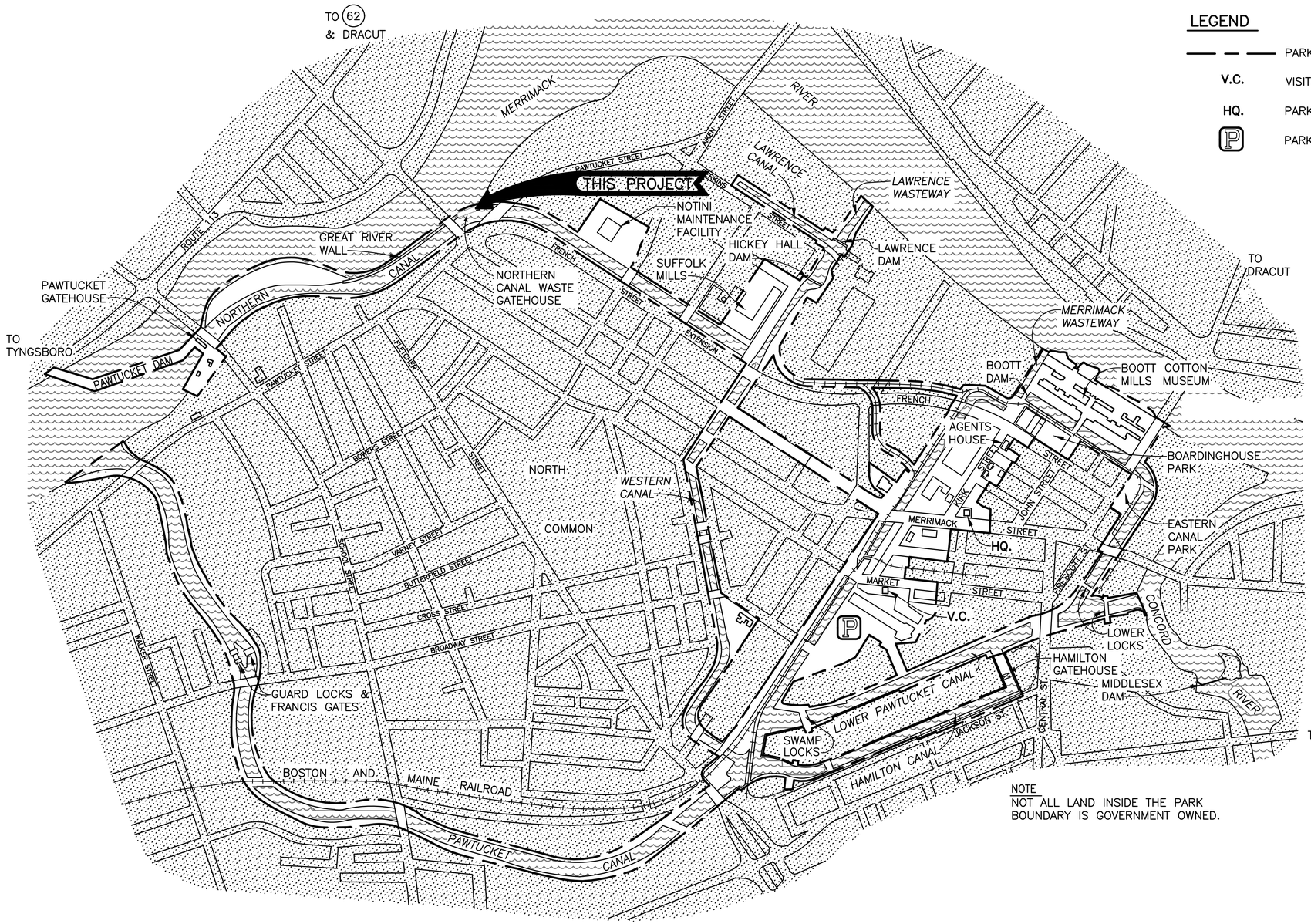
LOWELL NATIONAL HISTORICAL PARK

FACILITY EX CONDITION PHOTOGRAPHS:
GUARD GATE SLUICE GATEHOUSE (GUARD DAM) 2020

PHOTO 06: LOWER GATEHOUSE DOOR AND WASHED OUT GRANITE STEPS

PHOTO 07: DETAIL AT LOWER GATEHOUSE DOOR

REHABILITATE NORTHERN CANAL WASTE GATEHOUSE

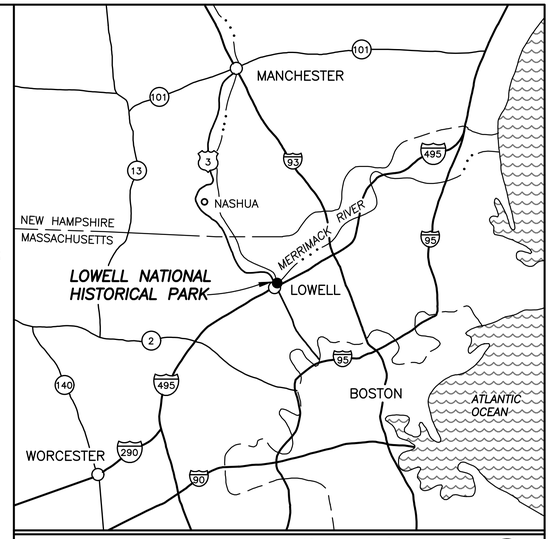


LEGEND

- PARK BOUNDARY
- V.C. VISITOR CENTER
- HQ. PARK HEADQUARTERS
- P PARKING

NOTE
NOT ALL LAND INSIDE THE PARK BOUNDARY IS GOVERNMENT OWNED.

SITE LOCATION MAP



SITE VICINITY MAP 10 0 10 SCALE OF MILES

LIST OF DRAWINGS

SHEET	SUB SHEET	TITLE OF SHEET
1	T1	COVER SHEET
Architectural Drawings		
2	A1	SITE PLAN/STAGING PLAN
3	A2	ROOF PLAN AND DETAILS
4	A3	ELEVATIONS AND SECTION
5	A4	EXISTING CONDITIONS PHOTOGRAPHS
6	A5	EXISTING CONDITIONS PHOTOGRAPHS
Structural Drawings		
7	S1	GENERAL NOTES, ABBREVIATIONS AND DESIGN CRITERIA
8	S2	EXISTING CONDITIONS FLOOR PLAN AND FRAMING PLAN
9	S3	SECTIONS AND DETAILS
10	S4	SECTIONS AND DETAILS
11	S5	SECTIONS AND DETAILS

BLDG. TRUE

LOWELL NATIONAL HISTORICAL PARK

100% CONSTRUCTION DOCUMENTS
06/28/2018

EYP, AE – C4526101001	Mark	Sheet	REVISION	Date	Initial
PRIME/ A.E: EYP INC. INDEPENDENCE WHARF 470 ATLANTIC AVE. – SEVENTH FLOOR BOSTON, MASSACHUSETTS 02210					

QUALITY DESIGN CERTIFICATION

- ☐ Prepared in Accordance with Design Development (Title I) ____ Drawing No.
  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

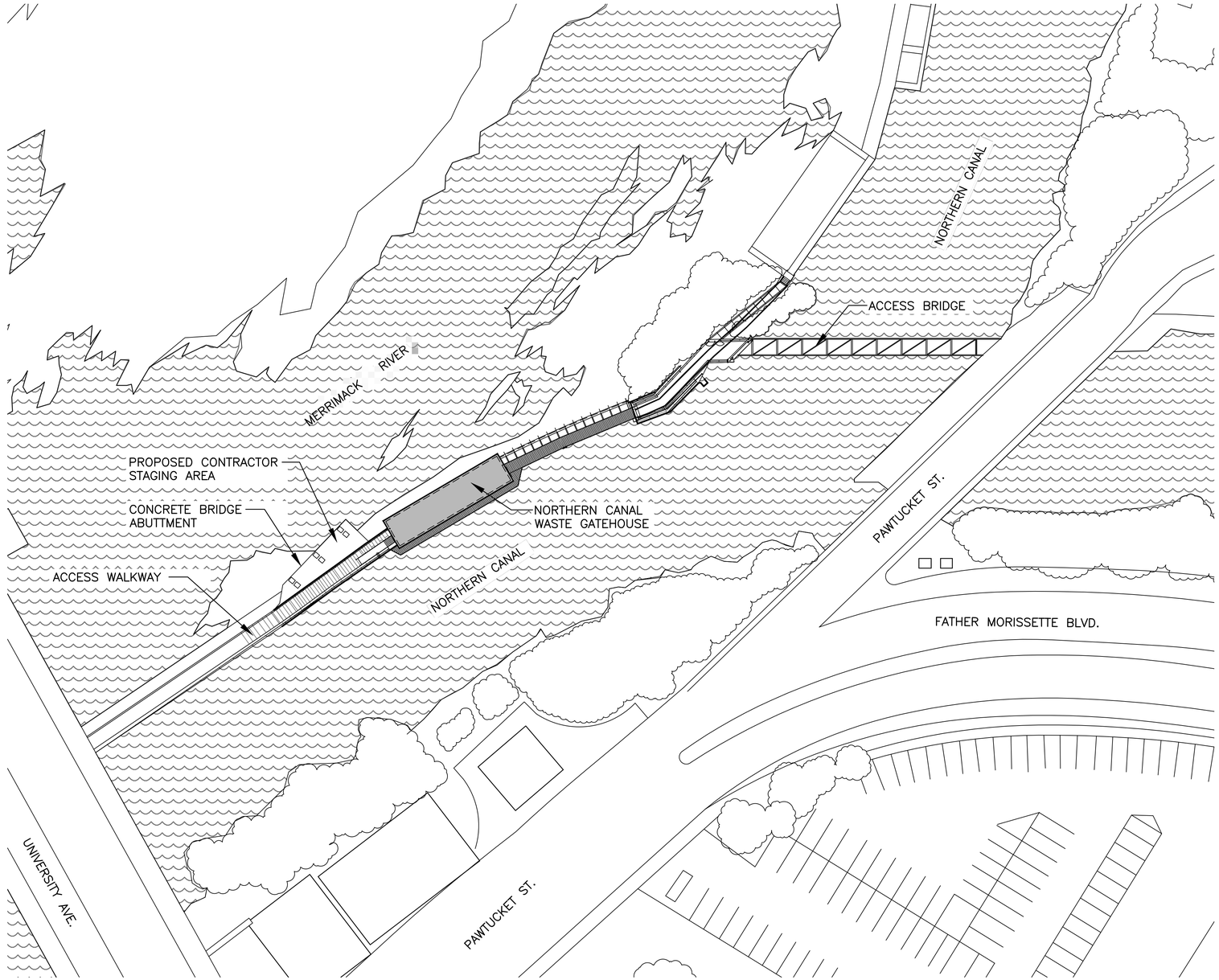
CONSTRUCTION DRAWINGS

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
PLANNING FACILITIES & CONSERVATION ASSISTANCE
NORTHEAST REGIONAL OFFICE

TITLE OF PROJECT
REHABILITATE NORTHERN CANAL WASTE GATEHOUSE
LOCATION WITHIN PARK
LOWELL, MASSACHUSETTS
NAME OF PARK
LOWELL NATIONAL HISTORICAL PARK

REGION	COUNTY	STATE
NORTH EAST	LOWELL	MASSACHUSETTS

DRAWING NO. 475 142661
PMIS/PKG NO. 225866
SHEET 1 OF 11



1 / A1 SITE PLAN / STAGING PLAN

SCALE (A)

SCALE (A) 32 0 32 64

SCALE OF FEET

DESIGNED: MK DRAWN: CV TECH. REVIEW: MK DATE: 06/28/2018	SUB SHEET NO. A1	TITLE OF SHEET SITE PLAN / STAGING PLAN REHABILITATE NORTHERN CANAL WASTE GATEHOUSE LOWELL NATIONAL HISTORICAL PARK, MASSACHUSETTS	DRAWING NO. 475 / 142661 PMIS/PKG NO. 255866 SHEET 2 OF 11

KEYED WORK ITEM NOTES

ALL MATERIALS REFERENCED IN THESE WORK ITEMS ARE EXISTING UNLESS IDENTIFIED AS NEW. WORK ITEM TAGS INDICATE APPROXIMATE LOCATIONS FOR REPAIR. CONTRACTOR TO FIELD VERIFY.

1 — REMOVE ADHERED SINGLE PLY EPDM ROOF MEMBRANE AND ANY COVERBOARD MATERIAL DOWN TO ROOF BOARDS. REPLACE DETERIORATED ROOF BOARDS. REPLACEMENT BOARDS TO MATCH EXISTING, FIELD VERIFY. REMOVE PERIMETER METAL DRIP EDGE IN ITS ENTIRETY.

2 — REMOVE AND STORE WOOD WALKWAY DECKING BOARDS AS REQUIRED TO FACILITATE WORK TO THE SOUTH WALL. REINSTALL DECKING BOARDS AFTER WORK TO THE SOUTH WALL IS COMPLETE.

3 — REMOVE DETERIORATED WOOD SILL ALONG ENTIRE LENGTH OF BOTH THE SOUTH WALL AND NORTH WALL.

4 — TEMPORARILY SHORE BUILDING AND INSTALL NEW STEEL FRAMING TO TRANSFER LOADS OF HEAVY TIMBER POSTS AND WALL STUDS DIRECTLY TO TOP OF MASONRY DAM.

5 — PROVIDE NEW ROOF SYSTEM CONSISTING OF FULLY ADHERED EPDM ROOF MEMBRANE ON MECHANICALLY FASTENED ½" COVERBOARD ON EXISTING ROOF BOARDS.

6 — REHABILITATE (8) NON–HISTORIC WOOD WINDOWS ON NORTH WALL; PAINT TO MATCH EXISTING.

7 — REMOVE AND SALVAGE NON–HISTORIC SHORING POSTS AND ANY ASSOCIATED STEEL SUPPORT BEAMS. STORE ON–SITE FOR RETRIEVAL BY THE CONTRACTING OFFICER.

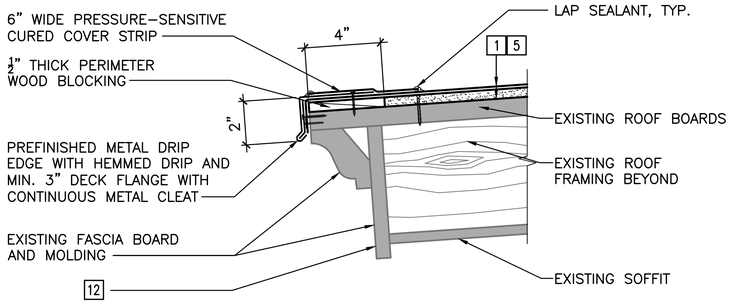
8 — PROVIDE NEW WOOD SIDING AND WALL BOARDS AT BASE OF EAST END OF NORTH WALL.

9 — REMOVE AND SALVAGE NON–HISTORIC CABLES AND ASSOCIATED STEEL SUPPORT BRACING. STORE ON–SITE FOR RETRIEVAL BY THE CONTRACTING OFFICER.

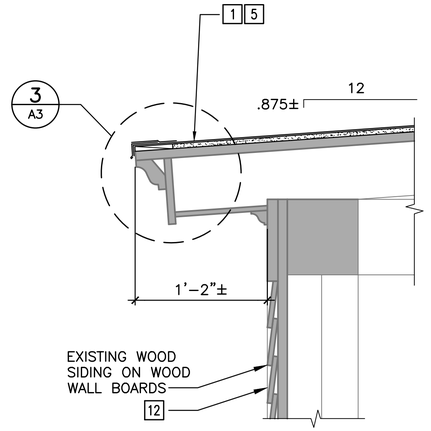
10 — MODIFY BOTH WOOD LADDERS TO ACCOMMODATE CHANGE IN FLOOR ELEVATION DUE TO NEW WOOD DECKING.

11 — PROVIDE NEW WOOD DECKING OVER NEW STEEL FRAMING AT NORTH WALL.

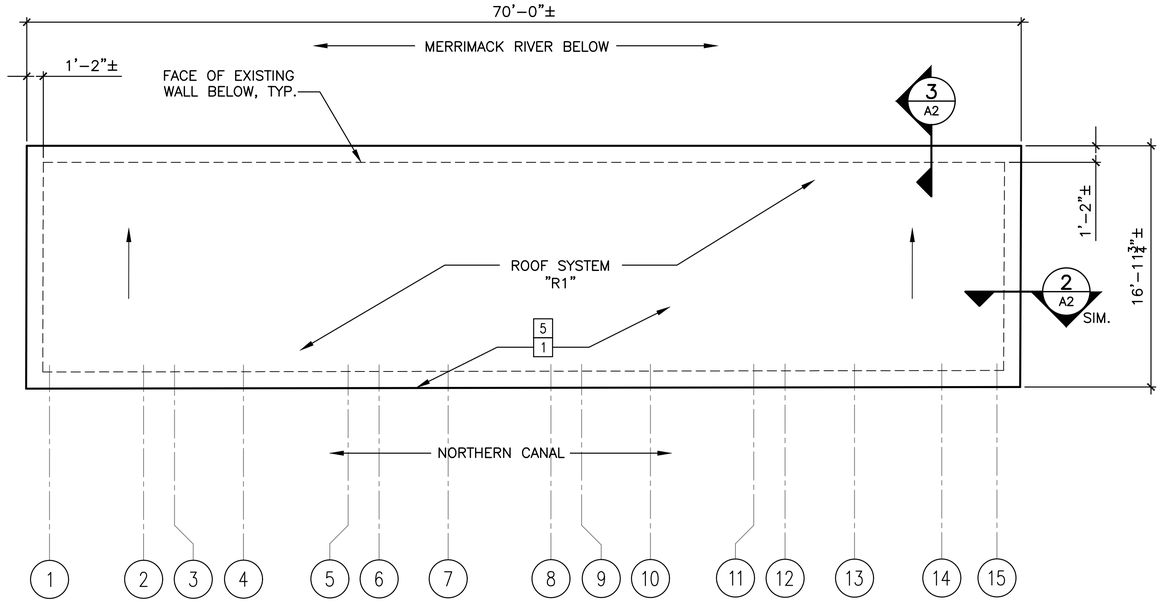
12 — REPAINT ENTIRE STRUCTURE; COLOR TO MATCH EXISTING.



