

GREENHALGE ELEMENTARY SCHOOL MASONRY AND ROOF REPAIR

149 ENNEL STREET
LOWELL, MA

PREPARED FOR:
LOWELL PUBLIC SCHOOLS



CONSULTANTS

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SYMBOLS	MATERIALS	ABBREVIATIONS	LIST OF DRAWINGS
	CONCRETE	ALT. ALTERNATE	A-1 LEGEND, ABBREVIATIONS, AND NOTES
	CONCRETE MASONRY UNIT	A.F.F. ABOVE FINISH FLOOR	A-2 ROOF PLANS & SECTION
	BRICK	A.F.G. ABOVE FINISH GRADE	A-3 DETAILS
	STEEL	APPROX. APPROXIMATELY	A-4 SPECIFICATION
	INSULATION - BATT	ATTEN. ATTENUATION	
	INSULATION - RIGID	BLDG. BUILDING	
	PLYWOOD	BOT. BOTTOM	
	EARTH	C.B. CATCH BASIN	
	CRUSHED STONE	C.M.U. CONCRETE MASONRY UNIT	
		C.O. CLEAN OUT	
		C.R. COLD ROLLED	
		CAB. CABINET	
		CEM. CEMENT	
		CER. CERAMIC	
		CLG. CEILING	
		COL. COLUMN	
		CONCR. CONCRETE	
		CONST. CONSTRUCTION	
		CONT. CONTINUOUS	
		DBL. DOUBLE	
		DTL. DETAIL	
		DIA. DIAMETER	
		DIM. DIMENSION	
		DN. DOWN	
		DWG. DRAWING	
		E.J. EXPANSION JOINT	
		E.W.C. ELECTRICAL WATER COOLER	
		EA. EACH	
		EL. ELEVATION	
		ELECT. ELECTRICAL	
		EPDM ETHYLENE-PROPYLENE-DIENE-MONOMER	
		EQ. EQUAL	
		EQUIP. EQUIPMENT	
		EXIST. EXISTING	
		EXP. EXPANSION	
		EXT. EXTERIOR	
		F. FACE OF	
		F.D. FLOOR DRAIN	
		FDN. FOUNDATION	
		FIN. FINISH	
		FLR. FLOOR	
		FLUOR. FLUORESCENT	
		F.R. FIRE RATED	
		FT. FOOT	
		GA. GAUGE	
		GALV. GALVANIZED	
		GEN. GENERAL	
		GL. GLASS	
		GYP. GYPSUM	
		G.W.B. GYPSUM WALL BOARD	
		H.M. HOLLOW METAL	
		HD. HEAD	
		HORIZ. HORIZONTAL	
		HT. HEIGHT	
		I.D. INSIDE DIAMETER	
		IN. INCH	
		INCAN. INCANDESCENT	
		INSUL. INSULATION	
		INT. INTERIOR	
		JT. JOINT	
		LT. WT. LIGHTWEIGHT	
		M.O. MASONRY OPENING	
		MANUF. MANUFACTURING	
		MAX. MAXIMUM	
		MECH. MECHANICAL	
		MIN. MINIMUM	
		N.I.C. NOT IN CONTRACT	
		N.T.S. NOT TO SCALE	
		O.C. ON CENTER	
		O.D. OUTSIDE DIAMETER	
		PARTN. PARTITION	
		P.LAM. PLASTIC LAMINATE	
		PLWD. PLYWOOD	
		PORC. PORCELAIN	
		Q.T. QUARRY TILE	
		R.D. ROOF DRAIN	
		R.O. ROUGH OPENING	
		RAD. RADIUS	
		REQ. REQUIRED	
		RET. RETAINING	
		RM. ROOM	
		S.S. STAINLESS STEEL	
		S.V. SHEET VINYL	
		SCHED. SCHEDULE	
		SECT. SECTION	
		SHT. SHEET	
		SIM. SIMILAR	
		SPEC. SPECIFICATION	
		SQ. SQUARE	
		STD. STANDARD	
		STRUCT. STRUCTURAL	
		SUSP. SUSPENDED	
		T.O.W. TOP OF WALL	
		TEL. TELEPHONE	
		THRU. THROUGH	
		TYP. TYPICAL	
		U.O.N. UNLESS OTHERWISE NOTED	
		V.C.T. VINYL COMPOSITE TILE	
		VERT. VERTICAL	
		V.I.F. VERIFY IN FIELD	
		V.P. VENEER PLASTER	
		W/ WITH	
		W.C. WATER CLOSET	
		W.P. WATERPROOF	
		W.W.F. WELD WIRE FABRIC	
		WD. WOOD	

MARK	DATE	DESCRIPTION
A	08-08-14	ISSUED FOR BID

PROJECT NO: 14401-04
MODEL FILE: A-1.dwg
DRAWN BY: LSP
CHKD BY: POB
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SHEET TITLE
**LEGEND,
ABBREVIATIONS,
AND NOTES**

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MARK	DATE	ISSUED FOR BID	DESCRIPTION
A	08-08-14		

