AT INTERFACE TO BUILDING 24



## BUILDING 124 SOUTH FACADE INTERIOR

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ALEC S. ZIMMER
STRUCTURAL
No. 45095
REGISTERED
PROFESSIONAL ENGINEER

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SUB SHEET NO. S006

TITLE OF SHEET
EXISTING CONDITIONS AND REMOVAL

STABILIZE BUILDING 124 BUILDING STRUCTURE
BOSTON NATIONAL HISTORIC PARK

DRAWING NO. 457 179757

SHEET 7 OF 10

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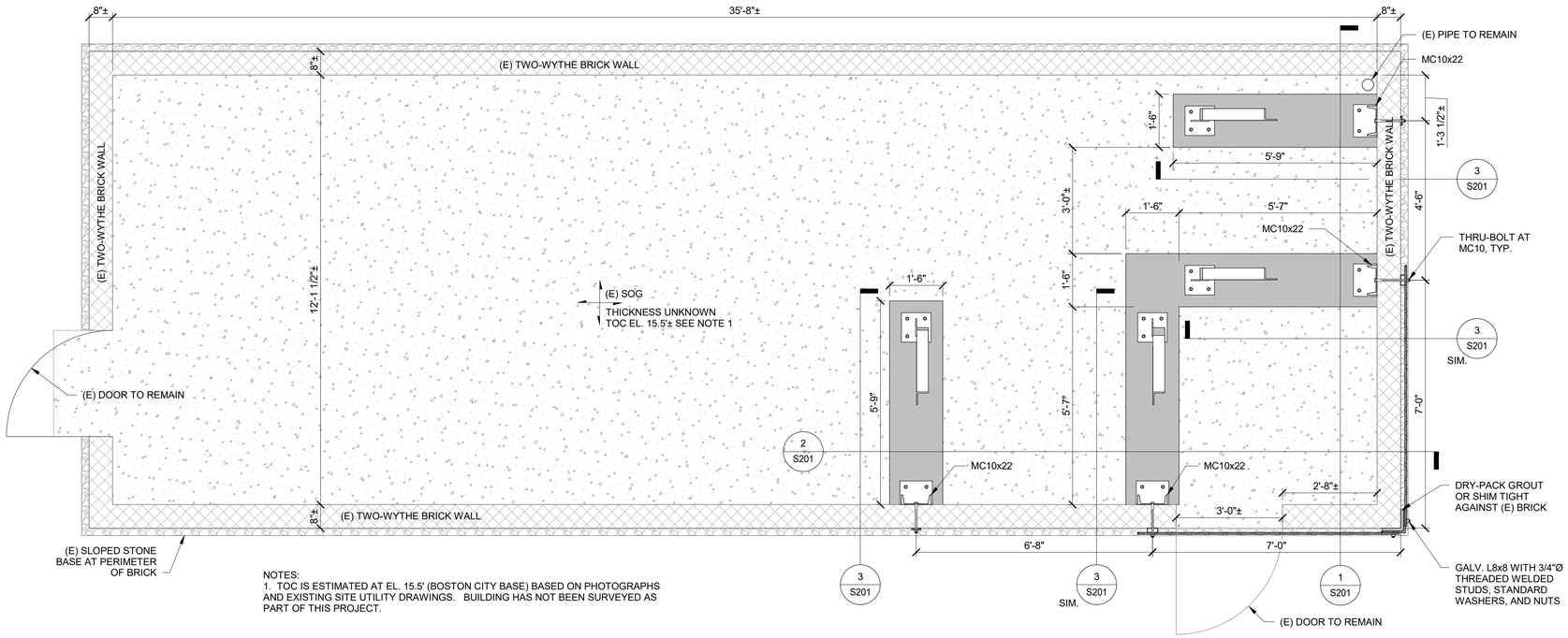
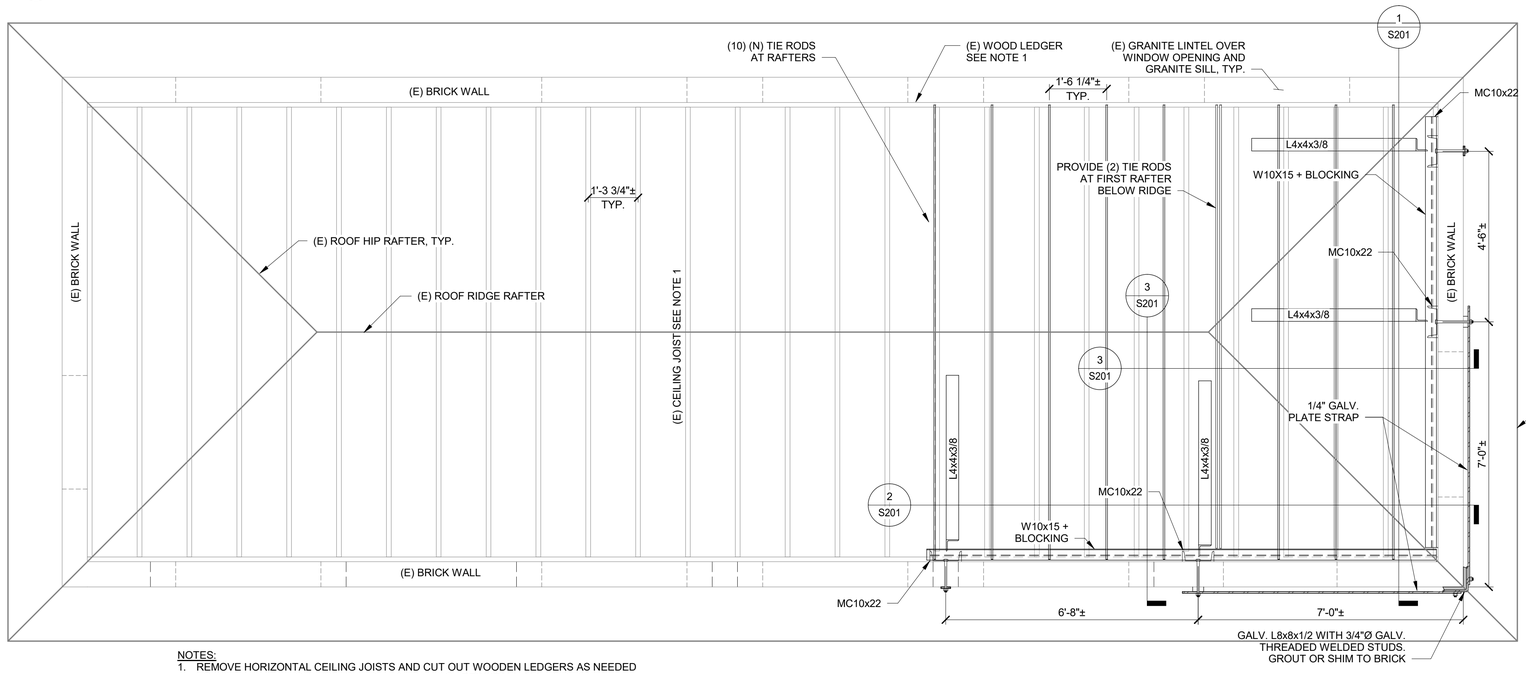