3 / A2 ROOF EDGE DETAIL
SCALE Ⓓ



2 / A2 ROOF EAVE DETAIL, RAKE DETAIL SIMILAR
SCALE Ⓓ



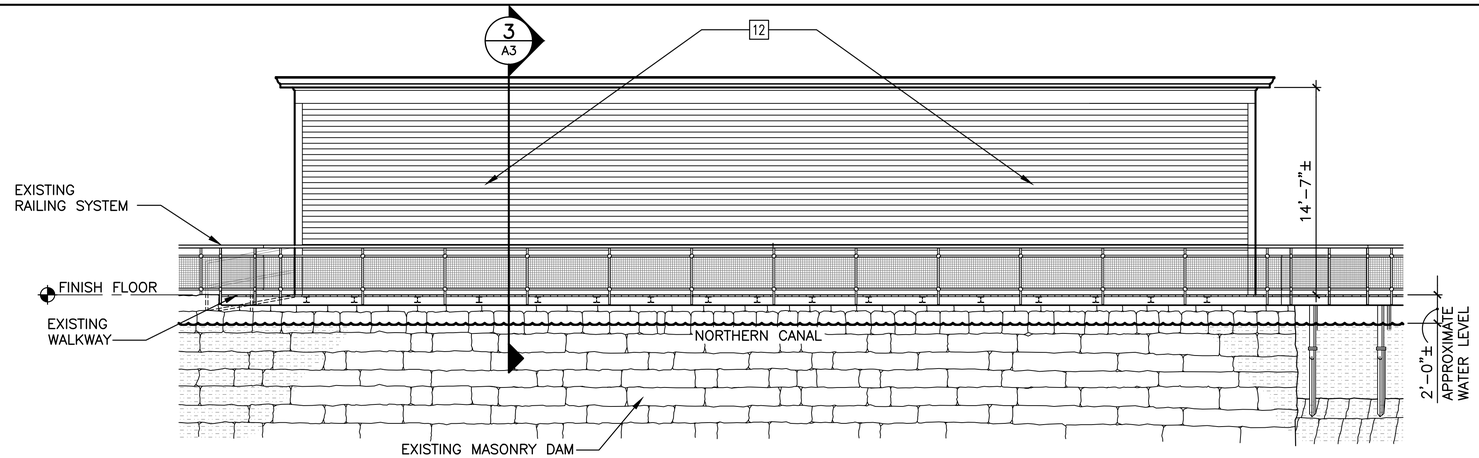
1 / A2 ROOF PLAN
SCALE Ⓑ

ROOF SYSTEM "R1": FULLY–ADHERED EPDM MEMBRANE ON MECHANICALLY–FASTENED ½" COVERBOARD ON EXISTING ROOF BOARDS.

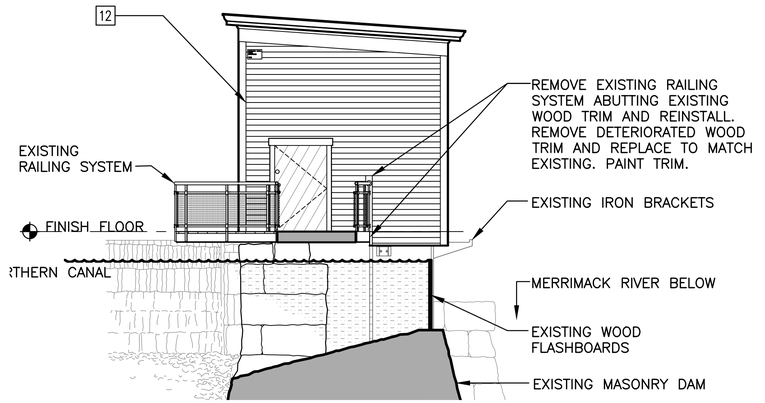
SCALE Ⓓ 6 3 0 6 SCALE OF INCHES

SCALE Ⓑ 4 0 4 8 12 SCALE OF FEET

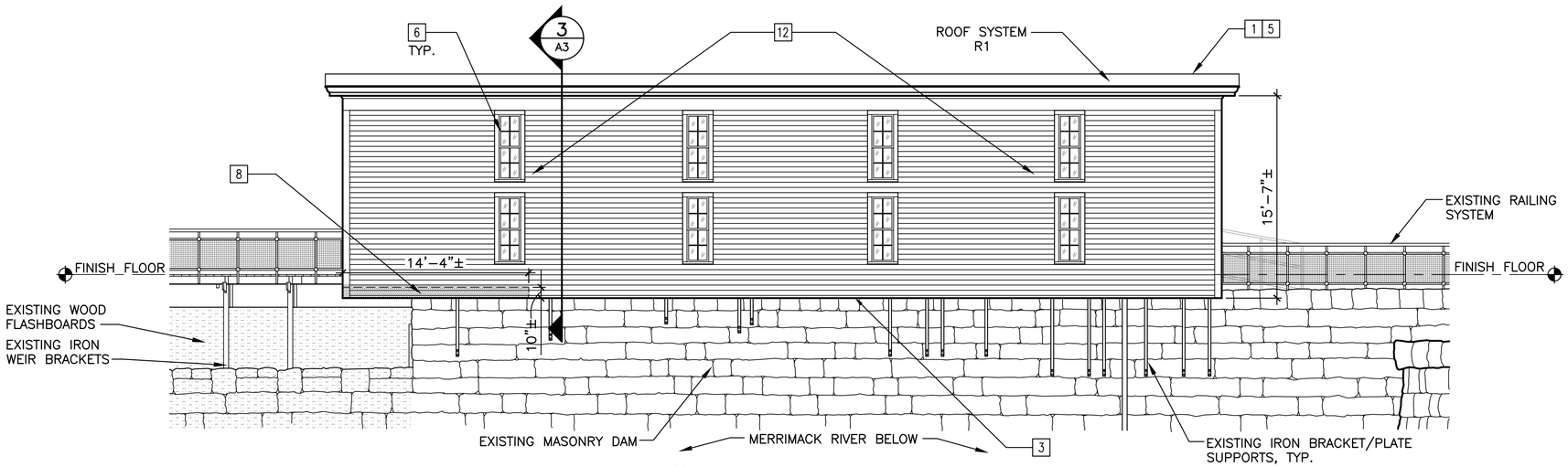
DESIGNED: MK DRAWN: CV TECH. REVIEW: MK DATE: 06/28/2018	SUB SHEET NO. A2	TITLE OF SHEET: ROOF PLAN AND DETAILS REHABILITATE NORTHERN CANAL WASTE GATEHOUSE LOWELL NATIONAL HISTORICAL PARK, MASSACHUSETTS	DRAWING NO. 475 / 142661 PMIS/PKG NO. 255866 SHEET 3 OF 11



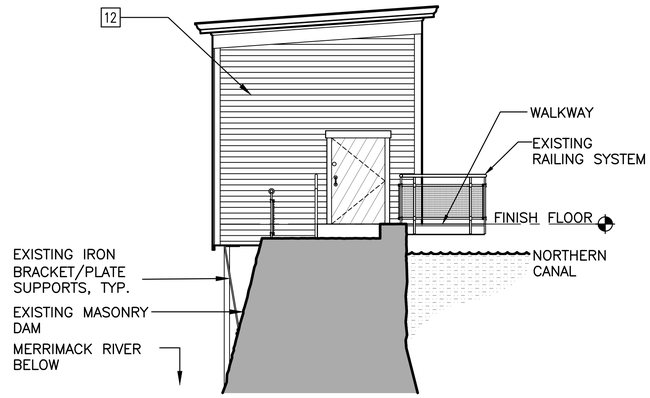
5 A3 SOUTH ELEVATION
SCALE (B)



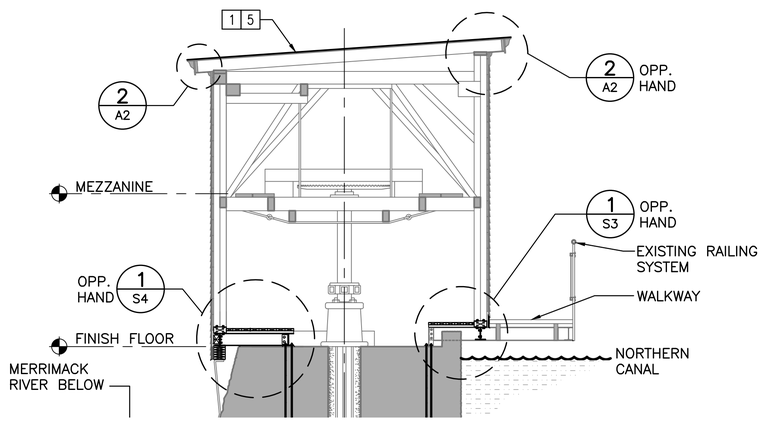
2 A3 EAST ELEVATION
SCALE (B)



4 A3 NORTH ELEVATION
SCALE (B)



1 A3 WEST ELEVATION
SCALE (B)



3 A3 BUILDING SECTION
SCALE (E)

KEYED WORK ITEM NOTES

ALL MATERIALS REFERENCED IN THESE WORK ITEMS ARE EXISTING UNLESS IDENTIFIED AS NEW. WORK ITEM TAGS INDICATE APPROXIMATE LOCATIONS FOR REPAIR. CONTRACTOR TO FIELD VERIFY.

1. REMOVE ADHERED SINGLE PLY EPDM ROOF MEMBRANE AND ANY COVERBOARD MATERIAL DOWN TO ROOF BOARDS. REPLACE DETERIORATED ROOF BOARDS. REPLACEMENT BOARDS TO MATCH EXISTING, FIELD VERIFY. REMOVE PERIMETER METAL DRIP EDGE IN ITS ENTIRETY.
2. REMOVE AND STORE WOOD WALKWAY DECKING BOARDS AS REQUIRED TO FACILITATE WORK TO THE SOUTH WALL. REINSTALL DECKING BOARDS AFTER WORK TO THE SOUTH WALL IS COMPLETE.
3. REMOVE DETERIORATED WOOD SILL ALONG ENTIRE LENGTH OF BOTH THE SOUTH WALL AND NORTH WALL.
4. TEMPORARILY SHORE BUILDING AND INSTALL NEW STEEL FRAMING TO TRANSFER LOADS OF HEAVY TIMBER POSTS AND WALL STUDS DIRECTLY TO TOP OF MASONRY DAM.
5. PROVIDE NEW ROOF SYSTEM CONSISTING OF FULLY ADHERED EPDM ROOF MEMBRANE ON MECHANICALLY FASTENED ½" COVERBOARD ON EXISTING ROOF BOARDS.
6. REHABILITATE (8) NON-HISTORIC WOOD WINDOWS ON NORTH WALL; PAINT TO MATCH EXISTING.
7. REMOVE AND SALVAGE NON-HISTORIC SHORING POSTS AND ANY ASSOCIATED STEEL SUPPORT BEAMS. STORE ON-SITE FOR RETRIEVAL BY THE CONTRACTING OFFICER.
8. PROVIDE NEW WOOD SIDING AND WALL BOARDS AT BASE OF EAST END OF NORTH WALL.
9. REMOVE AND SALVAGE NON-HISTORIC CABLES AND ASSOCIATED STEEL SUPPORT BRACING. STORE ON-SITE FOR RETRIEVAL BY THE CONTRACTING OFFICER.
10. MODIFY BOTH WOOD LADDERS TO ACCOMMODATE CHANGE IN FLOOR ELEVATION DUE TO NEW WOOD DECKING.
11. PROVIDE NEW WOOD DECKING OVER NEW STEEL FRAMING AT NORTH WALL.
12. REPAINT ENTIRE STRUCTURE; COLOR TO MATCH EXISTING.

SCALE (B) 4 0 4 8 12 SCALE OF FEET

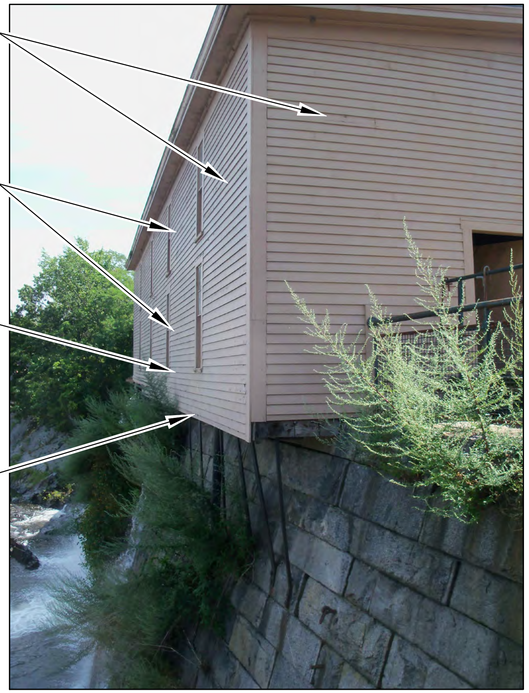
SCALE (E) 4 0 4 8 SCALE OF FEET

DESIGNED: CV	SUB SHEET NO. A3	TITLE OF SHEET: ELEVATIONS AND SECTION	DRAWING NO. 475 142661
DRAWN: CV		REHABILITATE NORTHERN CANAL WASTE GATEHOUSE	PMIS/PKG NO. 255866
TECH. REVIEW: MK		LOWELL NATIONAL HISTORICAL PARK, MASSACHUSETTS	SHEET 4 OF 11
DATE: 06/28/2018			

1/A4 PHOTO 1 @ SOUTHEAST ELEVATION

2/A4 PHOTO 2 @ INTERIOR LOOKING WEST

3/A4 PHOTO 3 @ SILL UNDER NORTH WALL



4/A4 PHOTO 4 @ NORTHWEST ELEVATION

5/A4 PHOTO 5 @ ROOF LOOKING WEST

EXISTING CONDITION PHOTOGRAPHS NOTES:

1. PHOTOGRAPHS MAY NOT INDICATE ALL WORK ITEMS IN AREA WHERE PHOTOGRAPH WAS TAKEN.

KEYED WORK ITEM NOTES

ALL MATERIALS REFERENCED IN THESE WORK ITEMS ARE EXISTING UNLESS IDENTIFIED AS NEW. WORK ITEM TAGS INDICATE APPROXIMATE LOCATIONS FOR REPAIR. CONTRACTOR TO FIELD VERIFY.

1 — REMOVE ADHERED SINGLE PLY EPDM ROOF MEMBRANE AND ANY COVERBOARD MATERIAL DOWN TO ROOF BOARDS. REPLACE DETERIORATED ROOF BOARDS. REPLACEMENT BOARDS TO MATCH EXISTING, FIELD VERIFY. REMOVE PERIMETER METAL DRIP EDGE IN ITS ENTIRETY.

2 — REMOVE AND STORE WOOD WALKWAY DECKING BOARDS AS REQUIRED TO FACILITATE WORK TO THE SOUTH WALL. REINSTALL DECKING BOARDS AFTER WORK TO THE SOUTH WALL IS COMPLETE.

3 — REMOVE DETERIORATED WOOD SILL ALONG ENTIRE LENGTH OF BOTH THE SOUTH WALL AND NORTH WALL.

4 — TEMPORARILY SHORE BUILDING AND INSTALL NEW STEEL FRAMING TO TRANSFER LOADS OF HEAVY TIMBER POSTS AND WALL STUDS DIRECTLY TO TOP OF MASONRY DAM.

5 — PROVIDE NEW ROOF SYSTEM CONSISTING OF FULLY ADHERED EPDM ROOF MEMBRANE ON MECHANICALLY FASTENED ½" COVERBOARD ON EXISTING ROOF BOARDS.

6 — REHABILITATE (8) NON-HISTORIC WOOD WINDOWS ON NORTH WALL; PAINT TO MATCH EXISTING.

7 — REMOVE AND SALVAGE NON-HISTORIC SHORING POSTS AND ANY ASSOCIATED STEEL SUPPORT BEAMS. STORE ON-SITE FOR RETRIEVAL BY THE CONTRACTING OFFICER.

8 — PROVIDE NEW WOOD SIDING AND WALL BOARDS AT BASE OF EAST END OF NORTH WALL.

9 — REMOVE AND SALVAGE NON-HISTORIC CABLES AND ASSOCIATED STEEL SUPPORT BRACING. STORE ON-SITE FOR RETRIEVAL BY THE CONTRACTING OFFICER.

10 — MODIFY BOTH WOOD LADDERS TO ACCOMMODATE CHANGE IN FLOOR ELEVATION DUE TO NEW WOOD DECKING.

11 — PROVIDE NEW WOOD DECKING OVER NEW STEEL FRAMING AT NORTH WALL.

12 — REPAINT ENTIRE STRUCTURE; COLOR TO MATCH EXISTING.

DESIGNED: CV DRAWN: CV TECH. REVIEW: MK DATE: 06/28/2018	SUB SHEET NO. A4	TITLE OF SHEET EXISTING CONDITIONS PHOTOGRAPHS REHABILITATE NORTHERN CANAL WASTE GATEHOUSE LOWELL NATIONAL HISTORICAL PARK, MASSACHUSETTS	DRAWING NO. 475 142661 PMIS/PKG NO. 255866 SHEET 5 OF 11

6 A5 PHOTO 6 @ SOUTHEAST ELEVATION

7 A5 PHOTO 7 @ UNDERSIDE OF WALKWAY LOOKING WEST

8 A5 PHOTO 8 @ WALKWAY WITH DECKING REMOVED

9 A5 PHOTO 9 @ FRAME 12

KEYED WORK ITEM NOTES

ALL MATERIALS REFERENCED IN THESE WORK ITEMS ARE EXISTING UNLESS IDENTIFIED AS NEW. WORK ITEM TAGS INDICATE APPROXIMATE LOCATIONS FOR REPAIR. CONTRACTOR TO FIELD VERIFY.

1. REMOVE ADHERED SINGLE PLY EPDM ROOF MEMBRANE AND ANY COVERBOARD MATERIAL DOWN TO ROOF BOARDS. REPLACE DETERIORATED ROOF BOARDS. REPLACEMENT BOARDS TO MATCH EXISTING, FIELD VERIFY. REMOVE PERIMETER METAL DRIP EDGE IN ITS ENTIRETY.
2. REMOVE AND STORE WOOD WALKWAY DECKING BOARDS AS REQUIRED TO FACILITATE WORK TO THE SOUTH WALL. REINSTALL DECKING BOARDS AFTER WORK TO THE SOUTH WALL IS COMPLETE.
3. REMOVE DETERIORATED WOOD SILL ALONG ENTIRE LENGTH OF BOTH THE SOUTH WALL AND NORTH WALL.
4. TEMPORARILY SHORE BUILDING AND INSTALL NEW STEEL FRAMING TO TRANSFER LOADS OF HEAVY TIMBER POSTS AND WALL STUDS DIRECTLY TO TOP OF MASONRY DAM.
5. PROVIDE NEW ROOF SYSTEM CONSISTING OF FULLY ADHERED EPDM ROOF MEMBRANE ON MECHANICALLY FASTENED ½" COVERBOARD ON EXISTING ROOF BOARDS.
6. REHABILITATE (8) NON-HISTORIC WOOD WINDOWS ON NORTH WALL; PAINT TO MATCH EXISTING.
7. REMOVE AND SALVAGE NON-HISTORIC SHORING POSTS AND ANY ASSOCIATED STEEL SUPPORT BEAMS. STORE ON-SITE FOR RETRIEVAL BY THE CONTRACTING OFFICER.
8. PROVIDE NEW WOOD SIDING AND WALL BOARDS AT BASE OF EAST END OF NORTH WALL.
9. REMOVE AND SALVAGE NON-HISTORIC CABLES AND ASSOCIATED STEEL SUPPORT BRACING. STORE ON-SITE FOR RETRIEVAL BY THE CONTRACTING OFFICER.
10. MODIFY BOTH WOOD LADDERS TO ACCOMMODATE CHANGE IN FLOOR ELEVATION DUE TO NEW WOOD DECKING.
11. PROVIDE NEW WOOD DECKING OVER NEW STEEL FRAMING AT NORTH WALL.
12. REPAINT ENTIRE STRUCTURE; COLOR TO MATCH EXISTING.