PROJECT NO: 14401-04
 MODEL FILE: A-3.dwg
 DRAWN BY: LSP
 CHKD BY: POB
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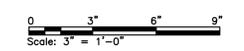
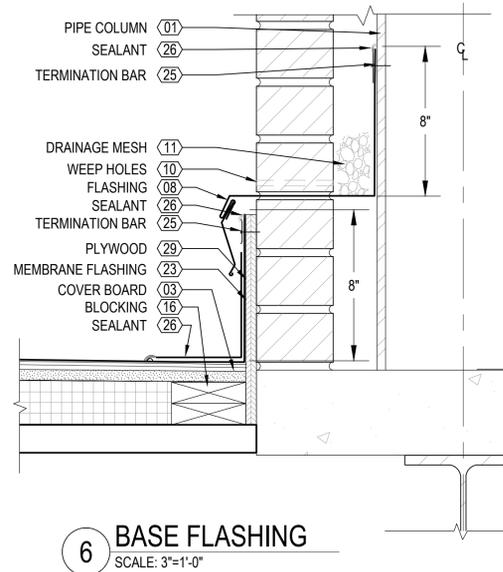
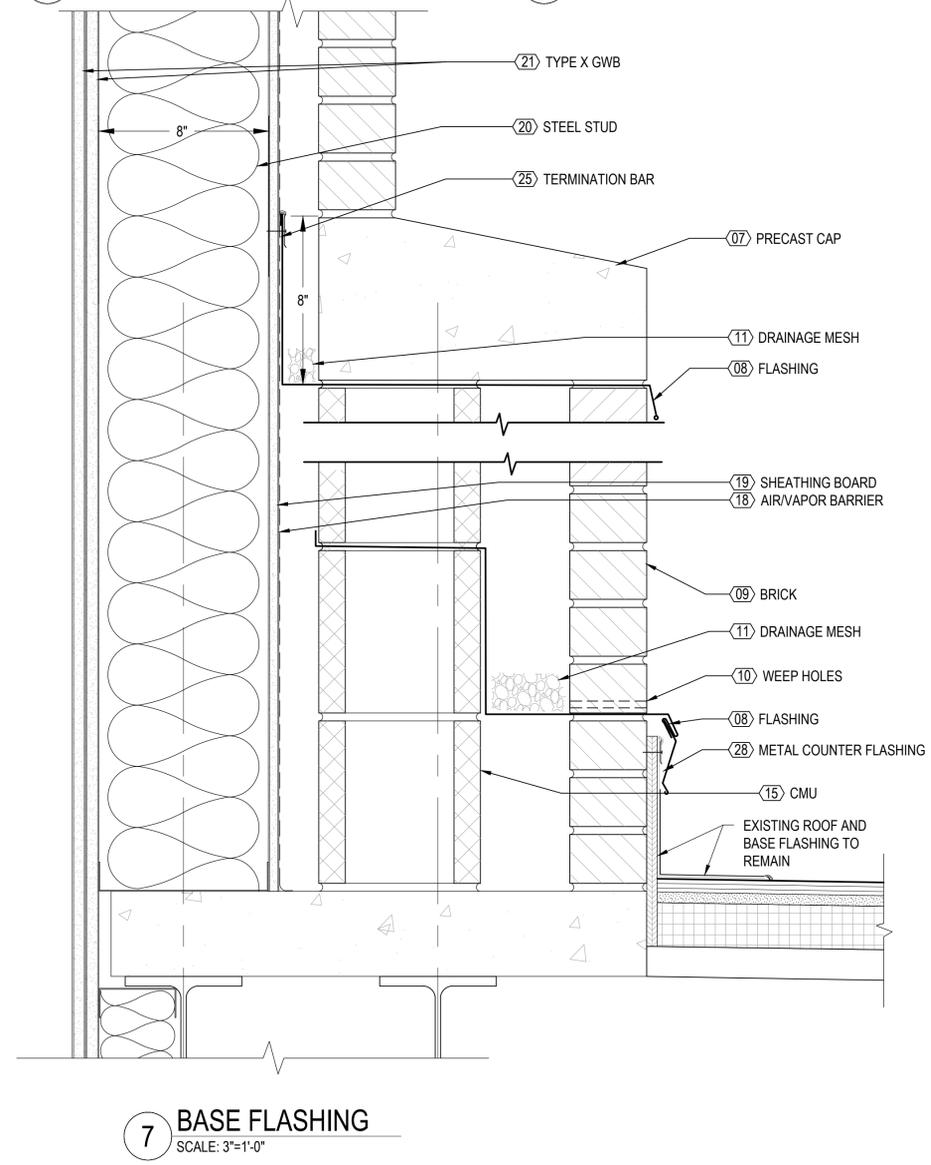
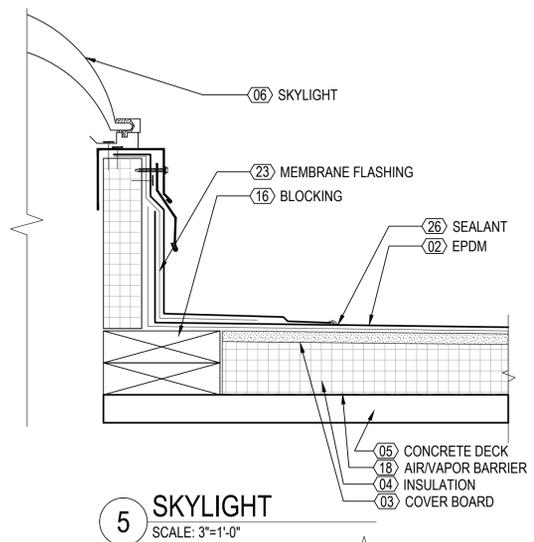