NOTES:
1. TOC IS ESTIMATED AT EL. 15.5' (BOSTON CITY BASE) BASED ON PHOTOGRAPHS AND EXISTING SITE UTILITY DRAWINGS. BUILDING HAS NOT BEEN SURVEYED AS PART OF THIS PROJECT.

## 1 BUILDING 124 GROUND FLOOR PLAN

1/2" = 1'-0"




NOTES:
1. REMOVE HORIZONTAL CEILING JOISTS AND CUT OUT WOODEN LEDGERS AS NEEDED TO INSTALL NEW MC10 POSTS AND W10 FRAMING. **REINSTALL ALL** HORIZONTAL CEILING JOISTS REMOVED IN THIS PROCESS.

## 2 BUILDING 124 REFLECTED CEILING PLAN

1/2" = 1'-0"

PLAN NORTH

SCALE IN FEET - 1/2" = 1'-0"

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ALEC S. ZIMMER
STRUCTURAL
No. 45095
REGISTERED PROFESSIONAL ENGINEER
5/16/2022

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SUB SHEET NO. S100

TITLE OF SHEET
BUILDING 124 FLOOR AND ROOF PLANS
STABILIZE BUILDING 124 BUILDING STRUCTURE
BOSTON NATIONAL HISTORIC PARK

DRAWING NO. 457 179757

SHEET 8 OF 10

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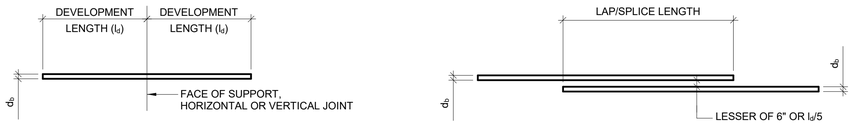
| BAR SIZE | TENSION DEVELOPMENT LENGTH | | | | TENSION LAP/SPLICE LENGTH | | | |
|---|---|---|---|---|---|---|---|---|
| | TOP BARS | | OTHER BARS | | TOP BARS | | OTHER BARS | |
| | 4000 PSI | 5000 PSI | 4000 PSI | 5000 PSI | 4000 PSI | 5000 PSI | 4000 PSI | 5000 PSI |
| #3 | 19 | 17 | 15 | 13 | 25 | 23 | 20 | 17 |
| #4 | 25 | 23 | 19 | 17 | 33 | 30 | 25 | 23 |
| #5 | 31 | 28 | 24 | 22 | 41 | 37 | 32 | 29 |
| #6 | 37 | 34 | 29 | 26 | 49 | 45 | 38 | 34 |
| #7 | 54 | 49 | 42 | 38 | 71 | 64 | 55 | 50 |
| #8 | 62 | 56 | 48 | 43 | 81 | 73 | 63 | 56 |
| #9 | 70 | 63 | 54 | 48 | 91 | 82 | 71 | 63 |
| #10 | 79 | 71 | 61 | 54 | 103 | 93 | 80 | 71 |
| #11 | 87 | 78 | 67 | 60 | 114 | 102 | 88 | 78 |

NOTES:
1. REFER TO "HOOKED REINFORCEMENT TENSION DEVELOPMENT LENGTH SCHEDULE" WHEN THE STRAIGHT DEVELOPMENT LENGTH IN TENSION CANNOT BE ACCOMMODATED IN THE CONCRETE SECTION.
2. ALWAYS USE TENSION DEVELOPMENT LENGTH AND TENSION LAP SPLICE LENGTH VALUES.
3. TABULATED DEVELOPMENT AND LAP SPLICE LENGTHS ARE BASED ON REINFORCING STEEL YIELD STRENGTH $F_y$=60 KSI, NORMAL WEIGHT CONCRETE, AND CLASS B LAPS.
4. TOP BARS ARE DEFINED AS HORIZONTAL BARS WITH MORE THAN 12 INCHES OF FRESH CONCRETE CAST IN THE MEMBER BELOW THE BARS TO BE DEVELOPED OR SPLICED. TOP BAR FACTOR DOES NOT APPLY TO VERTICAL BARS IN WALLS.
5. WHEN DIFFERENT BAR DIAMETERS ARE SPLICED, USE LARGER BAR LAP SPLICE LENGTH
6. ALL TABULATED VALUES ARE MINIMUM LENGTHS, IN CASE OF CONFLICT WITH PLANS, SECTIONS, OR DETAILS USE THE LONGER LENGTH.
7. $d_b$ = BAR DIAMETER.
8. $l_d$ = DEVELOPMENT, LAP OR SPLICE LENGTH.
9. ADJUST TABULATED LENGTHS BY THE FOLLOWING FACTORS WHERE APPLICABLE. NOTE THAT FACTORS ARE CUMULATIVE: (E.G. 1.30x1.50 = 1.95)
   - A. LIGHT WEIGHT CONCRETE: 1.33
   - B. 3 OR LESS BUNDLED BARS: 1.20
   - C. 4 OR MORE BUNDLED BARS: 1.33
   - D. CLEAR SPACING LESS THAN $2d_b$ AND CLEAR COVER LESS THAN $d_b$ 1.50
   - E. CLASS A LAP SPLICE 0.77
   - F. EPOXY COATED BARS 1.50
10. WELDED AND/OR MECHANICAL SPLICES MAY BE USED AT IF APPROVED BY THE STRUCTURAL ENGINEER OF RECORD PROVIDED THAT THE SPLICE IS CAPABLE OF DEVELOPING AT LEAST 125% OF THE YIELD STRENGTH OF THE LARGER BAR IN TENSION. WHERE WELDED AND/OR MECHANICAL SPLICES ARE TO BE USED, THE GENERAL CONTRACTOR SHALL SUBMIT FULL DATA ON THE PROPOSED MATERIAL, PROCEDURES, AND INSTALLATION INSTRUCTIONS TO THE ENGINEER FOR REVIEW AS A SHOP DRAWING SUBMISSION.
11. USE MECHANICAL COUPLERS FOR #14 AND LARGER BARS.
12. LAP SPLICES IN CONCRETE MASONRY SHALL BE AS SPECIFIED IN "STRAIGHT REINFORCEMENT DEVELOPMENT LENGTH IN GROUTED MASONRY" DETAIL.
13. SPLICES OF HORIZONTAL REINFORCEMENT IN WALLS SHALL BE STAGGERED.
14. SPLICES IN WALLS CONTAINING TWO CURTAINS OF REINFORCEMENT SHALL NOT OCCUR IN THE SAME LOCATION.