EXISTING CONDITION PHOTOGRAPHS NOTES:

1. PHOTOGRAPHS MAY NOT INDICATE ALL WORK ITEMS IN AREA WHERE PHOTOGRAPH WAS TAKEN.

DESIGNED: CV DRAWN: CV TECH. REVIEW: MK DATE: 06/28/2018	SUB SHEET NO. A5	TITLE OF SHEET EXISTING CONDITIONS PHOTOGRAPHS REHABILITATE NORTHERN CANAL WASTE GATEHOUSE LOWELL NATIONAL HISTORICAL PARK, MASSACHUSETTS	DRAWING NO. 475 142661 PMIS/PKG NO. 255866 SHEET 6 OF 11

WOOD AND TIMBER NOTES:

T1 REFER TO DIVISION 6 SPECIFICATION SECTION – ROUGH CARPENTRY – FOR REQUIREMENTS IN ADDITION TO THOSE LISTED BELOW.

T2 SAWN STRUCTURAL LUMBER SHALL BE STRESS–GRADED, KILN DRIED DOUGLAS FIR, DOUGLAS FIR/LARCH, HEM–FIR OR SPRUCE–PINE–FIR (SPF), NO. 2 OR BETTER.

T3 THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL STORAGE AND ERECTION PROCEDURES AND SEQUENCES TO PREVENT ANY ADVERSE EFFECTS ON THE SPECIFIED PHYSICAL PROPERTIES OF THE MEMBERS.

T4 THERE SHALL BE NO FIELD CUTTING OF STRUCTURAL MEMBERS WITHOUT THE PRIOR REVIEW OF THE CONTRACTING OFFICER.

COORDINATION WITH ENEL GREEN POWER NORTH AMERICA (E.G.P.N.A.)

CC1 CONTRACTOR SHALL COORDINATE THE WORK WITH E.G.P.N.A., INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

- USE OF THE CANAL BY THE CONTRACTOR, INCLUDING BOAT LAUNCHES AND NAVIGATIONAL LOCKS.
- MAINTAINING ACCESS TO THE CANAL DURING THE WORK FOR E.G.P.N.A.
- MAINTENANCE ACTIVITIES OF E.G.P.N.A., INCLUDING PLANNED AND/OR UNPLANNED TIMES WHEN THE CANAL WILL BE LOWERED OR DEWATERED.

STRUCTURAL STEEL FRAMING NOTES:

S1 REFER TO DIVISION 5 SPECIFICATION SECTION – MISCELLANEOUS STRUCTURAL STEEL FRAMING – FOR REQUIREMENTS IN ADDITION TO THOSE LISTED BELOW.

S2 A QUALITY CONTROL PROGRAM OF SHOP AND FIELD TESTING AND INSPECTION SHALL BE PERFORMED ON STRUCTURAL STEEL FABRICATION, ERECTION AND CONNECTIONS IN ACCORDANCE WITH THE SPECIFICATIONS. SCHEDULE WORK AND PROVIDE ACCESS TO ALLOW THE TESTING REQUIREMENTS TO BE COMPLETED.

S3 DETAIL, FABRICATE AND ERECT STRUCTURAL STEEL IN CONFORMANCE WITH THE APPLICABLE EDITIONS OF THE AISC SPECIFICATIONS AND CODES.

S4 PERFORM ALL WELDING USING CERTIFIED WELDERS AND IN ACCORDANCE WITH THE APPLICABLE EDITION OF THE AWS "STRUCTURAL WELDING CODE – STEEL." COMPLY WITH AISC SPECIFICATION SECTION J2 FOR MINIMUM FILLET WELD SIZE UNLESS SPECIFICALLY NOTED ON THE DRAWINGS.

S5 SUBMIT ENGINEERED AND CHECKED SHOP DRAWINGS TO THE CONTRACTING OFFICER FOR REVIEW. SHOW SHOP FABRICATION DETAILS, FIELD ASSEMBLY DETAILS, AND ERECTION DIAGRAMS FOR ALL STRUCTURAL STEEL. SCHEDULE SUBMISSIONS TO ALLOW ADEQUATE TIME FOR REVIEW PRIOR TO FABRICATION.

S6 PROVIDE CONNECTION DETAILS REQUIRED BY THE SPECIFIC CONSTRUCTION SEQUENCES.

S7 FABRICATE ALL MEMBERS WITH THE NATURAL CAMBER UP. CANTILEVERED BEAMS SHALL BE FABRICATED SO THAT THE NATURAL CAMBER RAISES THE CANTILEVERED END.

S8 AFTER FABRICATION, CLEAN STEEL OF ALL RUST, LOOSE MILL SCALE, DIRT, OIL, GREASE OR OTHER FOREIGN MATERIAL.

S9 DO NOT FIELD CUT ANY STRUCTURAL STEEL WITHOUT THE PRIOR REVIEW AND ACCEPTANCE OF THE CONTRACTING OFFICER. CLEARLY SHOW ON THE SHOP DRAWINGS SUBMITTED FOR REVIEW ANY MEMBER OPENINGS REQUIRED BY OTHER TRADES.

S10 ERECTION PROCEDURES, SEQUENCES AND COORDINATION OF WORK WITH OTHER TRADES IS THE RESPONSIBILITY OF THE CONTRACTOR. PROVIDE ANY ADDITIONAL STEEL REQUIRED FOR ERECTION PURPOSES AT NO COST TO THE OWNER. REMOVE THIS ADDITIONAL STEEL UNLESS DIRECTED OTHERWISE BY THE CONTRACTING OFFICER IN WRITING.

S11 PROVIDE TEMPORARY BRACING AND SHORING FOR THE SAFETY, STABILITY AND ALIGNMENT OF THE STRUCTURE. LEAVE TEMPORARY BRACING IN PLACE FOR AS LONG AS NECESSARY. PERFORM FINAL BOLTING AND WELDING ONLY ON THOSE PORTIONS OF THE STRUCTURE THAT HAVE BEEN ALIGNED AND PLUMBED WITHIN THE SPECIFIED TOLERANCES.

S12 DO NOT FIELD CUT ANY STRUCTURAL STEEL WITHOUT THE PRIOR REVIEW AND ACCEPTANCE OF THE CONTRACTING OFFICER. CLEARLY SHOW ON THE SHOP DRAWINGS SUBMITTED FOR REVIEW ANY MEMBER OPENINGS REQUIRED BY OTHER TRADES.

S15 PROVIDE NEW MATERIAL CONFORMING TO THE FOLLOWING REQUIREMENTS FOR ALL STRUCTURAL STEEL:

MEMBER	GRADE
WIDE FLANGE SHAPES	ASTM A992
ANGLES, CONNECTION PLATES	ASTM A36
HIGH STRENGTH BOLTS, NUTS, AND WASHERS	ASTM A325
WELDING ELECTRODE	E70XX

GENERAL NOTES:

1. DOCUMENTS FOR THE WORK TO CONFORM WITH MASSACHUSETTS STATE BUILDING CODE.
2. DO NOT SCALE DRAWINGS. DIMENSIONAL DISCREPANCIES AND QUESTIONS SHALL BE DIRECTED TO THE GOVERNMENT REPRESENTATIVE.
3. ALL DIMENSIONS SHOWN ARE FEET AND INCHES UNLESS NOTED OTHERWISE. DIMENSIONS INDICATED WITH (±) REQUIRE FIELD VERIFICATION BY THE CONTRACTOR.
4. ANY FIELD CONDITIONS AFFECTING NEW WORK NOT CORRESPONDING TO THE DRAWINGS SHALL IMMEDIATELY BE REPORTED TO THE CONTRACTING OFFICER FOR RESOLUTION.
5. THESE DRAWINGS ARE PREPARED AND COORDINATED WITH FEDERAL ACQUISITION REGULATIONS, CONTRACT CLAUSES, SPECIAL CONTRACT REQUIREMENTS, DRAWINGS AND PROJECT MANUAL, TOGETHER THESE FORM THE CONSTRUCTION DOCUMENTS.

MISCELLANEOUS NOTES:

M1 VERIFY EXISTING CONDITIONS, DIMENSIONS, MATERIALS AND METHODS OF CONSTRUCTION PRIOR TO COMMENCING WORK.

M2 DETAILS INDICATE REQUIRED CONSTRUCTION AT SPECIFIC LOCATIONS. FOR THE LOCATIONS NOT SPECIFICALLY DETAILED, USE SIMILAR CONSTRUCTION TO THE MOST APPROPRIATE DETAIL.

TEMPORARY SHORING NOTES:

TS1 THE EXISTING STRUCTURE IS IN A STATE OF DETERIORATION.

TS2 CONTRACTOR SHALL SUBMIT A SHORING PLAN FOR REVIEW PRIOR TO BEGINNING WORK; THE SHORING PLAN SHALL INCLUDE THE FOLLOWING AS A MINIMUM:

A. PHOTOGRAPHIC DOCUMENTATION OF EXISTING CONDITIONS; THIS DOCUMENTATION WILL BE USED TO DETERMINE IF THE WORK HAS CAUSED ANY DAMAGES.
B. MEASURES TO PROTECT EXISTING FINISHES AND MATERIALS.
C. DRAWINGS AND CALCULATIONS PREPARED BY A PROFESSIONAL ENGINEER LICENSED IN MASSACHUSETTS.

TS3 EXISTING MATERIALS DAMAGED DURING THE WORK SHALL BE REPAIRED TO MATCH ADJACENT CONSTRUCTION.

DESIGN CRITERIA:

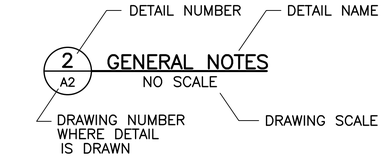
BUILDING CODE:
MASSACHUSETTS STATE BUILDING CODE, 780 CMR, 9TH EDITION
(BASED ON 2015 INTERNATIONAL BUILDING CODE)

LIVE LOAD:	
LEVEL 1	100 psf
MEZZANINE	20 psf
ROOF	20 psf
SNOW LOAD:	
GROUND SNOW LOAD, Pg	50 psf (TABLE 1604.11)
FLAT ROOF SNOW LOAD, Pf	42 psf
SNOW EXPOSURE FACTOR, Ce	1.0
SNOW LOAD IMPORTANCE FACTOR, Is	1.0
THERMAL FACTOR, Ct	1.2
WIND LOAD:	
BASIC WIND SPEED, (Vult, 3 SEC. GUST)	123 mph (TABLE 1604.11)
RISK CATEGORY	II
WIND EXPOSURE	C
INTERNAL PRESSURE COEFFICIENT, Gcpi	+/– 0.18
COMPONENTS AND CLADDING, Pasd	
ROOF SURFACE (ZONE 1)	+11.8/–29.2
ROOF EDGE (ZONE 2)	+11.8/–48.9
ROOF CORNER (ZONE 3)	+11.8/–73.5
WALL SURFACE (ZONE 4)	+29.2/–31.6
WALL EDGE (ZONE 5)	+29.2/–39.0
EARTHQUAKE DESIGN DATA:	
SITE CLASS (ASSUMED)	D
SEISMIC IMPORTANCE FACTOR, Ie	1.00
OCCUPANCY CATAGORY	II
SPECTRAL RESPONSE ACCELERATION, Ss	0.235 (TABLE 1604.11)
SPECTRAL RESPONSE ACCELERATION, S1	0.074 (TABLE 1604.11)
SPECTRAL RESPONSE COEFFICIENT, Sds	0.251
SPECTRAL RESPONSE COEFFICIENT, Sd1	0.109
SEISMIC DESIGN CATEGORY	B
BASIC SEISMIC–FORCE–RESISTING SYSTEM	LIGHT–FRAMED WALLS WITH SHEAR PANELS OF ALL OTHER MATERIALS
DESIGN BASE SHEAR, V	10 KIPS
SEISMIC RESPONSE COEFFICIENT, Cs	0.132
RESPONSE MODIFICATION FACTOR, R	2.5
ANALYSIS PROCEDURE	EQUIVALENT LATERAL FORCE PROCEDURE

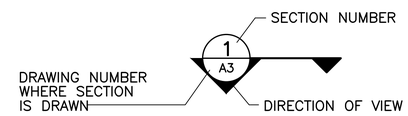
SPECIAL INSPECTION NOTES:

SI1 SPECIAL INSPECTIONS REQUIRED BY THE MASSACHUSETTS STATE BUILDING CODE SHALL BE PERFORMED BY THE SPECIAL INSPECTOR FOR THE FOLLOWING ITEMS:
- STEEL: BOLTED CONNECTIONS (BC 1705.2)

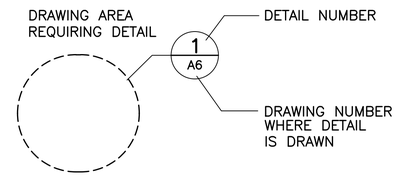
SI2 THE SPECIAL INSPECTOR SHALL FILE ALL APPROPRIATE FORMS WITH THE BUILDING DEPARTMENT.



DETAIL TITLE ON DETAIL DRAWING



SECTION INDICATION



DETAIL INDICATION

3 S1 DESIGN CRITERIA, GENERAL NOTES

ACOUS	ACOUSTICAL	D	DRAIN	GA	GAGE	MAX	MAXIMUM	QTY	QUANTITY	T/	TOP OF
ADJ	ADJACENT	DEMO	DEMOLISH	GALV	GALVANIZED	MECH	MECHANICAL	R	RISER, RADIUS	T&B	TOP & BOTTOM
AFF	ABOVE FINISHED FLOOR	DET	DETAIL	GED	GOOSENECK EXPOSED DUCT	MIN	MINIMUM	RAD	RADIUS	TEL	TELEPHONE
ALUM	ALUMINUM	DIA	DIAMETER	GWB	GYPSUM WALL BOARD	MO	MASONRY OPENING	RD	ROOF DRAIN	THK	THICK(NESS)
APPD	APPROVED	DIM	DIMENSION	GYP	GYPSUM	MTD	MOUNTED	REFL	REFLECTED	TGV	TURBINE GRAVITY VENT
ARCH	ARCHITECT(URE,URAL)	DS	DOWNSPOUT	HC	HOLLOW CORE	N	NORTH	REINF	REINFORCE(ED, MENT)	THR	THRESHOLD
ASPH	ASPHALT	DWG	DRAWING	HDWD	HARDWOOD	NIC	NOT IN CONTRACT	REQD	REQUIRED	TOS	TOP OF SLAB
BLDG	BUILDING	EA	EACH	HM	HOLLOW METAL	NOM	NOMINAL	RM	ROOM	TOW	TOP OF WALL
BLKG	BLOCKING	EF	EXHAUST FAN	HOR	HORIZONTAL	NTS	NOT TO SCALE	RO	ROUGH OPENING	TPO	THERMOPLASTIC POLYOLEFIN
BOT	BOTTOM	EJ	EXPANSION JOINT	HP	HIGH POINT	OC	ON CENTER	SC	SOLID CORE	TYP	TYPICAL
BRK	BRICK	EL	ELEVATION	HT	HEIGHT	OD	OUTSIDE DIAMETER	SHED	SCHEDULE(D)	UL	UNDERWRITERS LABORATORIES
BUR	BUILT–UP ROOF	ELEC	ELECTRICAL	HWD	HARDWOOD	OPG	OPENING	SECT	SECTION	UNFIN	UNFINISHED
C	CONDUIT	ELEV	ELEVATOR OR ELEVATION	ID	INSIDE DIAMETER	OPP	OPPOSITE	SF	SQUARE FEET	UNO	UNLESS NOTED OTHERWISE
CI	CAST IRON	EP	ELECTRICAL PANEL BOARD	IN	INCH	OZ	OUNCE	SHT	SHEET	VAR	VARIES
CJ	CONTROL JOINT	EQ	EQUAL	I.E.	THAT IS	P	POLE	SIM	SIMILAR	VERT	VERTICAL
CLG	CEILING	EQPT	EQUIPMENT	INSUL	INSULAT(E, D, ION)	PB	PULLBOX	SPEC	SPECIFICATIONS	VIF	VENT THROUGH ROOF MEMBRANE ROOF
CLL	CONTRACT LIMIT LINE	ETR	EXISTING TO REMAIN	INT	INTERIOR	PH	PHASE	SQ	SQUARE	VTRS	VENT THROUGH ROOF SHINGLES
CLR	CLEAR(ANCE)	EXIST	EXISTING	JB	JUNCTION BOX	PIL	PILASTER	SS	STAINLESS STEEL	VTR	
CMU	CONCRETE MASONRY UNIT	EXP	EXPANSION	JT	JOINT	PL	PLATE	STD	STANDARD	W/	WITH
COL	COLUMN	FE	FIRE EXTINGUISHER	LCC	LEAD COATED COPPER	PLAS	PLASTER	STL	STEEL	W/O	WITHOUT
CONC	CONCRETE	FF	FINISHED FLOOR	LP	LOW POINT	PLYWD	PLYWOOD	STRUCT	STRUCTURAL	WD	WOOD
CONT	CONTINU(OUS, ATION)	FIN	FINISH(ED)	LPDC	LIGHTNING PROTECTION DOWN CONDUCTOR	PNL	PANEL	SUSP	SUSPENDED	WP	WATERPROOF / WORKING POINT
COORD	COORDINATE	FL, FLR	FLOOR			PT	PRESSURE TREATED			WWF	WELDED WIRE FABRIC
CRS	COURSE	FOB	FACE OF BRICK			PTD	PAINT(ED)				
		FOC	FACE OF CONCRETE								
		FT	FEET, FOOT								

4 S1 ABBREVIATIONS

EXISTING CONSTRUCTION
EARTH
CONCRETE
ROUGH WOOD BLOCKING
GRANULAR FILL
PLYWOOD
FINISH WOOD
STEEL

2 S1 MATERIAL INDICATIONS

====== EXISTING ITEM TO BE REMOVED
2 — NEW WORK KEY NOTES
2 REVISION NUMBER
1 / A8 DETAIL OR SECTION

1 S1 SYMBOL LEGEND

DESIGNED: MK	SUB SHEET NO. S1	TITLE OF SHEET: GENERAL NOTES, ABBREVIATIONS AND DESIGN CRITERIA	DRAWING NO. 475 142661
DRAWN: CV		REHABILITATE NORTHERN CANAL WASTE GATEHOUSE	PMIS/PKG NO. 255866
TECH. REVIEW: MK		LOWELL NATIONAL HISTORICAL PARK, MASSACHUSETTS	SHEET 7 OF 11
DATE: 06/28/2018			

KEYED WORK ITEM NOTES

ALL MATERIALS REFERENCED IN THESE WORK ITEMS ARE EXISTING UNLESS IDENTIFIED AS NEW. WORK ITEM TAGS INDICATE APPROXIMATE LOCATIONS FOR REPAIR. CONTRACTOR TO FIELD VERIFY.