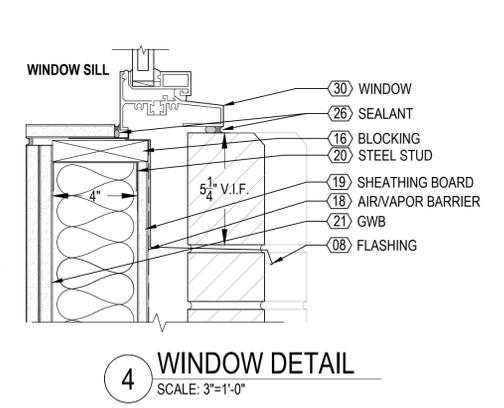
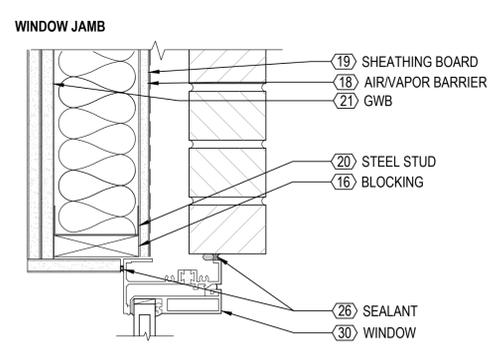
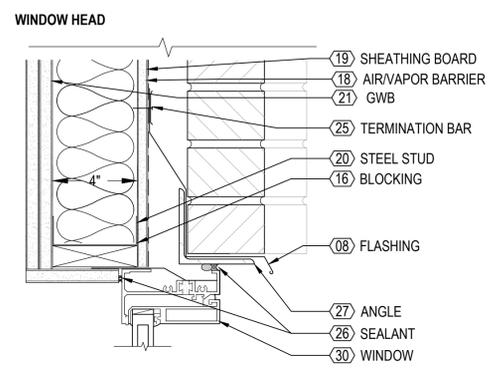
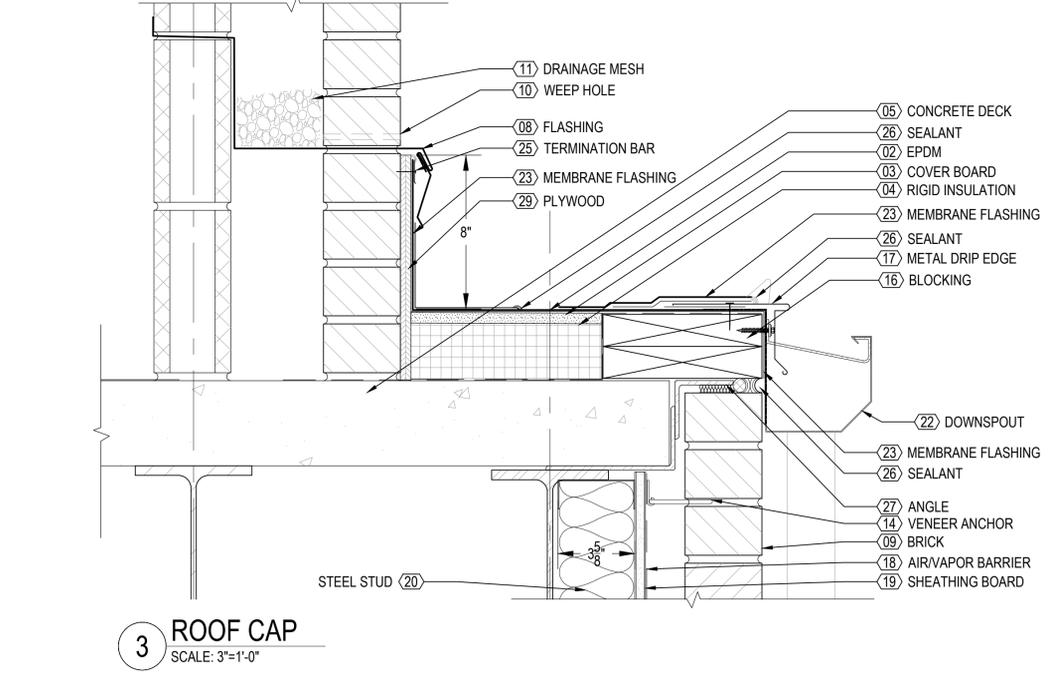
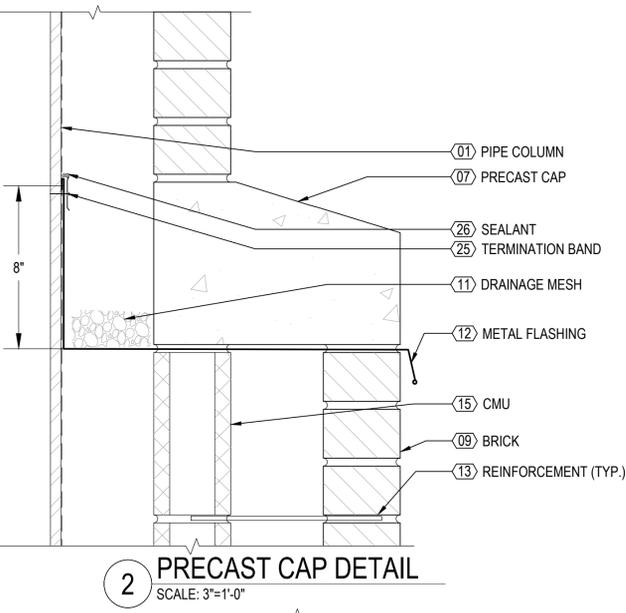
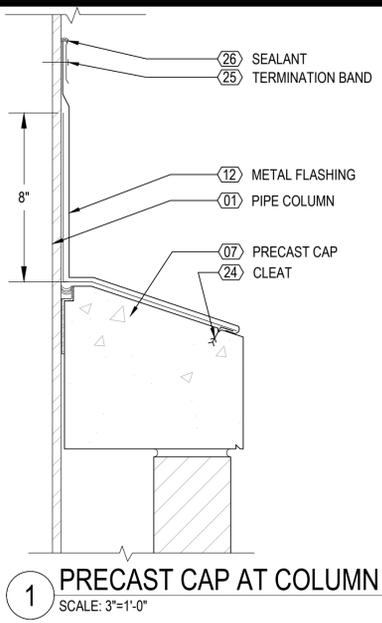
SHEET TITLE
DETAILS