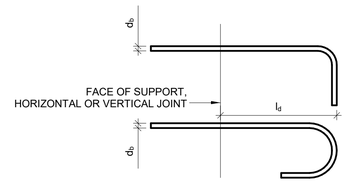



DEVELOPMENT




TENSION LAP/SPLICE

## 1 STRAIGHT REINFORCEMENT DEVELOPMENT AND SPLICE LENGTH SCHEDULE
NTS

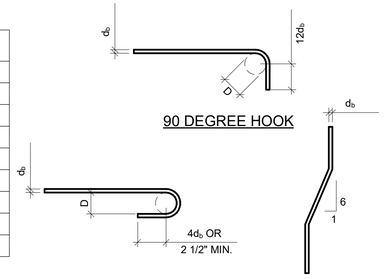



NOTES:
1. SEE TYPICAL TIE AND STIRRUP HOOKS DETAIL FOR ADDITIONAL INFORMATION.
2. TABULATED DEVELOPMENT LENGTHS ARE BASED ON REINFORCING STEEL YIELD STRENGTH $F_y$ = 60 KSI AND NORMAL WEIGHT CONCRETE.
3. ALL TABULATED VALUES ARE MINIMUM LENGTHS. IN CASE OF CONFLICT WITH THE PLANS, SECTIONS, OR DETAILS, USE THE LONGER LENGTH.
4. $d_b$ = BAR DIAMETER
5. $l_d$ = DEVELOPMENT LENGTH
6. ADJUST TABULATED LENGTHS BY THE FOLLOWING FACTORS WHERE APPLICABLE. NOTE THAT THE FACTORS ARE CUMULATIVE:
   - A. REINFORCING BAR STRENGTH OTHER THAN 60 KSI: ($F_y$/60,000)
   - B. LIGHT WEIGHT CONCRETE: 1.33
   - C. EPOXY COATED BARS: 1.2

| BAR SIZE | TENSION DEVELOPMENT LENGTH ($l_d$) INCHES | |
|---|---|---|
| | 4000 PSI | 5000 PSI |
| #3 | 8 | 7 |
| #4 | 10 | 9 |
| #5 | 12 | 11 |
| #6 | 15 | 13 |
| #7 | 17 | 15 |
| #8 | 19 | 17 |
| #9 | 22 | 20 |
| #10 | 24 | 22 |
| #11 | 27 | 24 |