1 — REMOVE ADHERED SINGLE PLY EPDM ROOF MEMBRANE AND ANY COVERBOARD MATERIAL DOWN TO ROOF BOARDS. REPLACE DETERIORATED ROOF BOARDS. REPLACEMENT BOARDS TO MATCH EXISTING, FIELD VERIFY. REMOVE PERIMETER METAL DRIP EDGE IN ITS ENTIRETY.

2 — REMOVE AND STORE WOOD WALKWAY DECKING BOARDS AS REQUIRED TO FACILITATE WORK TO THE SOUTH WALL. REINSTALL DECKING BOARDS AFTER WORK TO THE SOUTH WALL IS COMPLETE.

3 — REMOVE DETERIORATED WOOD SILL ALONG ENTIRE LENGTH OF BOTH THE SOUTH WALL AND NORTH WALL.

4 — TEMPORARILY SHORE BUILDING AND INSTALL NEW STEEL FRAMING TO TRANSFER LOADS OF HEAVY TIMBER POSTS AND WALL STUDS DIRECTLY TO TOP OF MASONRY DAM.

5 — PROVIDE NEW ROOF SYSTEM CONSISTING OF FULLY ADHERED EPDM ROOF MEMBRANE ON MECHANICALLY FASTENED ½" COVERBOARD ON EXISTING ROOF BOARDS.

6 — REHABILITATE (8) NON-HISTORIC WOOD WINDOWS ON NORTH WALL; PAINT TO MATCH EXISTING.

7 — REMOVE AND SALVAGE NON-HISTORIC SHORING POSTS AND ANY ASSOCIATED STEEL SUPPORT BEAMS. STORE ON-SITE FOR RETRIEVAL BY THE CONTRACTING OFFICER.

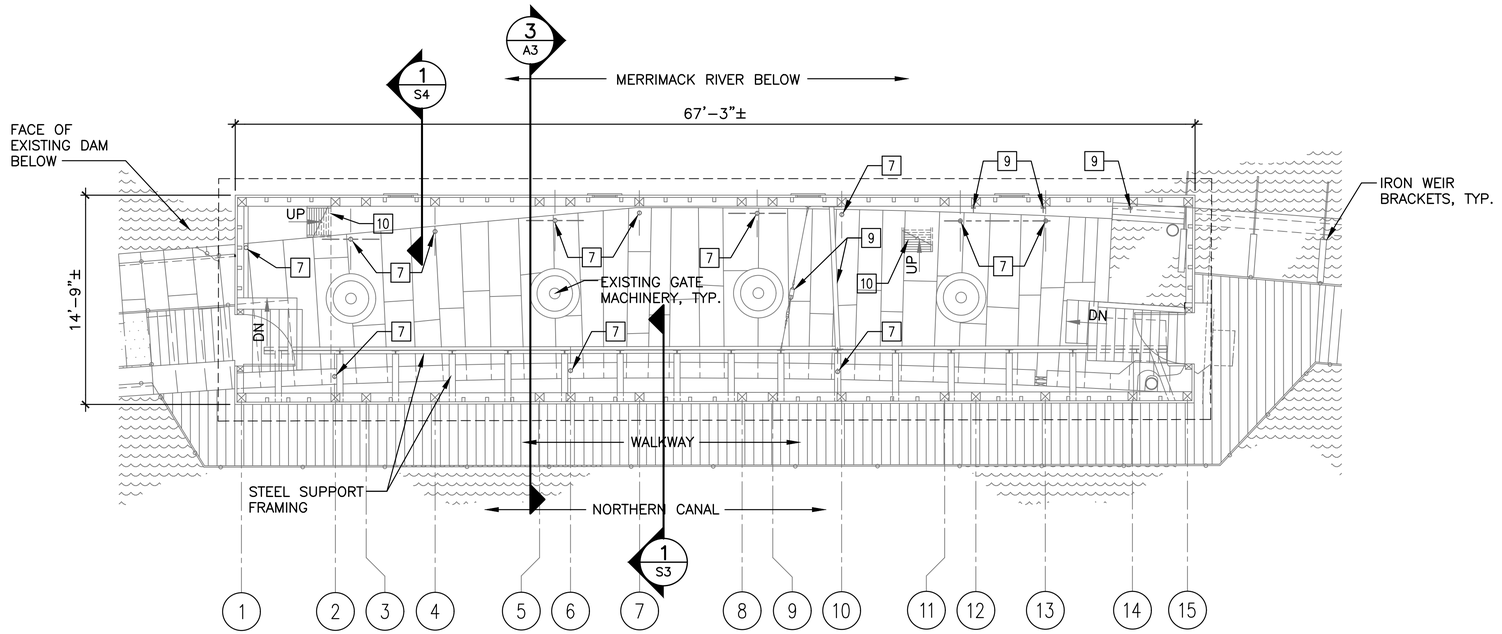
8 — PROVIDE NEW WOOD SIDING AND WALL BOARDS AT BASE OF EAST END OF NORTH WALL.

9 — REMOVE AND SALVAGE NON-HISTORIC CABLES AND ASSOCIATED STEEL SUPPORT BRACING. STORE ON-SITE FOR RETRIEVAL BY THE CONTRACTING OFFICER.

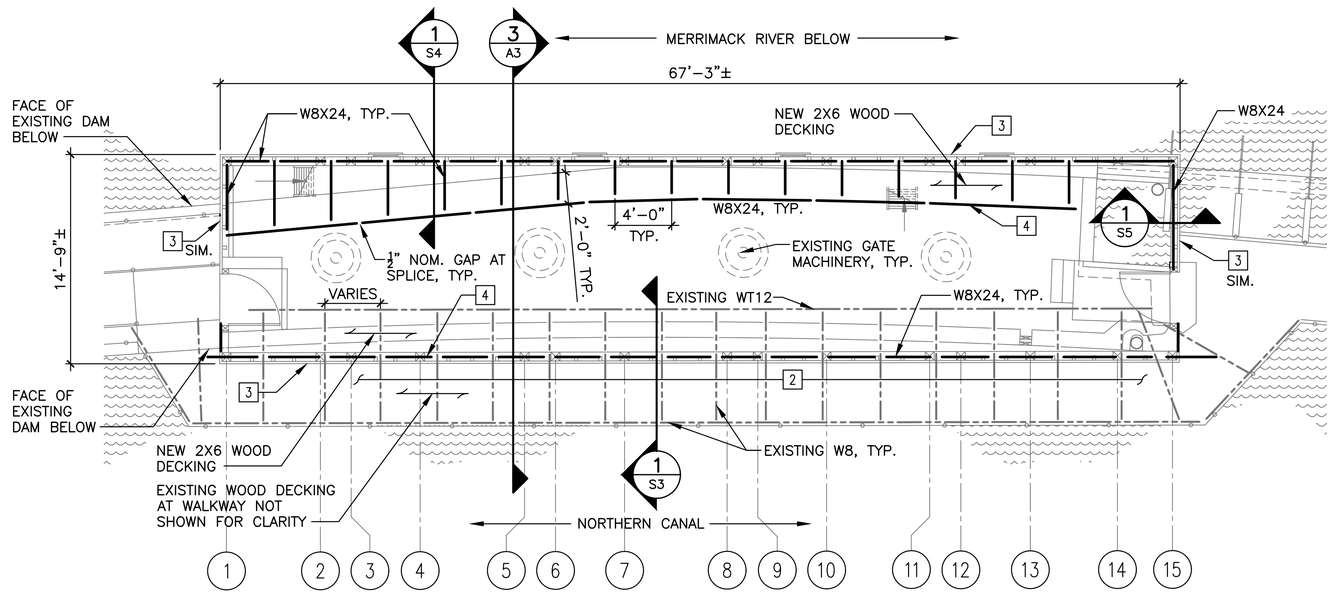
10 — MODIFY BOTH WOOD LADDERS TO ACCOMMODATE CHANGE IN FLOOR ELEVATION DUE TO NEW WOOD DECKING.

11 — PROVIDE NEW WOOD DECKING OVER NEW STEEL FRAMING AT NORTH WALL.

12 — REPAINT ENTIRE STRUCTURE; COLOR TO MATCH EXISTING.



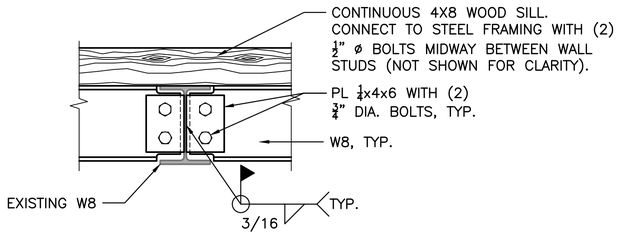
2 S2 EXISTING CONDITIONS FLOOR PLAN
SCALE (B)



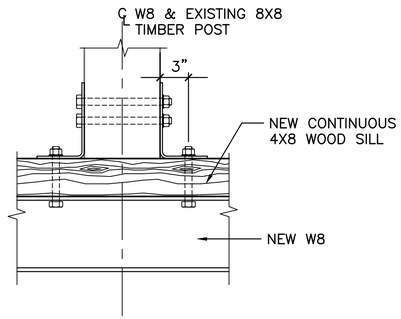
1 S2 FRAMING PLAN
SCALE (B)

SCALE (B) 4 0 4 8 12
SCALE OF FEET

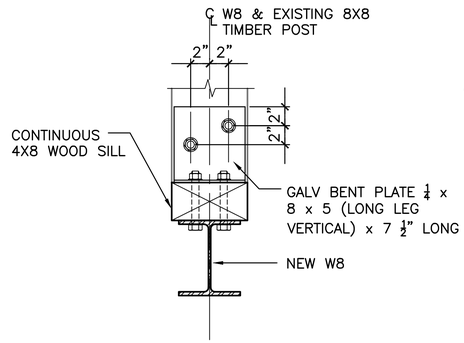
DESIGNED: MK	SUB SHEET NO. S2	TITLE OF SHEET: EXISTING CONDITIONS FLOOR PLAN & FRAMING PLAN REHABILITATE NORTHERN CANAL WASTE GATEHOUSE LOWELL NATIONAL HISTORICAL PARK, MASSACHUSETTS
DRAWN: CV		DRAWING NO. 475 142661
TECH. REVIEW: MK		PMIS/PKG NO. 255866
DATE: 06/28/2018		SHEET 8 OF 11



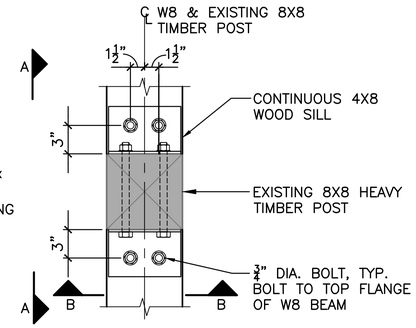
6 S3 SECTION AT EXISTING/NEW STEEL SUPPORT
SCALE ©



SECTION A–A

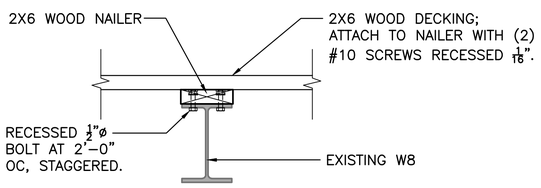


SECTION B–B

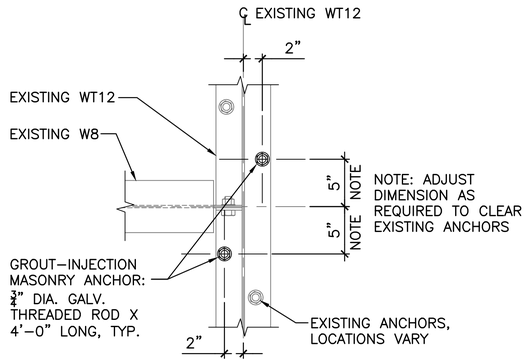


PLAN

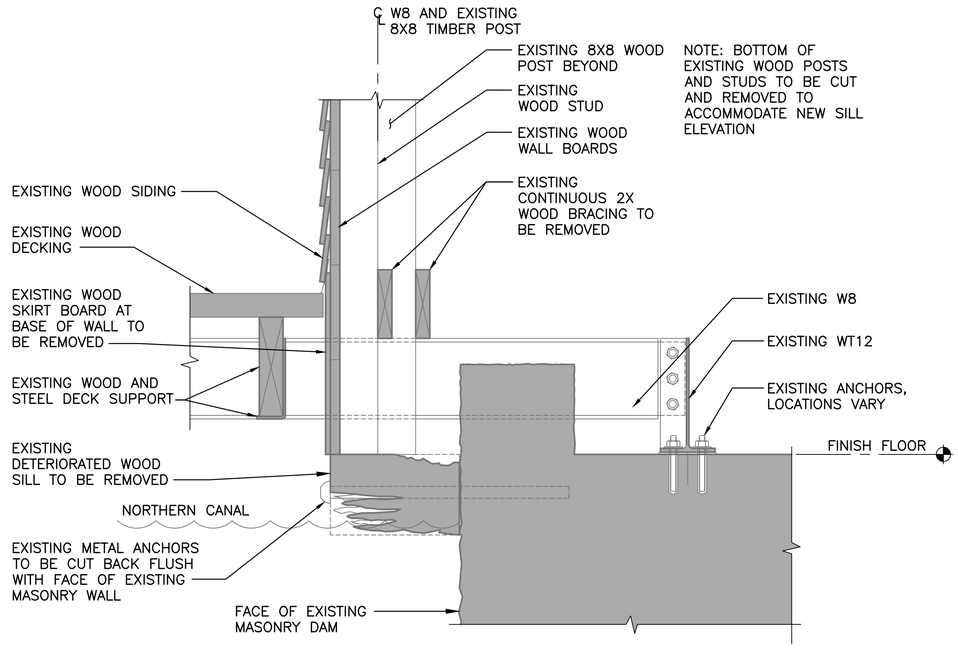
5 S3 SECTION AT EXISTING TIMBER POST
SCALE ©



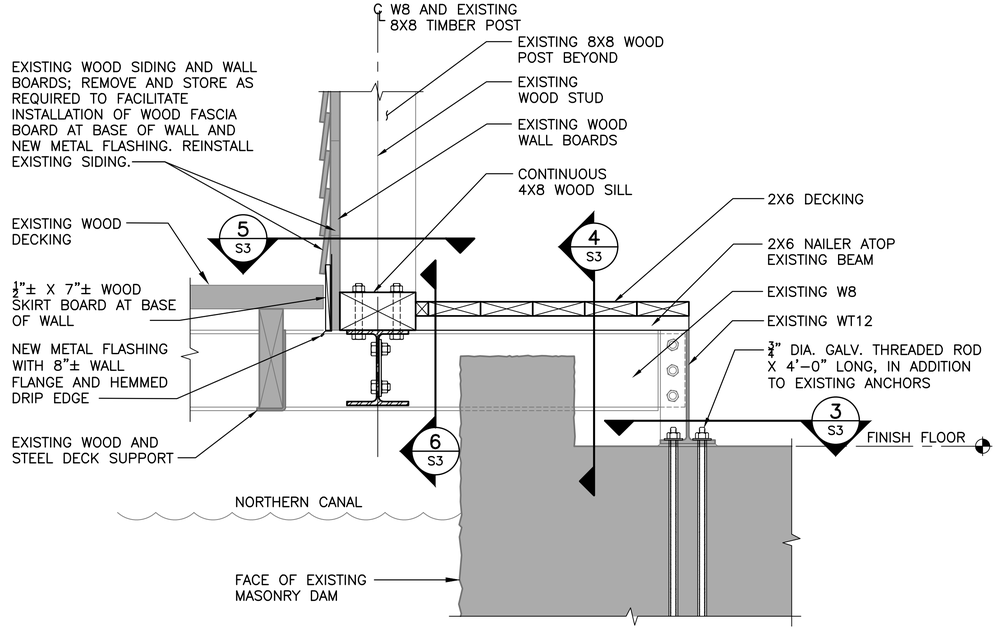
4 S3 SECTION AT EXISTING STEEL STRUCTURE
SCALE ©



3 S3 DETAIL AT EXISTING STEEL STRUCTURE
SCALE ©



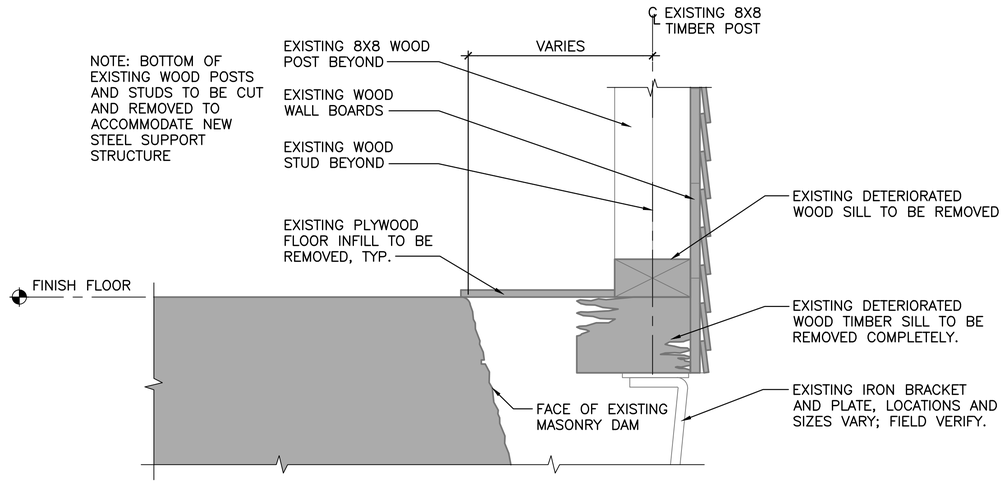
2 S3 SECTION AT SOUTH WALL – EXISTING CONDITION
SCALE ©



1 S3 SECTION AT SOUTH WALL – NEW WORK
SCALE ©

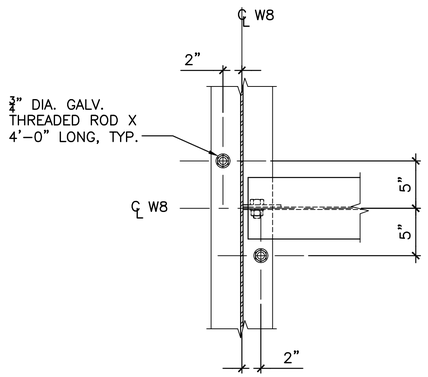
SCALE © 12 6 0 12
SCALE OF INCHES

DESIGNED: MK DRAWN: CV TECH. REVIEW: MK DATE: 06/28/2018	SUB SHEET NO. S3	TITLE OF SHEET SECTIONS AND DETAILS REHABILITATE NORTHERN CANAL WASTE GATEHOUSE LOWELL NATIONAL HISTORICAL PARK, MASSACHUSETTS	DRAWING NO. 475 142661 PMIS/PKG NO. 255866 SHEET 9 OF 11