NOTES:

1. ALL DIMENSIONS SHALL BE FIELD VERIFIED.
- 01 PIPE COLUMN: EXISTING TO REMAIN. CLEAN AND REMOVE ANY RUST; PAINT WITH RUST INHIBITIVE PRIMER AND 100 PERCENT ACRYLIC PAINT. COLOR TO BE SELECTED BY OWNER.
- 02 EPDM: REMOVE EXISTING AND INSTALL NEW EPDM (ETHYLENE PROPYLENE DIENE MONOMER) ROOF SYSTEM PER SPECIFICATION 07 53 00.
- 03 COVER BOARD: NEW 1/2" GYPSUM COVER BOARD MECHANICALLY FASTENED TO DECK.
- 04 RIGID INSULATION: POLYISOCYANURATE INSULATION BOARD 3" MIN TO PROVIDE 1/4" PER FOOT SLOPE TO DRAIN.
- 05 CONCRETE DECK: EXISTING TO REMAIN CONCRETE DECK; REPAIR ANY DAMAGED AREAS AS NEEDED TO MAINTAIN STRUCTURAL INTEGRITY.
- 06 SKYLIGHT: EXISTING TO REMAIN; PROVIDE NEW FLASHING AND COUNTER FLASHING; SEAL WATERTIGHT.
- 07 PRECAST CAP: EXISTING PRECAST CONCRETE CAP STONE TO BE REMOVED AND REINSTALLED PER SPECIFICATION 04 21 00. SEAL AND FLASH; SEE DETAIL SHEET A-3.
- 08 FLASHING: THRU WALL SHEET METAL FLASHING AND COUNTER FLASHING PER SPECIFICATION 04 21 00.
- 09 BRICK: EXISTING TO BE CLEANED AND REUSED.
- 10 WEEP HOLES: WEEP HOLES PROVIDED AT 24" O.C. MIN.
- 11 DRAINAGE MESH: INSTALL NEW DRAINAGE MESH PER SPECIFICATION 04 21 00.
- 12 METAL FLASHING: CIRCULAR COPPER PIPE FLASHING; SOLDER JOINTS.
- 13 REINFORCEMENT: HOT DIP GALVANIZED REINFORCEMENT AT 16" O.C. PER SPECIFICATION 04 21 00.
- 14 VENEER ANCHOR: INSTALL VENEER ANCHORS AT 16" O.C. PER SPECIFICATION 04 21 00.
- 15 CMU: EXISTING CMU TO BE REUSED.
- 16 BLOCKING: PRESSURE TREATED WOOD BLOCKING.
- 17 METAL DRIP EDGE: NEW METAL DRIP EDGE PER SPECIFICATION 07 53 00 COLOR TO MATCH EXISTING. PROVIDE SCUPPER AT CONDUCTOR HEAD LOCATION ONLY.
- 18 AIR/VAPOR BARRIER: AIR/VAPOR BARRIER PER SPECIFICATION 04 21 00.
- 19 SHEATHING BOARD: 1/2" FIBERGLASS FACED GYPSUM SHEATHING BOARD.
- 20 STEEL STUD: STEEL STUD WALL WITH FIBERGLASS BATT INSULATION DEPTH AS SHOWN.
- 21 GWB: 2 LAYERS 1/2" TYPE X GYPSUM WALL BOARD.
- 22 DOWNSPOUT & CONDUCTOR HEAD: REMOVE AND REINSTALL EXISTING DOWNSPOUT AND CONDUCTOR HEAD.
- 23 MEMBRANE FLASHING: MEMBRANE FLASHING PER SPECIFICATION 07 53 00.
- 24 CLEAT: COPPER CLEAT.
- 25 TERMINATION BAR/BAND: METAL TERMINATION BAR. USE CIRCULAR BAND @ PIPE COLUMNS.
- 26 SEALANT: SILICONE OR POLYURETHANE W/ BACKER ROD JOINT FILLER.
- 27 ANGLE: EXISTING TO REMAIN STEEL ANGLE.
- 28 METAL COUNTER FLASHING: METAL COUNTER FLASHING PER SPECIFICATION SECTION 04 21 00.
- 29 PLYWOOD: PROVIDE 1/2" PRESSURE TREATED EXTERIOR GRADE PLYWOOD.
- 30 WINDOW: EXISTING WINDOW WITH MANUFACTURES STRAP ANCHOR TO REMAIN, IF REMOVED STORE AND REINSTALL.