## 2 HOOKED REINFORCEMENT TENSION DEVELOPMENT LENGTH SCHEDULE
NTS

| BAR SIZE | D (IN.) |
|---|---|
| #3 | 2 1/4 |
| #4 | 3 |
| #5 | 3 3/4 |
| #6 | 4 1/2 |
| #7 | 5 1/4 |
| #8 | 6 |
| #9 | 9 |
| #10 | 10 1/4 |
| #11 | 11 1/4 |

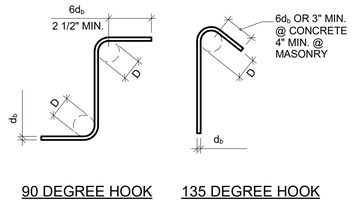



180 DEGREE HOOK REBAR BEND

NOTES:
1. ALL BENDS SHALL BE MADE COLD.
2. $d_b$ = BAR DIAMETER.

## 3 TYPICAL REINFORCEMENT BENDS
NTS

| BAR SIZE | D (IN.) |
|---|---|
| #3 | 1 1/2 |
| #4 | 2 |
| #5 | 2 1/2 |




90 DEGREE HOOK 135 DEGREE HOOK

NOTES:
1. ALL BENDS SHALL BE MADE COLD.
2. $d_b$ = BAR DIAMETER.

## 4 TYPICAL TIE AND STIRRUP HOOKS
NTS

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DATE: 5/16/22

SUB SHEET NO. S200

TITLE OF SHEET
# TYPICAL CONCRETE DETAILS
STABILIZE BUILDING 124 BUILDING STRUCTURE
BOSTON NATIONAL HISTORIC PARK

DRAWING NO. 457 179757

SHEET 9 OF 10

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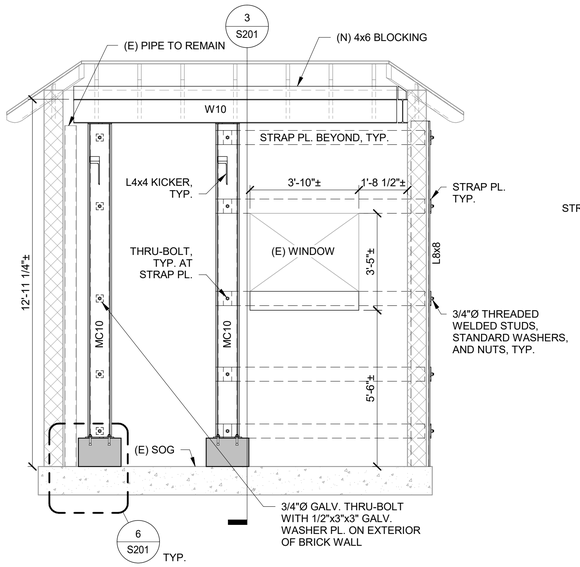
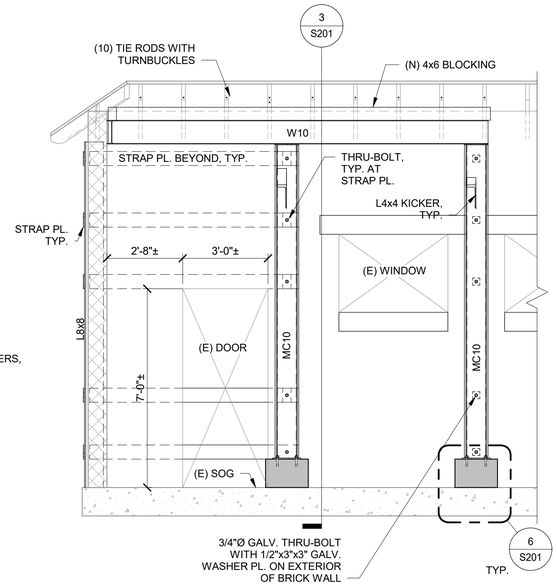