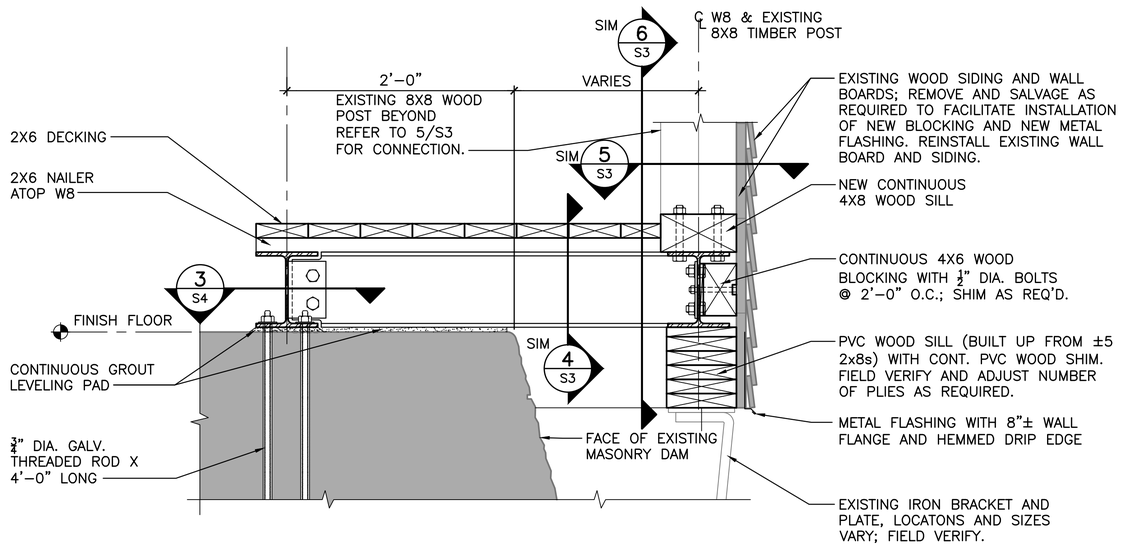
2 / S4 SECTION AT NORTH WALL – EXISTING CONDITION

SCALE ©



3 / S4 PLAN DETAIL AT BEAM CONNECTION

SCALE ©



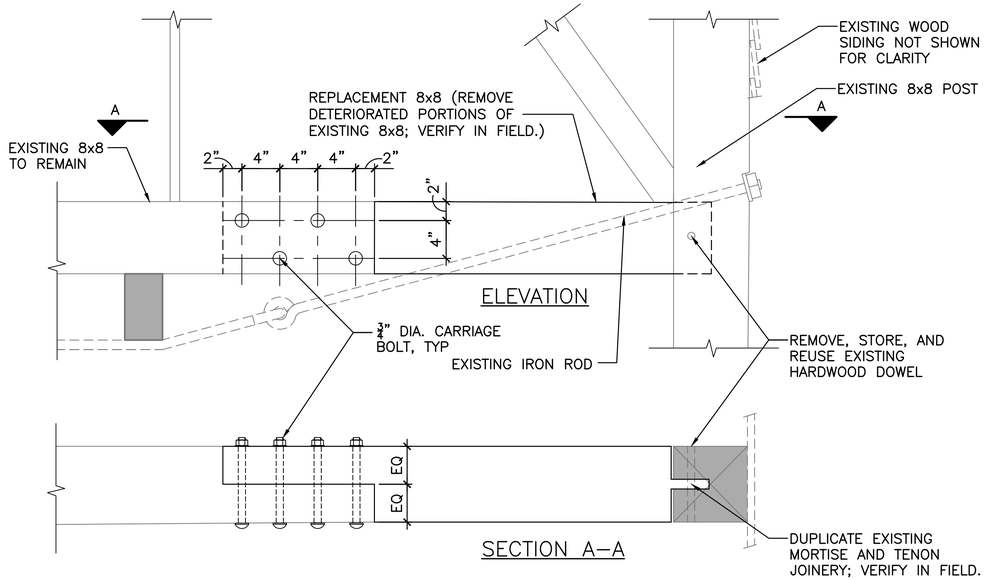
1 / S4 SECTION AT NORTH WALL – NEW WORK

SCALE ©

SCALE © 12 6 0 12

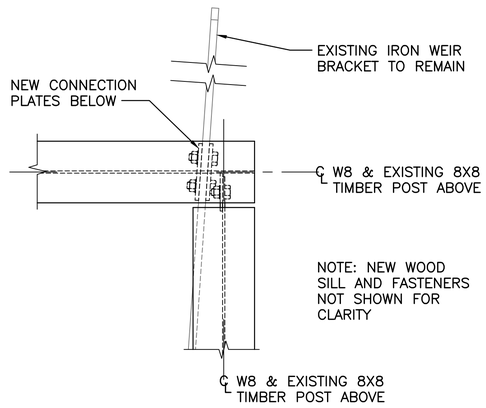
SCALE OF INCHES

DESIGNED: MK DRAWN: CV TECH. REVIEW: MK DATE: 06/28/2018	SUB SHEET NO. S4	TITLE OF SHEET SECTIONS AND DETAILS REHABILITATE NORTHERN CANAL WASTE GATEHOUSE LOWELL NATIONAL HISTORICAL PARK, MASSACHUSETTS	DRAWING NO. 475 / 142661 PMIS/PKG NO. 255866 SHEET 10 OF 11



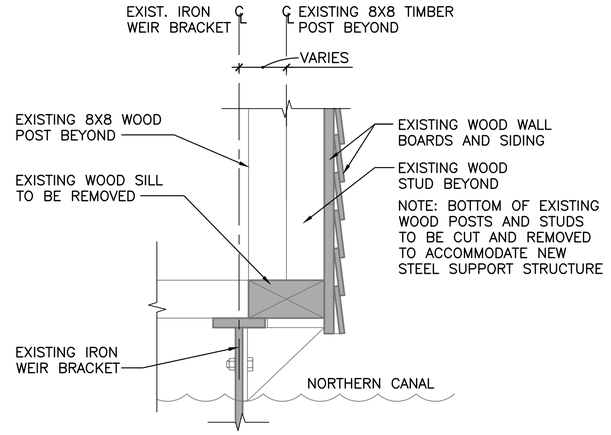
6 / S5 SECTION AT BEAM REPAIR AT FRAME 12

SCALE Ⓒ



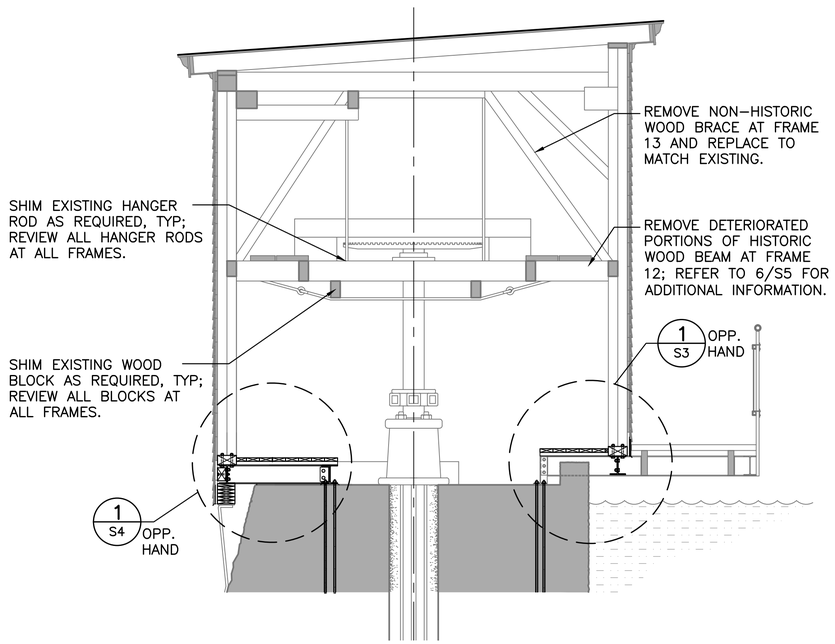
4 / S5 SECTION AT NEW BEAM CONNECTION

SCALE Ⓒ



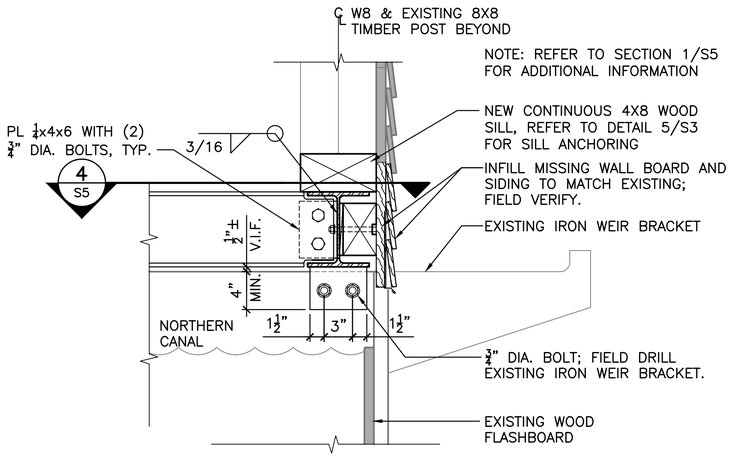
2 / S5 SECTION AT EAST WALL – EXISTING CONDITION

SCALE Ⓒ



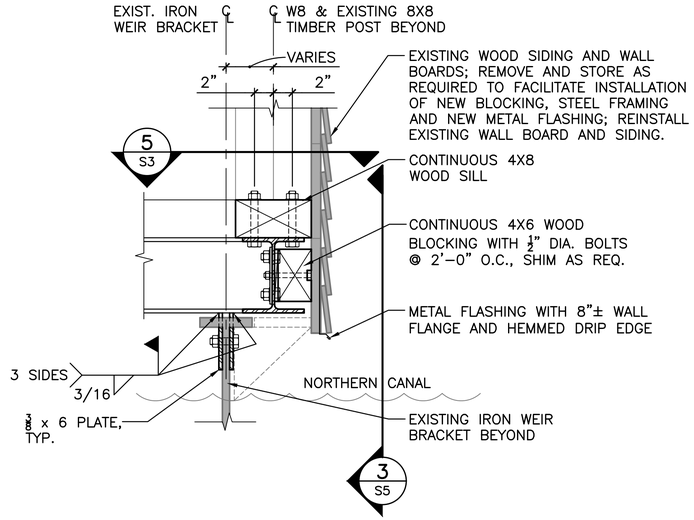
5 / S5 BUILDING SECTION

SCALE Ⓕ



3 / S5 DETAIL AT EAST WALL

SCALE Ⓒ



1 / S5 SECTION AT EAST WALL – NEW WORK

SCALE Ⓒ

SCALE Ⓕ 2 0 2 4 6 SCALE OF FEET

SCALE Ⓔ 4 0 4 8 SCALE OF FEET

SCALE Ⓒ 12 6 0 12 SCALE OF INCHES

DESIGNED: MK DRAWN: CV TECH. REVIEW: MK DATE: 06/28/2018	SUB SHEET NO. S5	TITLE OF SHEET SECTIONS AND DETAILS REHABILITATE NORTHERN CANAL WASTE GATEHOUSE LOWELL NATIONAL HISTORICAL PARK, MASSACHUSETTS	DRAWING NO. 475 142661 PMIS/PKG NO. 255866 SHEET 11 OF 11

Lowell National Historic Park
Lowell, Massachusetts

Rehabilitate Northern Canal Waste Gatehouse
LOWE – 225866

PROJECT SPECIFICATIONS

Construction Documents

NATIONAL PARK SERVICE
NORTHEAST REGION

100% SUBMISSION
June 28, 2018

TABLE OF CONTENTS

END OF TABLE OF CONTENTS

SECTION 01 11 00 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Work covered by the Contract Documents.
2. Contractor use of site.
3. Public use of site.
4. Work Restrictions.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Location: Lowell National Historic Park, Northern Canal Gatehouse, Lowell, Massachusetts

B. The Work consists of the following:

1. The Work includes rehabilitation of existing gatehouse including structural improvements, new roofing and new siding.

C. Project will be constructed under a single prime contract.

1.3 CONTRACTOR USE OF SITE

A. General: Contractor shall have limited use of the site for construction operations. Limit use of premises to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

B. Storage of Materials: Confine storage of materials to area directed by Contracting Officer.

C. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Government, Government's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

1. Schedule deliveries to minimize use of driveways and entrances.
2. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

D. Construction Camp: Establishment of a camp within the park will not be permitted.

E. Hauling Restrictions: Comply with all legal load restrictions in the hauling of materials. Load restrictions on park roads are identical to the state load restrictions with such additional regulations as may be imposed by the Park Superintendent. Information regarding rules and regulations for vehicular traffic on park roads may be obtained from the Office of the Park Superintendent. A special permit will not relieve Contractor of liability for damage which may result from moving of equipment.

1.4 PUBLIC USE OF SITE

A. The building will be closed to the public during construction.

1.5 CONDUCT OF OPERATIONS

A. At all times the contractor shall conduct his operations in conformance with the rules and regulations promulgated by the Secretary of the Interior for the National Park Service, and applicable park rules and regulations prescribed by the Park Superintendent.

B. Work on Saturdays, Sundays, Federal holidays or at night may not be performed without prior consent from the Contracting Officer. Submit requests 48 hours in advance of the work to the Contracting Officer for approval.

C. No signs or advertisements shall be displayed on the construction site or within the park unless approved by the Contracting Officer.

1.6 WORK RESTRICTIONS

A. On-Site Work Hours: Work shall be generally performed during normal business working hours of 9:00 a.m. to 5:00 p.m., Monday through Friday, except when otherwise indicated.

B. Existing Utilities

1. Contractor shall be responsible for locating and preventing damage to known utilities. If damage occurs, repair utility at no additional expense to the Government.
2. If damage occurs to an unknown utility, repair utility. An equitable adjustment will be made in accordance with the Changes clause of the contract.

C. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor air intakes.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 11 00

SECTION 01 26 01 – CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. The work of this section consists of administrative and procedural requirements for contract modifications.

1.2 DEFINITIONS AND ALLOWANCES

A. Home Office Overhead: Those costs incurred in support of all of a contractor's projects and not attributable to a specific job. The cost for home office overhead is only allowed as a percentage of all direct work excluding profit. The following items represent allowable home office overhead costs identified in Part 31 of the Federal Acquisition Regulation (FAR):

1. Rent
2. Utilities
3. Furnishings
4. Office equipment
5. Executive and management staff not exclusively assigned to the project
6. Support, accounting, and administrative staff
7. Preparation of cost proposals, estimating, and schedule analyses connected with Modifications
8. Estimating and preconstruction services
9. Mortgage costs
10. Real estate and corporate taxes
11. Automobile maintenance and travel costs for home office personnel
12. Home office insurances i.e. structure, automotive, umbrella, flood, etc.
13. Depreciation of equipment and other assets
14. Home office supplies (paper, staples, etc.)
15. Legal services
16. Accounting and data processing
17. Professional fees/registration

B. General Conditions (Field Office Overhead): Management and administrative costs incurred on site for the designated project. Costs associated with the preparation of modifications will not be allowed. The costs for these items are to be included only in the general conditions of the modification estimate. Only in the case of a contract time extension are additional general conditions included in modifications. The following items, if applicable, are considered allowable costs for calculating General Conditions:

1. Project Manager, Assistant Project Manager
2. Superintendent, Assistant Superintendent
3. Quality Control, Safety Officer, Environmental Manager, etc.
4. Engineers
5. Travel, lodging, and per diem (as established by Federal Travel Regulations)
6. Scheduling

7. Field Office Trailers and associated temporary utilities
8. Field office supplies

    a. Mailing and couriers
    b. Reproduction costs
    c. Storage
    d. Phones
    e. Computers
    f. Copiers

9. Personal vehicles i.e. Superintendent Pickup trucks

C. General Requirements: These are costs directly associated with the project and are necessary to perform the actual work of the modification. These costs shall be shown as direct costs in the estimate. The following items, if applicable, are considered allowable costs for calculating General Requirements:

1. Hoisting
2. Material handling
3. Temporary fencing
4. Port-a-lets
5. Trash removal, dumpsters
6. Barricades
7. Small tools
8. Safety supplies
9. Scaffolding
10. Daily cleaning
11. Traffic control
12. Temporary signage
13. Temporary heating and power

D. Personnel Costs: Costs included in the modification must only be for General Conditions staff and workers actually present and working on the project site. Modification costs for salaried workers are only allowed within the structure of a 40 hour week and no overtime or holiday pay will be allowed.

1. Worker Hourly Rates are costs directly associated with the individual worker and consist of the following:

    a. Base Rate: This is the hourly rate paid directly to the worker
    b. Labor Burden: Employer payments of all applicable burdens, this includes insurance and taxes that the business must pay on behalf of the worker to government entities and educational forums, such as:

        1) Social Security
        2) Medicare
        3) Workers Compensation– Policy and company calculation to be made available.
        4) FUTA– Cap Rate and percentage to be proportionally allocated over one year.
        5) SUTA– Cap Rate and percentage to be proportionally allocated over one year.
        6) Union agreement costs – Other costs required under an enforceable collective bargaining agreement.

c. Fringe Benefits: Various non-wage compensations provided to employees such as:

1) Health Care Insurance Premiums
2) Cell Phone
3) Clothing
4) 401K and Pensions
5) Vehicle allowances
6) Gas allowance
7) Life insurance premiums
8) Disability insurance
9) Other Fringe Benefits required under an enforceable collective bargaining agreement

E. Bonuses or Deferred Compensation: No Bonus or Deferred Compensation will be allowed within any components of pricing including Home Office Overhead, General Conditions, General Requirements, Hourly Worker Rates, or the direct costs of work.

F. General Liability Insurance: An insurance policy that protects the contractor from claims resulting from bodily injury or property damage to a third party. Include this as a separate line item within all modification proposals and provide a current insurance quote upon request.

G. Performance and Payment Bonds: A performance bond is a surety bond issued by an insurance company or bank to guarantee satisfactory completion of a project. The Payment Bond guarantees that the contractor will pay the labor and material costs they have incurred. Banks and Insurance companies charge a premium for each individual project based on a sliding scale which relates to the size of the project. Include this as a separate line item in modification proposals and provide current company bonding rates upon request.

H. Builder's Risk Insurance: This covers the contractor's loss due to fire, high winds, or other natural forces. This is not reimbursed by the National Park Service (NPS) and shall not be included in modification proposals.

1.3 MODIFICATION PROPOSAL PRICING REQUIREMENTS

A. General:

1. Your proposal must be received in the format and within the time frame specified in the Request for Proposal letter. Costs or delays resulting from failure of contractor to submit within the time frame specified will not be compensable.
2. The proposal must be detailed with itemized lists of equipment, materials, labor, production rates, overhead, profit, and bond markup for each item. Labor costs must be itemized by craft and hourly rate, including Fringe Benefits and Labor Burden. If the costs of Fringe Benefits and Labor Burden are not itemized, it is assumed that that they are included in the hourly rate shown, or contractor is not requesting reimbursement. Contractor may utilize the government provided Contractor Estimate Form, or their own form, provided that it contains the same information and level of detail as the Gov't provided form.