XX

KEYNOTES:



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SECTION 04 21 00
MASONRY VENEER

PART 1 GENERAL

1.1 SUMMARY

- A. Provide all labor, materials and equipment including staging for the complete repair and restoration of the damaged masonry and veneer backup as shown. Work includes brick and concrete masonry units; and reinforcement, anchorage, flashing, and accessories.
- B. Work includes removal and salvage of damaged masonry; installation of new flashing; re-installation of salvaged masonry units and/or providing new units to match existing if necessary to replace units damaged beyond repair.
- C. Demolish all damaged steel stud and gypsum board veneer back-up and replace in-kind with new steel studs, gypsum board, and air/vapor barrier.
- D. Clean all exposed surfaces (masonry and steel) of moss, mold and dirt.

1.2 REFERENCES

- A. Massachusetts State Building Code 780 CMR
- B. American Concrete Institute International (ACI)
 - 1. ACI 530/530.1 (2011; Errata 2011) Building Code Requirements and Specification for Masonry Structures and Related Commentaries
- C. ASTM International (ASTM)
 - 1. ASTM A153/A153M (2009) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 - 2. ASTM A307 (2010) Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
 - 3. ASTM A653/A653M (2011) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - 4. ASTM A82/A82M (2007) Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
 - 5. ASTM A951/A951M Standard Specification for Steel Wire for Masonry Joint Reinforcement
 - 6. ASTM B370 (2011) Standard Specification for Copper Sheet and Strip for Building Construction
 - 7. ASTM C1002 (2007) Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
 - 8. ASTM C129 (2011) Standard Specification for Nonloadbearing Concrete Masonry Units
 - 9. ASTM C270 (2010) Standard Specification for Mortar for Unit Masonry
 - 10. ASTM C494/C494M (2011) Standard Specification for Chemical Admixtures for Concrete
 - 11. ASTM C55 (2011) Concrete Brick

1.3 SUBMITTALS

- A. Product Data:
 - 1. Submit data for reinforcement, wall anchors, flashing, and other accessories.
 - 2. Submit data for mortar material and mix design.
- B. Samples: Provide mortar samples for selection of type to match existing. Provide sample panel of selected mortar type for final selection. Allow sample to cure prior to approval.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 530 Building Code Requirements for Masonry Structures and ACI 530.1 Specification for Masonry Structures.
- B. Perform Work in accordance with Massachusetts State Building Code 780 CMR.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Cold Weather Requirements: In accordance with ACI 530.1 when ambient temperature or temperature of masonry units is less than 40 degrees F.
- B. Hot Weather Requirements: In accordance with ACI 530.1 when ambient temperature is greater than 100 degrees F or ambient temperature is greater than 90 degrees F with wind velocity greater than 8 mph.

PART 2 PRODUCTS

2.1 UNIT MASONRY

- A. Facing Brick: Reuse existing salvaged units. Remove old mortar and clean prior to reinstallation. If not enough salvaged units exist, then provide new units to match existing.
- B. Hollow Non-Load Bearing Concrete Masonry Units: ASTM C129; normal weight. Reuse existing or provide new as required to complete work.
- C. Concrete Brick Units: ASTM C55, normal weight. Reuse existing or provide new as required to complete work.
- D. Decorative Masonry Units: Salvage and reuse existing caps, waterables, and other precast concrete or stone units. Clean and repair as required.