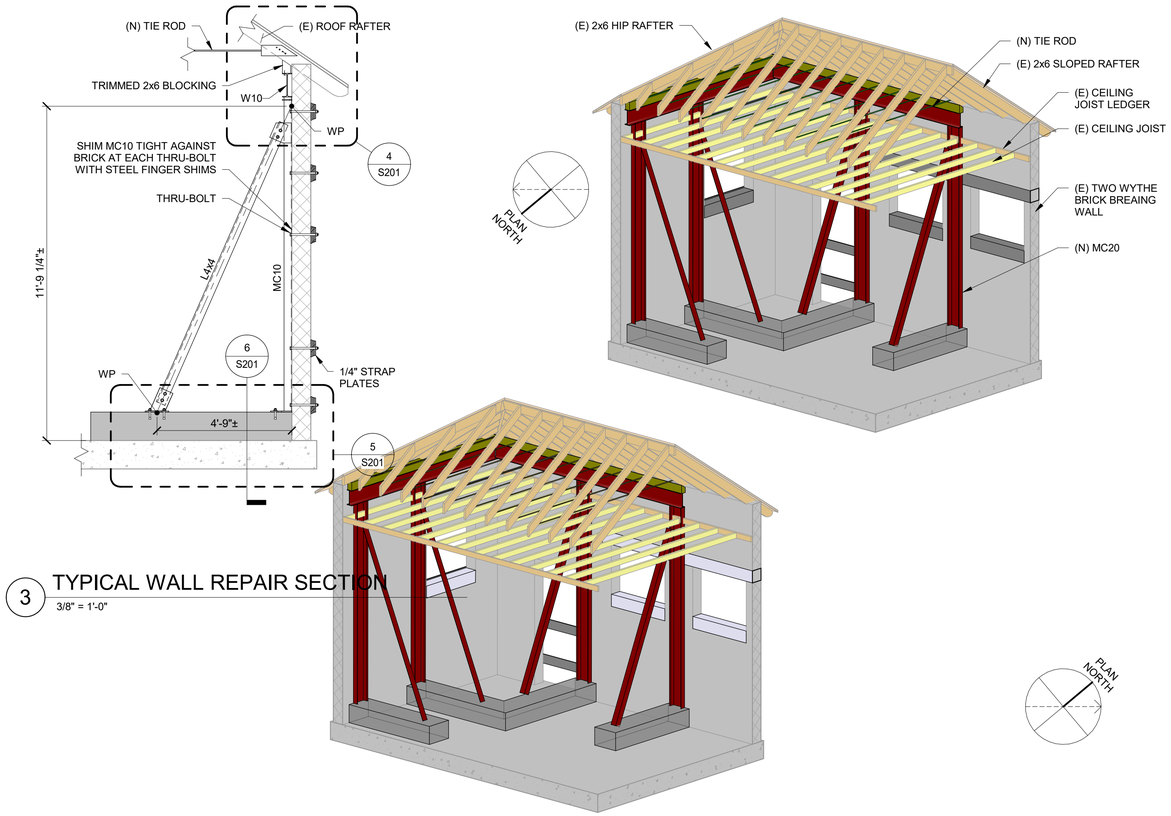

## 1 EAST ELEVATION (INTERIOR)

3/8" = 1'-0"



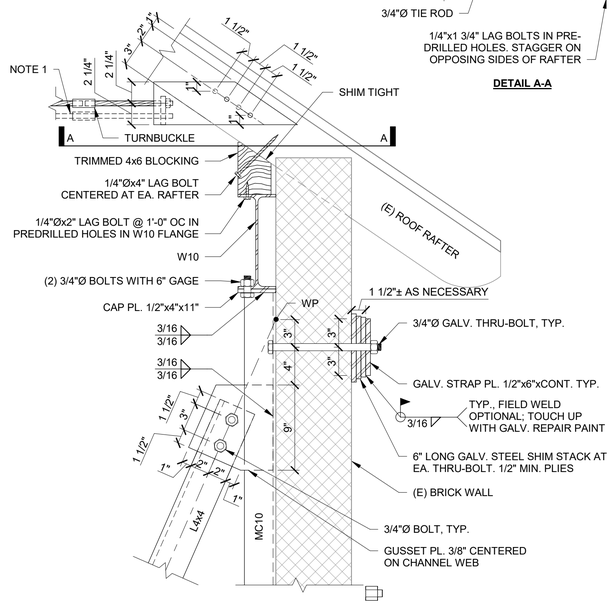

## 2 PARTIAL SOUTH ELEVATION (INTERIOR)

3/8" = 1'-0"