3. Requests for extensions of contract time as a result of this change must be justified with a Time Impact Analysis (TIA). Refer to Division 01 Specification, "Construction Schedule", for time impact analysis requirements. TIA and associated costs must be received with the proposal by the date shown within the Request for Proposal letter. Contractor's failure to submit within the specified time frame will be construed as the Contractor waiving the right for additional time and no time extension will be allowed.
4. All supporting documentation used to justify the proposed modification will be made available to the Contracting Officer upon request.
5. Contractor must review and approve all subcontractor/supplier pricing in detail for proper format, scope, production rates, and pricing prior to submission to the NPS. All delay costs associated with not reviewing and approving subcontractor/supplier pricing will be borne by the Contractor.
6. All pricing and production rates within the estimate must be based on fair and reasonable pricing and cannot include built-in contingency.

B. Labor:

1. Contractor shall estimate the cost of labor by itemizing each craft involved, indicating worker hourly rate (base rate + labor burden + fringe benefits) for each and itemizing the hours required for each craft that will be directly engaged in modification work. Any work proposed that will require overtime work or premium pay shall be itemized separately. All rates shall be in accordance with the Davis-Bacon Act as incorporated herein. Labor Burden may include payroll taxes, Social Security, unemployment insurances, workers compensation insurance, FICA, FUTA, and other direct costs resulting from Federal, State or local laws.
2. Itemize labor costs for equipment operators separate from equipment costs.
3. The labor cost for foremen shall only be costs for related work required for the modification.

C. Materials:

1. The estimated cost for materials shall include quotes from multiple sources. Material prices must include all applicable fees and credits, including but not limited to, sales tax, freight and delivery charges, and tax rebates.
2. No markup shall be applied to any material provided by the NPS.

D. Equipment:

1. Equipment used for the project must be appropriately sized for the work being performed.
2. Do not include costs for "miscellaneous tools and equipment", in your proposal for a replacement value of $500 or less. Costs shown in excess of $500 must be broken out separately.
3. Regardless of ownership, the rates to be used in determining equipment rental costs shall be the lowest cost from one of the following sources:

    a. U.S. Army Corps of Engineers, Ownership and Operating Expense Schedule (use latest edition and applicable region)
    b. Construction Blue Book
    c. Local equipment rental rates, documented by actual invoice charges, or itemized vendor quotes.

4. The estimated equipment rates shall include the operating costs of all fuel, oil, lubrication, supplies, small tools, necessary attachments, ground engaging components, tires & tracks, routine repairs and maintenance (cost of major repair and overhaul is not allowed per FAR 31.105(d)(2)), depreciation, storage, insurance, and all incidentals. Mobilization, if applicable, may be included for equipment solely used on the modification work but must be listed separately.
5. Estimate the full rate for equipment only for the duration that the equipment will be utilized to accomplish the work of the modification.
6. Standby unit rates used are to be in accordance with paragraph 1.3, D, 2, above. If the US Army Corp of Engineers is utilized then their standby rates prevail. If Bluebook or local equipment pricing is accepted, then ½ of the equipment costs minus any operating costs, major repair and overhaul will be accepted.
7. If equipment is in standby mode due solely to a documented NPS delay, the established standby rate shall apply from the first day of the delay.
8. Equipment that is not used and on the jobsite for up to five consecutive days may be classified at standby rates, provided that the equipment is or has been used solely to perform work on the modification and will be necessary to complete additional modification work. Equipment that is still on the jobsite but not in use after five consecutive days will not be considered in the modification pricing.
9. Requests for compensation for equipment stand by time must be justified, documented and itemized separately.
10. The estimated timeframe (daily, weekly, monthly) for use of the equipment must reflect the lowest cost to the Government.

E. Establishment and Application of Overhead and Profit Percentages:

Utilize the Profit Calculator to generate the allowable maximum rate for Profit on self-performed work. Insert the result below where indicated by the red X.XX%. Work collaboratively with the COR to produce the draft Profit Calculator for Design Development (DD) submission. Denver Service Center Contracting Services division will approve the final number. Submit completed Profit Calculator with the DD submission.

1. Home Office Overhead and Profit (OH&P) shall be applied to direct costs only. Profit shall not be applied to overhead amounts; and overhead shall not be applied to profit. Home office overhead shall contain only allowable, allocable, and reasonable costs per the contract documents and FAR Part 31. Profit percentages are based on risk factors found in FAR Part 31which have been applied to the specific type of work included in this project. Negotiated rates shall not exceed the following percentages for OH&P for contractor self-performed work:

   Overhead……10%
   Profit……X.XX%

2. Total aggregate limit of markup (OH&P) for contractor and subcontractors on modification work shall not exceed 25%. The NPS will not be responsible for allocation of percentages between contractor and subcontractors at any tier.
3. If contractors form a partnership, than the partnership may only receive home office overhead and profit in the same amount as an individual contractor (refer to par 1.3,E,1 above). It is the responsibility of the partners to decide on the division of revenue.

4. Combined Increases and Decreases: On proposals involving both increases and decreases in the Contract Price, the overhead and profit mark-ups are required on the net increases and deducted on net decreases.
5. At no time can profit be calculated on Overhead or itself, it must be calculated on direct costs of work only.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 012601

SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. Definitions
2. Construction Coordination.
3. Submittals
4. Coordination Drawings.
5. Requests for Information (RFIs).
6. NPS/DSC SharePoint Project Website.
7. Project meetings.
8. Environmental Coordination.
9. Permits

B. Related Requirements:

1. Section 01 32 16 “Construction Schedule” for preparing and submitting Contractor’s construction schedule.
2. Section 01 73 40 “Execution” for procedures for coordinating general installation.
3. Section 01 77 00 “Closeout Procedures” for coordinating closeout of the Contract.

1.2 DEFINITIONS

A. Agency with Jurisdiction
B. Construction Permits – Contractor Provided

1.3 CONSTRUCTION COORDINATION

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, which depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components with other Contractors to ensure maximum accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.
4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.

5. Properly plan construction operations to include permit requirements. Allow enough time to execute permit provisions to maintain work schedule, site visits, inspections, and reporting deadlines.

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

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's Construction Schedule.
2. Preparation of the Schedule of Values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Permit requirements.
7. Pre-installation conferences.
8. Project closeout activities.

1.4 SUBMITTALS

A. Division 01 documents: The following items shall be submitted a minimum of one week prior to the Preconstruction Conference. Contracting Officer will notify Contractor of tentative date for the Pre-Construction Conference.

1. Letter designating Project Superintendent.
2. Construction Schedule.
3. A comprehensive breakdown of the Schedule of Values.
4. Accident Prevention Plan.
5. A list of Subcontractors for this project.
6. Written statements from subcontractors certifying compliance with applicable labor standard clauses.
7. Satisfactory evidence of liability insurance coverage and workman’s compensation for the Contactor and all subcontractors.
8. Waste Management Plan.
9. Quality Control Plan.
10. Historic Preservation Treatment Plan.
11. List of Required Construction Permits. Include the following information for each permit:

    a. Name of Permit.
    b. The Agency(ies) with Jurisdiction issuing the permit.
    c. Information required from the Government to complete the permit application.

B. All items listed must be provided to the Contracting Officer before the Pre-Construction Conference is held. If all of these documents have not been received one week prior to the scheduled Pre-Construction Conference date, the conference will be cancelled, Notice to Proceed will not be issued, and the Contracting Officer will consider other contractual remedies. Work shall not commence until written Notice to Proceed has been issued.

1.5 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI utilizing the form created on the NPS/DSC SharePoint Project website.

1. CO will not respond to RFIs submitted by other entities controlled by Contractor.
2. Coordinate and submit RFIs in a prompt manner to avoid delays in the work.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. RFI number, numbered sequentially.
2. Date.
3. RFI subject.
4. Specification Section number and title and related paragraphs, as appropriate.
5. Drawing number and detail references, as appropriate.
6. Field dimensions and conditions, as appropriate.
7. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
8. Contractor's signature.
9. Requested date for response.
10. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Form: Complete the RFI Form on the NPS/DSC SharePoint website as follows:

1. Enter the general information at the top of the form.
2. Under the “Action” section at the bottom of the form, select “Question” then select “CMR” in the drop-down of the “Send to” box.
3. Enter the details of the question and attach related documents.
4. Select “Submit Form” at the bottom of the page.

D. Contracting Officer’s Action: CO will review each RFI, determine action required, and respond. CO will determine the critical nature of each RFI and issue a response accordingly.

1. The following are not considered to be RFIs and will receive no action:

    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor's means and methods.
    d. Requests for coordination information already indicated in the Contract Documents.
    e. Requests for adjustments in the Contract Time or the Contract Sum.
    f. Requests for interpretation of Architect's actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.

2. CO's action may include a request for additional information, in which case time for response will date from time of receipt of additional information.
3. CO's action on RFIs may result in the need for a change to the Contract Time or the Contract Sum. All contract changes will be processed following the terms and conditions of the contract.

1.6 PROJECT WEB SITE

A. Use the NPS/DSC SharePoint Project website for communication throughout the contract period. The NPS/DSC SharePoint Project website will be used for the following functions:

1. Project directory.
2. Project correspondence.
3. Meeting agendas and minutes.
4. Contract modifications forms and logs.
5. RFI form and processing.
6. Task and issue management.
7. Photo documentation.
8. Baseline schedule, schedule updates and calendar management.
9. Submittal form and processing.
10. Payment coordination documentation.
11. Drawing and specification document hosting, viewing, and updating.
12. Online document collaboration.
13. Reminder and tracking functions.
14. Archiving functions.
15. Notification of submittal and RFI statuses and current responsible party.
16. Permits and addendums

B. Some documents however are not suitable to be shared using the NPS/DSC SharePoint Project website. Documents containing Personal Identifying Information (PII) (i.e. certified payrolls) shall not be shared using the NPS/DSC SharePoint Project website and shall be coordinated with the SharePoint Project team as appropriate.

C. Submit to the CO a list of all employees who will need access to the website. The users will receive an invitation to register from the Department of Interior (DOI). Once the user is registered on the DOI website, they will be given access to the NPS/DSC SharePoint Project website. For login procedures and other SharePoint information, refer to the Workflows website at http://www.nps.gov/dscw/precon_spproj.htm.

D. All users will be required to have the following software packages:

1. Internet Explorer version 7 or later.
2. Adobe Acrobat Professional (Pro) version 9 or later

1.7 PROJECT MEETINGS

A. Preconstruction Conference: Before start of construction, Contracting Officer will arrange an on-site meeting with Contractor. The meeting agenda will include the following as a minimum:

1. Roles & Responsibilities/ Lines of Authority.
2. Park rules and regulations.
3. Jobsite Safety.
4. Resolution of comments on required Division 01 documents.
5. Coordination of Subcontractors.
6. Labor law application.
7. Modifications.
8. Payments to Contractor.
9. Payroll reports.
10. Contract time.
11. Liquidated damages.
12. Contractor Performance Evaluation.
13. Display of Hotline posters.
14. Notice to proceed.
15. Correspondence procedures.
16. NPS/DSC SharePoint Project website.
17. Acceptance/rejection of work.
18. Progress meetings.
19. Submittal procedures.
20. NPS Final Accessibility Inspection.
21. Environmental requirements.
22. Permit requirements.
23. As-constructed drawings/operation and maintenance (O&M) manuals.
24. Saturday, Sunday, holiday and night work.
25. Reference materials.
26. Value engineering.

B. Progress Meetings: The Contracting Officer will schedule weekly meetings with the Contractor.

1. Attendees: In addition to Government Representatives, each Contractor, Subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. The meeting agenda will include the following:

    a. Approval of minutes of previous meetings.
    b. Submittal status.
    c. Review of off-site fabrication and delivery schedules.
    d. Requests for information (RFI) and other issues.
    e. Modifications.
    f. Work in progress and projected.

        1) Status of required inspections (Special Inspections, Accessibility, etc.)

g. Inspections of work in progress and projected (Special inspections,
h. Construction Schedule update (provide updated CPM).
i. Status of Project Record Drawings and O&M manuals.
j. Other business relating to work.
k. Permit requirements.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise CO of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

a. Contract Documents.
b. Options.
c. Related RFIs.
d. Related Change Orders.
e. Purchases.
f. Deliveries.
g. Submittals.
h. Review of mockups.
i. Possible conflicts.
j. Compatibility requirements.
k. Time schedules.
l. Weather limitations.
m. Manufacturer's written instructions.
n. Warranty requirements.
o. Compatibility of materials.
p. Acceptability of substrates.
q. Temporary facilities and controls.
r. Space and access limitations.
s. Regulations of agency(ies) with jurisdiction.
t. Testing and inspecting requirements.
u. Installation procedures.
v. Coordination with other work.
w. Required performance results.
x. Protection of adjacent work.
y. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

1.8 ENVIRONMENTAL COORDINATION

A. Contractor's Environmental Manager: Designate an on-site party responsible for overseeing the Contractor's conformance to environmental goals for the project and implementing procedures for environmental protection.

1. Qualifications: Minimum 3 years Construction experience on projects of similar size and scope; with environmental procedures similar to those of this project; must be familiar with environmental regulations applicable to construction operations.
2. Responsibilities: Responsibilities shall include:

a. Compliance with applicable Federal, State, and local environmental regulations, including maintaining required documentation.
b. Implementation of the Waste Management Plan(WMP).
c. Present an overview of environmental issues and summarize site specific procedures relating to management plans at the Preconstruction conference.
d. Training for Contractor personnel in accordance with their position requirements.
e. Monitoring and documentation of environmental procedures.

B. Perform project quality control in accordance with requirements specified in Related Sections, including:

1. Quality Requirements.
2. Regulatory Requirements.
3. Noise & Acoustics Management.
4. Construction Waste Management.

C. Contractor's Environmental Training Program: Contractor shall provide environmental training for workers performing work on the project site. Training shall include the following:

1. Overview of environmental issues related to the building industry.
2. Overview of environmental issues related to the Project.
3. Review of site specific procedures and management plans:

a. Construction Waste Management.
b. Noise & Acoustics Management.

4. Pollution Prevention (P2) practices: Submit evidence of familiarity with P2 practices.
5. Green Building Rating Programs: Submit evidence of familiarity with USGBC-LEED.
6. Compliance with environmental regulations: As specified in Regulatory Requirements. Submit Contractor 40 CFR employee training records upon request of Contracting Officer.

D. Provide documentation for environmental procedures as specified herein and in accordance with approved Waste Management Plan.

1.9 PERMITS

A. General:

1. Permits and Responsibilities: The Contractor shall, without additional expense to the Government, be responsible for obtaining any necessary licenses and permits, and for complying with any Federal, State and municipal laws, codes, and regulations applicable to the performance of the work. The Contractor shall also be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the work.
2. For the purpose of this contract the Contractor will not be considered an agent of the Government. Therefore the Contractor will comply with the appropriate Federal, State and local laws.

B. Potential Permits: The permits listed below were identified during the design process as likely to be required based on typical means and methods of construction. The list is provided to assist the contractor in determining which permits will be required for the contract's chosen means and methods. The list shall not be considered complete, as it is the responsibility of the contractor to determine means and methods, and obtain the required permits. It is the responsibility of the Contractor to obtain all permits required to legally conduct the work.

1. Electrical Utility Hookup.

C. Coordination with Agency(ies) with Jurisdiction Issuing Permits

1. Coordination: Contact the Agency(ies) with Jurisdiction as needed and sufficiently in advance to avoid delaying the work: Coordinate meetings, reporting requirements, inspections, or any other requirements.

D. Administrative Procedures:

1. Coordinate scheduling and timing of required administrative provisions of project permits with Agency(ies) with Jurisdiction, Construction Manager, and Park to avoid conflicts and to ensure orderly execution of the Work.
2. Supply all needed information to Agency(ies) with Jurisdiction issuing permits, pay any fees required and provide all material needed to comply with the permit's conditions and provisions.
3. Upload permits to the NPS/DSC SharePoint project website when the permits are obtained.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

SECTION 01 32 16 – CONSTRUCTION SCHEDULE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section consists of Construction Schedule requirements including but not limited to the following:

1. Schedule of Values
2. Construction Schedule Requirements.
3. Construction Schedule Updates.
4. Time Impact Analysis.

B. Purpose: The purpose of the Construction Schedule is to ensure adequate planning, coordination, scheduling, and reporting during execution of the work by the Contractor. The Construction Schedule will assist the Contractor and Contracting Officer in monitoring the progress of the work, evaluating proposed changes, and processing the Contractor's monthly progress payment.

1.2 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the Schedule of Values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum, unless otherwise approved by the Contracting Officer.

C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

E. Float: The measure of leeway in starting and completing an activity.

1. Float: Float is not for the exclusive use or benefit of either the Government or the Contractor but is jointly owned.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

F. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

G. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.

1.3 SUBMITTALS

A. Electronic Copies: All schedules and reports submitted shall be posted on the NPS DSC SharePoint project website, provided in the native electronic file format. It is the intent of the Government to limit the number of printed reports to only those reports determined by the project team to be essential.

B. Schedule of Values: After contract award and before the Pre-Construction conference submit a schedule of dollar values based on the Contract Price Schedule.

C. Construction Baseline Schedule: After contract award and before the Pre-Construction conference, submit two paper copies of baseline schedule, large enough to show entire schedule for entire construction period.

D. CPM Reports: Concurrent with CPM schedule, submit three paper copies of each of the following computer-generated reports. Format for each activity in reports shall contain activity number, activity description, resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of predecessor and successor tasks for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
3. Total Float Report: List of all activities sorted in ascending order of total float.

E. Construction Schedule Updates: On or before the 7th day preceding the progress payment request date, submit estimates of the percent completion of each schedule activity and necessary supporting data. Provide two paper copies.

F. Construction Schedule Revisions and Time Impact Analysis: For each Construction Schedule revision submit two paper copies of a Time Impact Analysis. Each Time Impact Analysis shall include a Fragmentary Network (Fragnet), incorporated into the currently accepted Construction Schedule, demonstrating how the Contractor proposes to incorporate a modification, change, delay, or Contractor request.

1.4 QUALITY ASSURANCE

A. The Contractor shall meet with the Contracting Officer on the day of the preconstruction conference to go over the following:

1. Review software limitations, content and format for reports.
2. Verify availability of qualified personnel needed to develop and update schedule.
3. Discuss constraints, including interim milestones.

4. Review time required for review of submittals and re-submittals.
5. Review requirements for tests and inspections by independent testing and inspecting agencies.
6. Review time required for completion and startup procedures.
7. Review time required for obtaining and activating permits.
8. Review and finalize list of construction activities to be included in schedule.
9. Review baseline schedule comments, resolve issues and progress on incorporating them
10. Review procedures for updating schedule.
11. Discuss reporting requirements and establish a protocol for naming and transmitting electronic schedules.

B. Contractor's Schedule Representative: Before or at the preconstruction conference, designate an authorized representative to be responsible for the preparation and maintenance of the Construction Schedule. A resume outlining the qualifications of the Scheduler shall be submitted to the Contracting Officer for acceptance. The Scheduler shall have prepared and maintained at least 5 previous schedules of similar size and complexity similar to this Contract, demonstrating proficiency in the use of scheduling software. The authorized representative will be responsible for preparing the Baseline Schedule, all required updates, revisions, Time Impact Analyses, and preparation of reports.