2.2 MORTAR

- A. Mortar to match existing in color and conforming to ASTM C270, Type S. Mortar mix shall be based on proportion specifications. Cement shall be of one brand. Provide aggregates from one source.
- B. Admixtures: In cold weather, a non-chloride based accelerating admixture may be used subject to approval. Accelerating admixtures shall be non-corrosive, contain less than 0.2 percent chlorides, and conform to ASTM C494/C494M, Type C.

2.3 VENEER ANCHORS

- A. Veneer Anchors: ASTM A82/A82M; rectangular or triangular hoops of steel wire 3/16 inch diameter, adjustable; ASTM A153/A153M hot dip galvanized. Provide anchors wires without drips.

2.4 REINFORCEMENT

- A. Single Wythe Joint Reinforcement: Ladder type; steel; 0.148 inch diameter side rods with 0.148 inch diameter cross ties; hot dip galvanized.
- B. Multiple Wythe Joint Reinforcement: ASTM A951/A951M; truss type; steel; without moisture drip; 0.148 inch diameter side rods with 0.148 inch diameter cross ties; hot dip galvanized.
- C. Anchor Rods: ASTM A307; Grade C; J-shaped or L-shaped; complete with washers and heavy hex nuts; sized for minimum 15 inch embedment; Hot-Dipped Galvanized per ASTM A153/A153M.

2.5 FLASHING

- A. Flashing shall be supplied in a continuous sheet extending from the exterior sheathing across the cavity and through the masonry veneer as shown.
- B. Flashing: ASTM B370; Copper, cold-rolled temper, H 00 (standard); 16 oz/sq ft.
- C. Lap Sealant: Butyl type.

2.6 MOISTURE PROTECTION

- A. Air/Vapor Barrier System: Self-adhering roll-type product of cross-laminated polyethylene bonded to specially modified asphalt.
 - 1. Thickness: nominal 40 mils.

2.7 COLD-FORMED STEEL FRAMING

- A. Provide cold-formed framing consisting of steel studs, top and bottom tracks, runners, horizontal bridging, and other cold-formed members and other accessories as required to repair and/or replace damaged framing in-kind.
 - 1. ASTM A653/A653M; Hot-dip galvanized, coating thickness of G60.

2.8 EXTERIOR SHEATHING

- A. Gypsum board sheathing with a water-resistant core and water-resistant glass mat facings embedded onto core. Replace all damaged sheathing.
 - 1. Mold and mildew resistant surface.
 - 2. Thickness: 1/2 inch.

2.9 CONNECTIONS

- A. Screws, bolts and anchors shall be hot-dip galvanized in accordance with ASTM A153/A153M.
- B. Veneer Anchor Screws:
 - 1. As recommended by manufacturer, No. 12 minimum.
 - 2. Penetration: 5/8 inch through stud minimum.
- C. Gypsum Sheathing Screws: Screws for attachment of gypsum sheathing to cold-formed steel framing shall conform to ASTM C1002, Type S.

2.10 ACCESSORIES

- A. Caulking and Sealants: One part polyurethane or silicone.
- B. Joint Filler: Closed cell polyethylene; oversized 50 percent to joint width; self expanding.
- C. Cavity Drain Material: Open polyethylene mesh, thickness required to fill cavity space, and shaped to ensure moisture drainage to cavity weeps.
- D. Weeps: Preformed plastic or cotton rope.
- E. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

PART 3 EXECUTION

3.1 EXAMINATION & PREPARATION

- A. Verify field conditions are acceptable and are ready to receive Work.
- B. Provide sample of selected mortar to demonstrate match with existing. Allow to cure prior to examination and approval. Do not proceed with work until mortar is approved by Owner.

3.2 INSTALLATION

- A. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness. Install veneer masonry to match and blend with existing as close as practicable.
- B. Weeps: Install weeps in outer wythe at 24 inches oc horizontally above through-wall flashing, above shelf angles and lintels, at bottom of walls, and where shown.
- C. Cavity Wall: Do not permit mortar to drop or accumulate into cavity air space or to plug weep holes. Build inner wythe ahead of outer wythe to receive air/vapor barrier.
- D. Anchor the masonry veneer to the cold-formed steel framing and structural steel as shown on drawings. Anchors shall transfer the design loadings from the masonry veneer to the cold-formed steel framing system or other support without exceeding the allowable stresses and deflections in the anchors. Length of anchor wires shall be such that the outermost wires lie between 1-1/4 inch from each face of the masonry veneer.
- E. Joint Reinforcement and Anchorage:
 - 1. Install horizontal joint reinforcement 16 inches oc. Place joint reinforcement continuous in first and second joint below top of walls.
 - 2. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
 - 3. Embed wall anchors in masonry backing or secure wall anchors to stud framed backing. Bond veneer at maximum 16 inches oc vertically and 16 inches oc horizontally. Place wall ties at maximum 8 inches oc vertically within 8 inches of jamb of wall openings and corners.
- F. Masonry Flashings:
 - 1. Extend flashings horizontally through outer wythe above ledge or shelf angles and lintels, under parapet caps, at bottom of walls, and where shown and turn down on outside face to form drip.
 - 2. Turn flashing up minimum 8 inches and bed into mortar joint of masonry or seal to sheathing over steel stud back-up.
 - 3. Lap end joints and seal watertight.
 - 4. Turn flashing, fold, and seal at corners, bends, and interruptions.
 - 5. Turn up flashing on inside face and ends to form pan and seal watertight.