## 3 TYPICAL WALL REPAIR SECTION

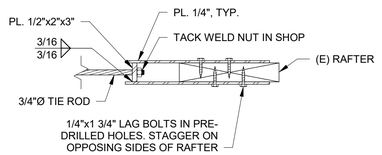
3/8" = 1'-0"



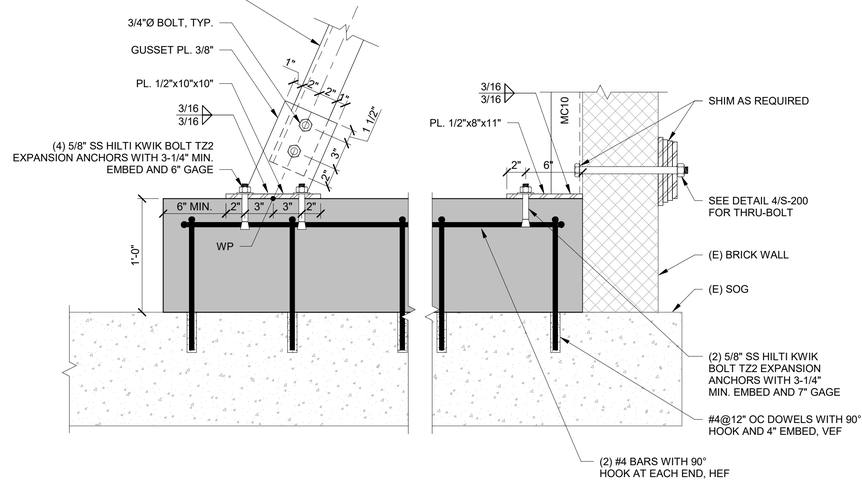

NOTES:
1. PROVIDE (2) 3/4"Ø TIE RODS AT FIRST RAFTER BELOW RIDGE/HIP INTERSECTION. SEE PLANS.

## 4 TYPICAL SHORING AND KICKER REPAIR DETAIL

1 1/2" = 1'-0"

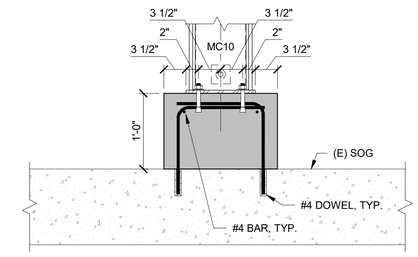



**DETAIL A-A**




## 5 TYPICAL KICKER AND POST ANCHORAGE AT NEW CONCRETE PAD

1 1/2" = 1'-0"




NOTES:
1. SEE DETAIL 5/S201 FOR INFORMATION NOT SHOWN HERE.

## 6 TYPICAL SECTION AT NEW CONCRETE PAD

1" = 1'-0"

2' 1' 0' 2' 4' 6' 8' SCALE IN FEET - 3/8" = 1'-0"

1' 1/2' 0' 1' 2' 3' SCALE IN FEET - 1" = 1'-0"

1' 1/2' 0' 1' 2' SCALE IN FEET - 1 1/2" = 1'-0"

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| DESIGNED: | SUB SHEET NO. | TITLE OF SHEET | DRAWING NO. |
|---|---|---|---|
| REE | S201 | REPAIR DETAILS | 457 / 179757 |
| DRAWN: REE | | | |
| TECH. REVIEW: ASZ | | STABILIZE BUILDING 124 BUILDING STRUCTURE BOSTON NATIONAL HISTORIC PARK | SHEET 10 OF 10 |
| DATE: 5/16/22 | | | |

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