1.5 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate Contractors.

B. Coordinate Construction Baseline Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.

1. In developing the Construction Baseline Schedule, ensure that the Subcontractor’s work at all tiers, as well as the prime Contractor’s work, is included and coordinated.
2. Secure time commitments for performing critical elements of the Work from parties involved.
3. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SCHEDULE OF VALUES

A. Breakdown each lump-sum item into component work activities used in the schedule, for which progress payments may be requested. The work activities broken out within the schedule of values shall be integrated into and made a logical part of the construction baseline schedule submitted under this specification. The total costs for the component work activities shall equal the contract price for that lump-sum item. The Contracting Officer may request data to verify accuracy of dollar values. Include mobilization, general condition costs, overhead and profit in the total dollar value of unit price items and in the component work activities for each lump-sum item. Do not include mobilization, general condition costs, overhead or profit as a separate item.

B. Do not break down unit price items. Use only the contract price for unit price items.

C. The total cost of all items shall equal the contract price. The Schedule of Values will form the basis for progress payments.

D. An acceptable Schedule of Values shall be agreed upon by the Contractor and Contracting Officer before the first progress payment is processed.

2.2 CONSTRUCTION SCHEDULE REQUIREMENTS

A. Construction Baseline Schedule: Prepare Construction Baseline Schedule using a computerized, resource-loaded, time-scaled CPM network analysis diagram for the Work.

1. Develop and finalize Construction Baseline Schedule so it can be accepted for use no later than 30 days after date established for the Notice of Award.

    a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Governments acceptance of the schedule.

2. Establish procedures for monitoring and updating Construction Baseline Schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.

B. Construction Baseline Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary CPM network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated duration, sequence requirements, and relationship of each activity in relation to other activities.
2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. The Construction Baseline Schedule as developed shall show the sequence and interdependence of activities required for complete performance of the work. Ensure all work sequences are logical and the Construction Baseline Schedule shows a coordinated plan of the work.
5. Resource loading of each activity shall include all personnel by labor category and equipment type and capacity proposed to complete the activity in the duration shown.
6. Consider seasonal weather conditions in planning and scheduling all work influenced by high and low ambient temperatures, wind, or precipitation to ensure completion of all work within the contract time.
7. Time Frame: Proposed duration assigned to each activity shall be the Contractor's best estimate of time required to complete the activity considering the scope and resources planned for the activity.

a. An early finish date may be shown but the late finish date must be the same date as the last day of the contract period. An early completion schedule must contain the following:

    1) Insert an activity titled “Project Float” as a successor to the last activity in the early project completion schedule network.
    2) Add a milestone titled “Contract End Date” as a successor to the activity “Project Float”.
    3) Add duration to the activity “Project Float” as required so the milestone “Contract End Date” equals the last day of the Contract Period.

b. Contract completion date shall not be changed by submission of a schedule that shows an early completion date.
c. The Contractor shall limit use of lead or lag duration’s between schedule activities.
d. Project Calendars: Develop and incorporate the following calendars:

    1) Administrative Calendar: Include a calendar that is based on a 7 day week to be used on any activities that are based on calendar days. Apply this calendar to administrative tasks or any other tasks that are not affected by non-working days (Federal Holidays, weather, etc.).
    2) Project Calendar: Include a calendar that is based on the planned work week for the project. Include Federal Holidays, weekends, and any other non-work days indicated in the contract documents. Apply this calendar to activities which are not anticipated to be affected by weather.
    3) Weather Calendar: Utilize the Project Calendar and show anticipated normal downtime related to weather as non-working time. Weather days shall be based on data for the local area from a reliable source like the National Oceanic and Atmospheric Administration (NOAA), National Park Service records, or source acceptable to the Contracting Officer. Apply this calendar to activities that are anticipated to be affected by weather.

e. Activity Duration: Define activities so no activity is longer than 15 days, except for non-construction activities including mobilization, shop drawings and submittals, fabrication and delivery of materials and equipment.
f. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 calendar days, as separate activities in the schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
g. Submittal Review Time: Include review and re-submittal times indicated. Coordinate submittal review times in Construction Baseline Schedule.
h. Substantial Completion: Allow time for Government administrative procedures necessary for certification of Substantial Completion. (For more information, refer to Division 01 Specification 01 77 00 Closeout Procedures.)

8. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

    a. Work Restrictions: Show the effect of the following items on the schedule:

        1) Coordination with existing construction.
        2) Use of premises restrictions.

3) Provisions for future construction.
4) Seasonal variations.
5) Environmental control.
6) Permit provisions.

b. Work Stages: Indicate important stages of construction for each major portion of the Work.

1) Subcontract awards.
2) Submittals.
3) Purchases.
4) Mockups.
5) Fabrication.
6) Sample testing.
7) Deliveries.
8) Installation.
9) Tests and inspections.
10) Adjusting.
11) Curing.

9. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion.

C. Joint Review, Revision, and Acceptance:

1. Within seven calendar days of receipt of the Contractor's proposed Construction Baseline Schedule, the Contracting Officer and Contractor shall meet for joint review, correction, or adjustment of the initial Construction Baseline Schedule. Any areas which, in the opinion of the Contracting Officer, conflict with timely completion of the project shall be subject to revision by the Contractor.
2. Within seven calendar days after the joint review between the Contractor and Contracting Officer, the Contractor shall revise and resubmit the Construction Baseline Schedule in accordance with agreements reached during the joint review.
3. In the event the Contractor fails to define any element of work, activity, or logic, and the Contracting Officer review does not detect this omission or error, such omission or error, when discovered by the Contractor or Contracting Officer, shall be corrected by the Contractor within seven calendar days and shall not affect the contract period.
4. Upon acceptance of the Construction Baseline Schedule by the Contracting Officer, save the schedule as a baseline and update on a monthly basis. The construction schedule update will be used to evaluate the Contractor's monthly applications for payment based upon information developed at the monthly Construction Schedule update meeting.

D. Recovery Schedule: When periodic schedule update indicates the Work is 14 or more calendar days behind the current accepted schedule, a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule must also be submitted. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

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

PART 3 - EXECUTION

3.1 CONSTRUCTION SCHEDULE UPDATES

A. Progress Meeting Updates: Provide a 2 week look-ahead schedule, derived from the currently accepted schedule, before each weekly progress meeting. Utilize the look-ahead schedule to facilitate and take notes on discussions held during the progress meeting.

B. Monthly Schedule Updates:

1. General: Update the Construction Schedule on a monthly basis to reflect actual construction progress and activities throughout the entire contract period and until project substantial completion. The status date of each schedule update shall be the 7th day preceding the progress payment request date.
2. Procedure: The Contractor shall meet with the Contracting Officer each month at a Construction Schedule update meeting to review actual progress made through the status date of the Construction Schedule update, including dates activities were started and/or completed and the percentage of work completed on each activity started and/or completed.
3. Reports: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

    a. Identification of activities that have changed.
    b. Changes in early and late start dates.
    c. Changes in early and late finish dates.
    d. Changes in activity durations in workdays.
    e. Changes in the critical path.
    f. Changes in total float or slack time.
    g. Changes in the Contract Time.

4. Narrative: The report shall include a brief description of the actual progress made during the update period; actual and potential delaying activities; any impediments to progress; issues related to inclement weather; progress toward established milestones and project float. The report shall include a brief description of the work anticipated to be performed in the next month. Any minor revisions to the schedule should be identified so they can be evaluated and accepted or rejected.
5. As the Work progresses, indicate Actual Completion percentage for each activity.
6. If the schedule update shows a late finish date after the contract completion date, at a minimum, include the following in the narrative with your submission:

    a. Any known delays.
    b. Actions that will be taken to get back on schedule.
    c. Pending modifications.
    d. Impediments or constraints affecting progress.

7. Progress Payments: The monthly updating of the currently accepted Construction Schedule shall be an integral part of the process upon which progress payments will be made under this contract. If the Contractor fails to provide schedule updates or revisions, then a portion of the monthly payment may be retained until such corrections have been made.

C. Distribution: Distribute copies of accepted schedule to Contracting Officer, Contracting Officers Representative, Construction Management Representative, Subcontractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

D. Construction Schedule Revisions:

1. Required Revisions: If, as a result of the monthly schedule update, it appears the currently accepted Construction Schedule no longer represents the actual prosecution and progress of the work, the Contracting Officer will request, and the Contractor shall submit, a revision to the Construction Schedule. The Contractor may also request reasonable revisions to the currently accepted Construction Schedule in the event the Contractor's planning for the work is revised. If the Contractor desires to make changes, the Contractor shall notify the Contracting Officer in writing, stating the reason for the proposed revision. Accepted revisions will be incorporated into the currently accepted Construction Schedule for the next monthly schedule update.
2. Procedure: If revision to the currently accepted Construction Schedule is contemplated, the Contractor or Contracting Officer shall so advise the other in writing at least seven calendar days prior to the next monthly schedule update meeting, describing the revision and reasons for the revision. Government-requested revisions will be presented in writing to the Contractor, who shall respond in writing within seven calendar days.
3. Reports: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

    a. Identification of activities that have changed.
    b. Changes in early and late start dates.
    c. Changes in early and late finish dates.
    d. Changes in activity durations in workdays.
    e. Changes in the critical path.
    f. Changes in total float or slack time.

3.2 TIME IMPACT ANALYSIS FOR CONTRACT MODIFICATIONS CHANGES DELAYS AND CONTRACTOR REQUESTS:

1. Requirements: When contract modifications or changes are initiated, delays are experienced, or the Contractor desires to revise the currently accepted Construction Schedule, the Contractor shall submit to the Contracting Officer a written time impact analysis illustrating the influence of each modification, change, delay, or Contractor request on the contract time.
2. Time Extensions: Activity delays, which result in projecting a late completion date, shall not automatically mean that an extension of the contract time is warranted or due the Contractor. It is possible that a modification, change, or delay will not affect existing critical path activities or cause non-critical activities to become critical. A modification, change, or delay may result in only absorbing a part of the available total float that may exist within an activity chain of the Schedule, thereby not causing any effect on the contract time. Time extensions will be granted in accordance with the terms of the contract.

3. Extension of the contract time will be granted only to the extent the equitable time adjustments to the activity or activities affected by the modification, change, or delay exceeds the total (positive or zero) float available on a particular activity.
4. Procedure: Each time impact analysis shall be submitted within the time period stated in a request for proposal, or the time period designated under the clauses entitled Changes or Default. In cases where the Contractor does not submit a written request for extension of time and a time impact analysis within the designated time, it is mutually agreed that the particular modification, change, delay, or Contractor request does not require an extension of the contract time. Upon acceptance, the time impact analysis shall be incorporated into the currently accepted Construction Schedule at the next monthly schedule update.
5. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall Construction Schedule.

END OF SECTION 01 32 16

SECTION 01 32 33 – PHOTO DOCUMENTATION FOR HISTORIC PRESERVATION PROJECTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for the following:

1. Existing Condition images.
2. Periodic construction images.

B. See Division 01 Section "Closeout Procedures" for a complete listing of closeout documents.

1.2 SUBMITTALS

A. Construction Images: Submit images electronically within seven days of taking the image. Include the following for each:

1. Include Date, time and number (sequentially number all images) in filename.
2. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
3. Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

B. Closeout: Submit a complete set of digital image electronic files as a Project Record Document**.** Submit on either a Compact Disc (CD) or Digital Video Disc (DVD).

1. Provide an index as a separate file on the Disc. List each image as a file name with number, date, and time. Include description and or vantage point image was taken.
2. Submit images that have the same aspect ratio as the sensor, un-cropped.

PART 2 - PRODUCTS

2.1 FORMAT REQUIREMENTS

A. Media: CD-R Archival Gold or DVD-R Archival Gold

B. Media Labels: Archival CD/DVD labeling markers, archival labels, or direct print CD

C. Images: Provide sRGB color images in JPEG format. Minimum sensor size of 8 mega pixels, and at an image resolution of not less than 1600 by 1200 pixels.

PART 3 - EXECUTION

3.1 CONSTRUCTION IMAGES

A. General: Take digital images using the maximum range of depth of field, and that are in focus, to clearly show the Work. Images with blurry or out-of-focus areas will not be accepted.

1. Maintain index with each set of Construction images that identifies the number, date, time, and description for each.
2. Maintain one set of images accessible in the field office at the Project site, available at all times for reference.

B. Existing Condition Images: Before commencement of demolition, take color digital images of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Contracting Officer.

1. Flag construction limits before recording construction images.
2. Take eight separate images to show existing conditions adjacent to property before starting the Work.
3. Take eight separate images of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.

C. Periodic Construction Images: Take 12 color, digital images monthly, coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last images were taken.

D. Additional Images: Contracting Officer may issue requests for additional images, in addition to periodic Construction images specified.

1. Three days notice will be given, where feasible.
2. In emergency situations, take additional images within 24 hours of request.
3. Circumstances that could require additional images include, but are not limited to, the following:

a. Immediate follow-up when on-site events result in construction damage or losses.
b. Images to be taken at fabrication locations away from Project site.
c. Substantial Completion of a major phase or component of the Work.
d. Extra record images at time of final acceptance.

END OF SECTION 01 32 33

SECTION 01 33 23 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

A. Action Submittals: Written, graphic information, and physical samples that require Government's responsive action.

B. Informational Submittals: Written information that does not require Government's responsive action. Submittals may be rejected for not complying with the requirements.

C. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.3 GENERAL SUBMITTAL PROCEDURES

A. General: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual specific sections.

1. Contracting Officer reserves the right to require submittals in addition to those called for in individual sections.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Review them for legibility, accuracy, completeness, and compliance with Contract Documents.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

a. Contracting Officer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Submittal List: A submittal list has been attached to the end of this Specification Section. The intent is to provide an overall summary of submittal requirements and not a comprehensive list. The requirements of the individual Specification Sections, terms and conditions of the Contract still apply regardless of what is shown on the submittal list.

D. Processing Time: Allow enough time for submittal review, including time for re-submittals, as follows. Time for review shall commence when an e-mail notification is received by the Contracting Officer (or designee) indicating the submittal has been posted on the NPS SharePoint website and is ready for review. When the Contracting Officer has completed their review, an e-mail notification will be sent to the Contractor indicating the submittal has been processed. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including re-submittals.

1. Action Submittals

    a. Initial Review: Allow 30 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required.
    b. Re-submittal Review: Allow 30 days for review of each re-submittal.

2. Informational submittals

    a. Review: Allow 10 days for review of each submittal.

E. Approved Equals:

1. For each item proposed as an "approved equal," submit supporting data, including:

    a. Drawings and samples as appropriate.
    b. Comparison of the characteristics of the proposed item with that specified.
    c. Changes required in other elements of the work because of the substitution.
    d. Name, address, and telephone number of vendor.
    e. Manufacturer's literature regarding installation, operation, and maintenance, including schematics for electrical and hydraulic systems, lubrication requirements, and parts lists. Describe availability of maintenance service, and state source of replacement materials.

2. A request for approval constitutes a representation that Contractor:

    a. Has investigated the proposed item and determined that it is equal or superior in all respects to that specified.
    b. Will provide the same warranties for the proposed item as for the item specified.
    c. Has determined that the proposed item is compatible with interfacing items.
    d. Will coordinate the installation of an approved item and make all changes required in other elements of the work because of the substitution.
    e. Waives all claims for additional expenses that may be incurred as a result of the substitution.

F. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. CM-SPE Transmittal Form: All submittals shall be transmitted using National Park Service form CM-SPE form. The form is accessed and completed on the NPS/DSC SharePoint Project website. No action will be taken on a submittal item unless accompanied by the CM-SPE transmittal form.

    a. Complete the general information at the top of the form.

b. Provide all required information based on the submittal type

c. Attach all related documents.

d. Sign the CM-SPE form in the contractor section at the bottom of the form, and select “submit” when complete.

2. Physical samples: Complete the CM-SPE on the NPS/DSC SharePoint Project website as described above. Deliver the physical sample to the CO (or designee) on site for processing. All comments and actions will be documented on the CM-SPE form on the NPS/DSC SharePoint Project website.

G. Identification: Submittal number or other unique identifier, including revision identifier.

1. Submittal number shall use a sequential number (e.g., .001). Re-submittals shall include an alphabetic suffix after another decimal point (e.g., .001.A).

H. Re-submittals: Make re-submittals using the same process used with the initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in the title block on the CM-SPE and clearly indicate the extent of revision.
3. Re-submit submittals until they are marked “Approved” or “Approved with notations”.

I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, and others as necessary for performance of construction activities.

J. Use for Construction: Use only final submittals with mark indicating “Approved” or “Approved with notations”. Ensure all notations have been incorporated and, at a minimum, keep one copy of the final approved submittal on site for use during construction.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

a. Manufacturer’s product specifications.

b. Manufacturer’s installation instructions: When Contract Documents require compliance with manufacturer’s printed instructions, provide one complete set of instructions to Contracting Officer and keep another complete set of instructions at the project site until substantial completion.

c. Manufacturer’s catalog cuts: Submit only pertinent pages; mark each page of standard printed data to identify specific products proposed for use.

d. Wiring diagrams showing factory-installed wiring.

e. Printed performance curves.
f. Operational range diagrams.
g. Compliance with specified referenced standards.
h. Testing by recognized testing agency.

4. Submit product data in PDF file format before or concurrent with samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Dimensions.
b. Identification of products.
c. Fabrication and installation drawings.
d. Roughing-in and setting diagrams.
e. Shopwork manufacturing instructions.
f. Templates and patterns.
g. Schedules.
h. Notation of coordination requirements.
i. Notation of dimensions established by field measurement.
j. Relationship to adjoining construction clearly indicated.
k. Seal and signature of professional engineer if specified.

2. Submit shop drawings as a PDF electronic file.

C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Complete and post the CM-SPE on the NPS SharePoint website for processing and documentation of action on submitted samples.
3. Identification: Attach label on unexposed side of Samples that includes the following:

a. Generic description of Sample.
b. Product name and name of manufacturer.
c. Sample source.
d. Submittal Number and title of appropriate Specification Section.

4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

a. Number of Samples: Submit two full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Contracting Officer will return submittal with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

    a. Number of Samples: Submit four sets of Samples. Contracting Officer will retain three Sample sets; remainder will be returned. Retain Sample set as a Project Record Sample.

D. Construction Materials: The Contractor is encouraged to submit for approval products made out of recycled or environmentally responsible material. Every effort will be made by the National Park Service to approve these materials.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by individual Specification Sections.

1. Post informational submittals as PDF electronic files directly to the NPS SharePoint website.
2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
3. Informational submittals that do not comply with the requirements specified in the Contract Documents will be rejected and one copy will be returned.

B. Contractors Construction Schedule: Comply with the requirements specified in Section 01 32 16 “Construction Schedule.”

C. Accident Prevention Plan: Comply with the requirements specified in Section 01 35 23 “Safety Requirements.”

D. Schedule of Values: Comply with the requirements specified in Section 01 32 16 “Construction Schedule.”

E. Waste Recycling Plan: Comply with the requirements specified in Section 01 74 19 “Construction Waste Management and Disposal.”