G. Cleaning:

- 1. Clean all exposed surfaces of entire tower of moss, mold, and dirt.
- 2. Include all masonry and steel, including underside of tower metal roof.
- 3. Do not include painted metal roof.
- 4. Remove excess mortar and mortar smears as work progresses.
- 5. Clean soiled surfaces with non-acidic detergent cleaning solution and low pressure water wash.

H. Tolerances:

- 1. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- 2. Maximum Variation from Level Coursing: 1/8 inch in 3 feet and 1/4 inch in 10 feet; 1/2 inch in 30 feet.

END OF SECTION

SECTION 07 53 00

ELASTOMERIC MEMBRANE ROOFING AND FLASHING

PART 1 GENERAL

1.1 SUMMARY

- A. Work Includes:
 - 1. Ethylene-Propylene-Diene-Monomer (EPDM) Elastomeric Sheet Membrane Conventional Roofing System, fully adhered, with all labor and materials necessary for a complete roof system.
 - 2. 20 year manufacturer's warranty.

1.2 REFERENCES

- A. Massachusetts State Building Code 780 CMR
- B. FM Global/Factory Mutual: FM Property Loss Prevention Data Sheets
- C. Sheet Metal and Air Conditioning Contractors' National Association: SMACNA Architectural Sheet Metal Manual.
- D. ASTM International (ASTM)
 - 1. ASTM E108 (2011) Fire Tests of Roof Coverings
 - 2. ASTM D4637/D4637M (2012) EPDM Sheet Used in Single-Ply Roof Membrane
 - 3. ASTM E84 (2012a) Standard Test Method for Surface Burning Characteristics of Building Materials
 - 4. ASTM C1289 (2012) Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
 - 5. ASTM B209 (2010) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
- E. Underwriters Laboratories (UL): UL 790 (2004; Reprint Oct 2008) Standard Test Methods for Fire Tests of Roof Coverings
- F. National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual

1.3 SYSTEM DESCRIPTION

- A. EPDM sheet membrane roof assembly on steel deck including tapered rigid roof insulation, cover board, metal and membrane roof flashings, scupper and downspout, roof membrane, and all accessories required to provide a water tight installation.
- B. Insulation shall be adhered or mechanically fastened to the steel deck. The cover board shall be mechanically fastened to the deck through the insulation and the membrane shall be fully adhered to the cover board.

1.4 DESIGN REQUIREMENTS

- A. Low Slope Membrane Roof Securement: Conform to wind speeds determined from Massachusetts Building Code and FM 1-90 requirements, whichever is more stringent.
- B. Conform to requirements of FM Property Loss Prevention Data Sheets:
 - 1. 1-28 Wind Design
 - 2. 1-29 Roof Deck Securement and Above-Deck Roof Components
 - 3. 1-49 Perimeter Flashing

1.5 SUBMITTALS

- A. Shop Drawings: Provide detailed drawings for all shop fabricated or custom metal flashing.
- B. Product Data: Submit characteristics on membrane materials, flashing materials, prefabricated coping and flashing, seaming materials, adhesives, fasteners, insulated roof curbs, cover board, insulation, and accessories.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with NRCA Roofing and Waterproofing Manual.
- B. Roof Assembly Classification: FM wind uplift requirement of 1-90, in accordance with FM Data Sheet 1-28.
- C. Roof membrane Fire Classification: Minimum Class A when tested in accordance with ASTM E108.
- D. Surface Burning Characteristics:
 - 1. Foam Insulation: Maximum 75/450 flame spread/smoke developed index when tested in accordance with ASTM E84 or UL 790.
- E. Apply label from agency approved by authority having jurisdiction to identify each roof assembly component.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not install membrane during inclement weather or when air temperature may fall below 40 degrees F.

1.8 MANUFACTURER'S INSPECTION

- A. Manufacturer's technical representative must visit the site if required for the warranty.
- B. Follow-up inspections of previously noted deficiencies or application errors must be performed as requested by the Owner at no additional cost.
- C. After each inspection, submit a report signed by the manufacturer's technical representative to the Owner within 3 working days. Note overall quality of work, deficiencies and any other concerns, and recommended corrective action.

1.9 WARRANTY

- A. Furnish 20 year manufacturer's warranty including coverage of materials and installation.

PART 2 PRODUCTS

2.1 ELASTOMERIC ROOF COMPONENTS

- A. Membrane: ASTM D4637; EPDM; non-reinforced, 0.060 inch thick, by the widest standard roll width available from the manufacturer; black color.
- B. Seaming Materials: Field and/or factory applied tape as recommended by membrane manufacturer. Adhesive as recommended by membrane manufacturer where tape can not be used. Cleaner and primer as required for

END OF SECTION

- C. Cover Board: Non combustible core, moisture resistant sheathing: 1/2 inch Dens Deck Prime by Georgia Pacific or equal.
- D. Insulation Materials:
 - 1. Insulation: ASTM C1289, Type II, Class I, faced rigid cellular polyisocyanurate roof insulation, with the following characteristics:
 - a. Board Size: 4' x 8'
 - b. Board Thickness: Tapered 1/4 inch per foot, 2 inches minimum thickness.
 - c. Board Edges: square.
 - d. Thermal Resistance: Aged R-6.0 per inch, minimum.
 - e. Compressive Strength: Minimum 20 psi
 - 2. Insulation Perimeter Restraint: Metal edge device configured to restrain insulation boards in position or as required by FM Data Sheet 1-29.

2.2 FLASHING AND SHEET METAL

- A. Aluminum Sheet: ASTM B 209-2010.
 - 1. Heavyweight: 0.040 inch.
 - 2. Factory Finish: Fluoropolymer coating; color to match the flashing on the existing building.
- B. Sheet Metal Flashing and Trim:
 - 1. Joints: Lap seams a minimum of 4" and seal with silicone sealant. Lapped seams are to provide expansion movement at maximum 10 feet on center.
- C. Fabrication and Installation: Comply with recommendations of SMACNA Architectural Sheet Metal Manual.

2.3 ACCESSORIES

- A. Membrane Fastening:
 - 1. Surface Conditioner: compatible with membrane.
 - 2. Membrane Adhesive: As recommended by membrane manufacturer.
 - 3. Termination Bars and Screws: As recommended by the membrane manufacturer.
- B. Insulation Adhesive: Urethane foam or as recommended by insulation manufacturer.
- C. Insulation Joint Tape: Asphalt treated glass fiber reinforced; self adhering.
- D. Wood Blocking: Pressure treated wood.
- E. Cover Board fasteners: Heavy duty roof deck screws specially made for attachment to steel decks of length and gauge required per FM Data Sheet 1-29, with corrosion resistant coating and stress plates.
- F. Roofing Nails: G-90 Galvanized, hot dipped.
- G. Sealants: Silicone or polyurethane, and as recommended by membrane manufacturer.
- H. Penetrations: Prefabricated rubber boots for pipe and conduits with stainless steel seal band clamp. No "pitch pockets" or pourable sealant pockets are allowed.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify surfaces and site conditions are ready to receive Work; deck is clean and smooth, free of snow or ice; properly sloped.
- B. Verify roof openings, curbs, and protrusions through roof are solidly set; wood blocking and reglets are in place.

3.2 PREPARATION

- A. Insulation Application:
 - 1. Adhere first layer of insulation to deck. Embed second layer of insulation into insulation adhesive. Lay second layer of insulation with joints staggered from first layer.
 - 2. Minimum Total Insulation Thickness: 2 inches.
 - 3. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
 - 4. Tape joints of insulation if recommended by manufacturer.
- B. Install cover board over insulation. Lay with long side at right angle to insulation. Stagger end joints. Mechanically fasten sheathing into steel deck in accordance with FM requirements.
- C. Membrane Application:
 - 1. Apply membrane, fully adhered.
 - 2. Apply adhesive as recommended by the manufacturer.
 - 3. Roll out membrane free from air bubbles, wrinkles, or tears. Bond sheet to substrate except those areas directly over or within 3 inches of control or expansion joint. Firmly press sheet into place without stretching.
 - 4. Seal membrane to adjoining surfaces.
 - 5. Shingle joints on sloped substrate in direction of drainage. Apply joint sealant / seaming tape.
 - 6. Continue membrane up vertical surfaces minimum 12 inches unless otherwise noted. Continue membrane over the top and front of roof edges and parapets and under metal edge flashing. Reinforce membrane with multiple thickness of membrane material over joints.
 - 7. Apply roof expansion joint materials to isolate new addition from existing building as shown on the drawings.
- D. Flashings And Accessories:
 - 1. Apply flexible flashings to seal membrane to vertical elements.
 - 2. Install prefabricated roofing expansion joint to isolate new and existing buildings.
 - 3. Coordinate installation of mechanical and electrical components and related flashings.
 - 4. Seal flashings and flanges of items penetrating membrane.



GREENHALGE ELEMENTARY SCHOOL
MASONRY AND ROOF REPAIR

148 FENNEL STREET
LOWELL, MA
PREPARED FOR:
LOWELL PUBLIC SCHOOLS

MARK	DATE	DESCRIPTION
A	08-06-14	ISSUED FOR BID

PROJECT NO: 14401-04
MODEL FILE: A4.dwg
DRAWN BY: LSP
CHKD BY: POB
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SHEET TITLE
SPECIFICATION

Plot Date: 8/1/2014 4:06:46 PM File Path: J:\01 Projects\1400X\14401-04 Lowell Public Schools Roof\11.0 Working Files\Greenhalge\11.1 Drawings\11.1 Sheet Files\A-4.dwg