F. Quality Control Plan: Comply with the requirements specified in Section 01 40 00 “Quality Requirements.”

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

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

I. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with the requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

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

K. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with the requirements in the Contract Documents.

L. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with the requirements in the Contract Documents.

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

N. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with the requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

O. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.

P. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

Q. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

R. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with the requirements in the Contract Documents.

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

T. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.

U. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:

1. Statement on condition of substrates and their acceptability for installation of product.
2. Summary of installation procedures being followed, whether they comply with the requirements and, if not, what corrective action was taken.
3. Results of operational and other tests and a statement of whether observed performance complies with the requirements.

V. Permit Compliance Products: Prepare required information for compliance with permit provisions. Products include written notification of project startup, suspension, and completion of work; photo documentation of site conditions; reports; and drawings.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions.

3.2 CONTRACTING OFFICER'S ACTION

A. General: Submittals will be disapproved without technical review if identification information is missing, not filled in, or if placed on the back of the submittal; an incorrect format of submittals is provided; the transmittal form is incorrectly filled out; submittals are not coordinated; or submittals do not show evidence of Contractor's approval.

1. Any work done or orders for materials or services placed before approval shall be at the Contractor's own risk.

B. Action Submittals: Contracting Officer will review each submittal, generate comments on corrections or modifications required, and indicate the appropriate action on the CM-SPE Transmittal Form. The submittal will be marked in one of three ways as defined below:

1. APPROVED: Acceptable with no corrections.
2. APPROVED WITH NOTATIONS: Minor corrections or clarifications required. All comments are clear and no further review is required. The Contractor shall address all review comments when proceeding with the work.
3. DISAPPROVED - RESUBMIT: Rejected as not in accordance with the contract or as requiring major corrections or clarifications. The Contracting Officer will identify the reasons for disapproval. The Contractor shall revise and resubmit with changes clearly identified.

C. Informational Submittals: Contracting Officer will review each submittal and will either accept or reject it.

D. Partial submittals are not acceptable, will be considered non-responsive, and will be returned without review.

END OF SECTION 01 33 23

SECTION 01 35 23 - SAFETY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes establishing an effective accident prevention program and providing a safe working environment for all personnel and visitors.

1.2 SUBMITTALS

A. Accident Prevention Plan (APP): After contract award and before the Pre-Construction conference, submit for review, an Accident Prevention Plan. The Contracting Officer will review the proposed Plan. If the plan requires any revisions or corrections, the Contractor shall resubmit the Plan within 10 days. No progress payments will be made until the Plan is accepted.

1.3 QUALITY ASSURANCE

A. Comply with contract clauses entitled "Accident Prevention" and "Permits and Responsibilities". In case of conflicts between Federal, State, and local safety and health requirements, the most stringent shall apply. Equipment or tools not meeting OSHA requirements will not be allowed on the project sites. Failure to comply with the requirements of this section and related sections may result in suspension of work.

B. Qualifications of Employees:

1. All employees must be physically and able to perform their assigned duties in a safe manner.
2. Do not allow employees to perform work whose ability or alertness is impaired because of prescription or illegal drug use, fatigue, illness, intoxication, or other conditions that may expose themselves or others to injury.
3. Operators of vehicles, hoisting equipment, and hazardous plant equipment shall be able to understand signs, signals, and operating instructions, and be fully capable of operating such equipment. Provide operating instructions for all equipment. Newly hired operators shall be individually tested by an experienced operator or supervisor to determine if they are capable of safely operating equipment. Retain copies of all operators licenses and/or certifications onsite.

1.4 ACCIDENT REPORTING

A. Reportable Accidents (per OSHA 29CFR 1904): A project reportable accident is defined as death, occupational disease, traumatic injury to employees or the public, fires, and property damage by accident in excess of $100. Notify Contracting Officer immediately in the event of a reportable accident. Within 7 days of a reportable accident, fill out and forward to Contracting Officer an Accident/Property Damage Report (Form CM-22). Form may be obtained from the Contracting Officer.

PART 2 - PRODUCTS

2.1 ACCIDENT PREVENTION PLAN (APP)

A. The Plan shall be written to comply with OSHA and project requirements (a generic plan is not acceptable) including but not limited to the following:

1. Name of responsible supervisor to carry out the program.
2. Weekly and monthly safety meetings shall be documented with topic and attendees.
3. First aid and rescue procedures.
4. Outline of each phase of the work, the hazards associated with each major phase, and the methods proposed to provide for property protection and safety of the public, National Park Service personnel, and Contractor's employees. Identify the work included under each phase, with an Job Hazard Analysis (JHA)/Job Safety Analysis (JSA), etc.
5. Training, both initial and continuing.
6. Planning for possible emergency situations, such as cave-ins, earthquake, explosions,, fires, floods, power outages, slides, and wind storms. Such planning shall take into consideration the nature of construction, site conditions, and degree of exposure of persons and property.

2.2 FIRST AID FACILITIES

A. Provide adequate facilities for the number of employees and appropriate to the hazards associated with the types of ongoing construction work at the site.

2.3 PERSONNEL PROTECTIVE EQUIPMENT

A. Meet requirements of applicable ANSI standards. Selection shall conform to OSHA 29CFR 1926.95 Subpart E.

PART 3 - EXECUTION

3.1 EMERGENCY INSTRUCTIONS

A. Post telephone numbers and reporting instructions for ambulance, physician, hospital, fire department, and police in conspicuous locations at the work site.

3.2 FIRE AND LIFE SAFETY

A. Comply with the requirements of NFPA 241 (Standard for Safeguarding Construction, Alteration, and Demolition Operations).

B. Store hazardous materials in accordance with manufacturer’s and OSHA 29CFR1926 Subpart D requirements. Maintain readily available, on site, MSDS/Safety Data Sheets (SDS) for each chemical.

1. Immediately report all spills of hazardous materials to the park.
2. Maintain a spill emergency response kit.
3. Train employees how to respond to a spill and use the emergency response kit.

3.3 PROTECTIVE EQUIPMENT

A. Inspect personal protective equipment daily and maintain in a serviceable condition. Clean, sanitize, and repair personal items, as appropriate, before issuing them to another individual.

B. Inspect, maintain, and document other protective equipment and devices before use and on a periodic basis to ensure safe operation. Retain inspection documentation onsite.

3.4 SAFETY MEETINGS

A. As a minimum, conduct one weekly 15-minute "toolbox" safety meetings. These meetings shall be conducted by a foreman or supervisor and attended by all construction personnel at the worksite. Topics need to coincide with work scheduled for the following week. Document and submit meeting minutes to the Contracting Officer within one day after the meeting.

B. Conduct monthly safety meetings for all levels of supervision. Meetings shall be attended by all contractors and subcontractors performing work on the site. Notify the Contracting Officer of meeting dates and times. These meetings shall be used to review the effectiveness of the Contractor's safety effort, to resolve current health and safety problems, to provide a forum for planning safe construction activities, and for updating the Accident Prevention Plan. The Contracting Officers Representative will attend the meeting and enter the results of the meetings into the daily log.

3.5 HARD HATS AND PROTECTIVE EQUIPMENT AREAS

A. A hard hat use area shall be designated by the Contractor. The hard hat area shall be posted by the Contractor in a manner satisfactory to the Contracting Officer.

B. It is the Contractor's responsibility to require all those working on or visiting the site to wear hard hats and other necessary personal protective equipment in good repair at all times. As a minimum, maintain six hard hats and all other APP required equipment.

3.6 TRAINING

A. First Aid: Provide adequate training to an adequate number of personnel to ensure prompt and efficient first aid.

B. Hazardous Material: Train and instruct each employee exposed to hazardous material in safe and approved methods of handling and storage. Hazardous materials are defined as explosive, flammable, poisonous, corrosive, oxidizing, irritating, or otherwise harmful substances that could cause death or injury.

END OF SECTION 01 35 23

SECTION 01 35 91 - HISTORIC PRESERVATION TREATMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes special procedures for historic treatment on the Project including, but not limited to, the following:

1. Definitions.
2. Submittals.
3. Quality Assurance.
4. Storage and protection of existing historic materials.
5. Project site conditions.
6. Historic Preservation Treatment Plan
7. Protection, General.
8. Protection during application of chemicals.
9. Historic preservation treatment procedures.

1.2 DEFINITIONS

A. “Dismantle”: To disassemble or detach a historic item from a surface, or a nonhistoric item from a historic surface, using gentle methods and equipment to prevent damage to historic items and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

B. "Rehabilitation": To make possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features that convey its historical, cultural, or architectural values.

C. "Reconstruction": To reproduce in the exact form and detail a building, structure, or artifact as it appeared at a specific period in time. Reconstructed elements do not possess historic integrity in their own right since it is not original fabric.

D. "Stabilize": To apply measures designed to reestablish a weather-resistant enclosure and the structural reinforcement of an item or portion of the building while maintaining the essential form as it exists at present. This level of intervention is aimed at retarding or arresting adverse impacts to structures.

E. "Protect and Maintain": To remove deteriorating corrosion, reapply protective coatings, and install protective measures such as temporary guards; to provide the least degree of intervention.

F. "Repair": To stabilize, consolidate, or conserve; to retain existing materials and features while employing as little new material as possible. Repair includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials. Within restoration, repair also includes limited replacement in kind, rehabilitation, and reconstruction, with compatible substitute materials for deteriorated or missing parts of features when there are surviving prototypes.

G. "Replace": To duplicate in its entirety a historic element or feature by matching its historic pattern, detail and appearance. . Replacement is justified when original or historic elements are damaged beyond repair or are missing. Replacement methods includes the following conditions:

1. Replacement with Original or Historic Fabric: Includes fabric salvaged from other locations or projects having identical architectural qualities. It means duplication of appearance using identical material possessing historical significance.
2. Replacement with New Materials: Includes replacement with new material of like kind (custom fabricated of manufactured) that is currently in production. It means duplication of appearance using like material.
3. Replacement with Substitute Materials: Includes replacement with a compatible substitute that is frequently contemporary and unlike the historic fabric. It means duplication of appearance using modern (non-traditional) material Use of substitute materials is not approved unless matching materials are not available.

H. "Remove": To demolish or detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

I. "Remove and Salvage": To detach items from existing construction and deliver them to the NPS.

J. "Remove and Reinstall": To detach items from existing construction, repair and prepare them for reuse, and reinstall them where indicated.

K. "Existing to Remain" or "Retain": Existing items of construction that are not to be removed and that are not otherwise indicated to be removed and salvaged, or removed and reinstalled.

L. "Material in Kind": Material that closely matches existing materials, through comparison of architectural qualities and salient characteristic such as species, cut, color, grain, , dimension, profile, thickness, and finish.

1.3 SUBMITTALS

A. Historic Preservation Treatment Plan:

1. After the contract award and before the Pre-Construction conference, submit for approval a written Historic Preservation Treatment Plan (HPTP).
2. If the plan requires any revisions or corrections, the contractor shall resubmit the plan within 10 days.
3. No change in the approved plan may be made without written concurrence by the Contracting Officer.

B. Alternative Methods and Materials: If alternative methods and materials to those indicated are proposed for any phase of work, provide a written description including evidence of successful use on other, comparable projects, and program of testing to demonstrate effectiveness for use on this Project.

C. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by historic treatment operations. Submit before work begins.

1.4 QUALITY ASSURANCE

A. Historic Preservation Treatment Specialist Qualifications: An experienced firm with the required certifications and training that can demonstrate through past performance that they are qualified to perform this work.

1.5 STORAGE AND PROTECTION OF HISTORIC MATERIALS

A. Removed and Salvaged Historic Materials:

1. Clean salvaged historic items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to the NPS.
4. Transport items to storage area designated by Contracting Officer.
5. Protect items from damage during transport and storage.
6. Do not dispose of items removed from existing construction without prior written consent of Contracting Officer.

B. Removed and Reinstalled Historic Materials:

1. Clean and repair historic items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

C. Existing Historic Materials to Remain: Protect construction indicated to remain against damage and soiling during historic treatment. When permitted by Contracting Officer, items may be removed to a suitable, protected storage location during historic treatment and reinstalled in their original locations after historic treatment operations are complete.

D. Storage and Protection: When removed from their existing location, store historic materials within a weather-tight enclosure where they are protected from wetting by rain, snow, or ground water, and temperature variations. Secure stored materials to protect from theft.

1. Identify removed items with an inconspicuous mark indicating their original location.
2. Develop a key plan when many similar items are scheduled for removal and reinstallation.

1.6 PROJECT-SITE CONDITIONS

A. Exterior Cleaning and Repairing:

1. Proceed with the work only when forecasted weather conditions are favorable.

a. Wet Weather: Do not attempt repairs during rainy or foggy weather. Do not apply primer, paint, putty, or epoxy when the relative humidity is above 80 percent. Do not remove exterior elements of structures when rain is forecast or in progress.

b. Do not perform exterior wet work when the air temperature is below 40 deg F (5 deg C).
c. Do not begin cleaning, patching, or repairing when there is any likelihood of frost or freezing.
d. Do not begin cleaning when either the air or the surface temperature is below 45 deg F (7 deg C) unless approved means are provided for maintaining a 45 deg F (7 deg C) temperature of the air and materials during, and for 48 hours subsequent to, cleaning.

2. Perform cleaning and rinsing of the exterior only during daylight hours.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 HISTORIC PRESERVATION TREATMENT PLAN

A. Prepare a written technical plan for preservation work covering all preservation components of the project. The plan must verify that the construction strategy and the intent is compatible with the Department Of Interior's standards for the Treatment of Historic Properties, guidelines for the Treatment of Cultural Landscapes, and National Park Service management policies for cultural resources. The plan must satisfy both the project scope and resource protection requirements. The plan shall include the following:

1. Organized list of preservation components of the project, systems, and tasks.
2. Staging and sequence of the work.
3. Disassembly and reassembly techniques and steps.
4. Equipment and tools required.
5. Supplies and materials with manufacturer or supplier identified.
6. Skilled trades and crafts required.
7. Anticipated testing and analysis of fabric.
8. Additional investigations for the extents or magnitude of treatments needed.
9. Protective measures.
10. Seasonal limitations on the work.
11. Alternative means if primary treatment method is unfeasible.
12. Work conducted off-site (Approval from CO required prior to taking resources off-site).

3.2 PROTECTION, GENERAL

A. Comply with manufacturer's written instructions for precautions and effects of products and procedures on adjacent building materials, components, and vegetation.

B. Ensure that supervisory personnel are present when work begins and during its progress.

C. Temporary Protection of Historic Materials during Construction:

1. Protect existing materials during installation of temporary protections and construction. Do not deface or remove existing materials.
2. Attachments of temporary protection to existing construction shall be approved by Contracting Officer prior to installation.

D. Existing Drains: Prior to the start of work or any cleaning operations, test drains and other water removal systems to ensure that drains and systems are functioning properly. Notify Contracting Officer immediately of drains or systems that are stopped or blocked. Do not begin Work of this Section until the drains are in working order.

1. Provide a method to prevent solids from entering the drains or drain lines. Clean out drains and drain lines that become blocked or filled by sand or any other solids because of work performed under this Contract.
2. Protect storm drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

3.3 PROTECTION DURING APPLICATION OF CHEMICALS

A. Protect persons, motor vehicles, surrounding surfaces of building being rehabilitated, building site, plants, and surrounding buildings from harm or damage resulting from applications of chemical cleaners and paint removers.

B. Comply with requirements in Division 01 Section "Temporary Facilities and Controls."

C. Cover adjacent surfaces with materials that are proven to resist chemical cleaners selected for Project unless chemicals being used will not damage adjacent surfaces. Use covering materials that contain only waterproof, UV-resistant adhesives. Apply masking agents to comply with manufacturer's written instructions. Do not apply liquid masking agent to painted or porous surfaces. When no longer needed, promptly remove masking to prevent adhesive staining.

D. Do not clean surfaces during winds of sufficient force to spread cleaning solutions to unprotected surfaces.

E. Neutralize and collect alkaline and acid wastes and dispose of outside park boundaries.

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

3.4 HISTORIC PRESERVATION TREATMENT PROCEDURES

A. The principal aim of rehabilitation work is to halt the process of deterioration and stabilize the item's condition, to sustain the integrity of the historic element, feature or structure being preserved. Cyclic maintenance is often required as well as repair work. Repair is required where specifically indicated. The following procedures shall be followed:

1. Retain as much existing material as possible; repair and consolidate rather than replace.

2. Use additional material or structure to reinforce, strengthen, prop, tie, and support existing material or structure.
3. Use reversible processes wherever possible.
4. Use traditional replacement materials and techniques if possible. New work shall be distinguishable from old work and original materials and techniques.
5. Record the existing condition before commencing with repair work; document with preconstruction photos, sketches and field notes. Record repair work during construction with periodic construction photos and daily inspection reporting. Photo documentation is specified in Division 01 Section "Photo Documentation For Historic Preservation Projects".

B. Prohibit smoking by personnel performing work on or near historic structures. Do not use heat-generating equipment in the work.

C. Notify Contracting Officer of visible changes in the integrity of material or components whether due to environmental causes including biological attack, UV degradation, freezing, or thawing; or due to structural defects including cracks, movement, or distortion.

1. Do not proceed with the work in question until directed by Contracting Officer.

D. Where Work requires existing features to be removed, cleaned, and reinstalled, perform these operations without damage to the material itself, to adjacent materials, or to the substrate.

END OF SECTION 01 35 91

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

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

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements. The quality of all work shall be the responsibility of the Contractor.

1. Specified tests, inspections, and related actions do not limit Contractor's other quality assurance and control procedures that facilitate compliance with the Contract Document requirements.

C. See Divisions 02 through 06 Sections for specific test and inspection requirements.

1.2 DEFINITIONS

A. Quality Assurance Services: Activities, actions, and procedures performed before and during execution of the work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality Control Services: Tests, inspections, procedures, and related actions during and after execution of the work to evaluate that actual products incorporated into the work and completed construction comply with requirements.

C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

D. Preconstruction Testing: Tests and inspections that are performed specifically for the project before products and materials are incorporated into the work to verify performance or compliance with specified criteria.

E. Product Testing: Tests and inspections that are performed by a Nationally Recognized Testing Laboratory (NRTL), a National Voluntary Laboratory Accreditation Program (NVLAP), or a testing agency qualified to conduct product testing, to establish product performance and compliance with industry standards.

F. Source Quality Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.

G. Field Quality Control Testing: Tests and inspections that are performed on-site for installation of the work and for completed work.

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

I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Using a term such as “carpentry” does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as “carpenter.” It also does not imply that requirements specified apply exclusively to trades people of the corresponding generic name.

1.3 CONFLICTING REQUIREMENTS

A. Reference Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Contracting Officer for a decision before proceeding.

B. Minimum Quality Levels: The quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Contracting Officer for a decision before proceeding.

1.4 SUBMITTALS

A. Quality Control Plan:

1. After contract award and before the Pre-Construction conference, submit for approval a written Contractor Quality Control (CQC) plan.
2. If the plan requires any revisions or corrections, the Contractor shall resubmit the plan within 10 days.
3. The Government reserves the right to require changes in the plan during the contract period as necessary to obtain the quality specified.
4. No change in the approved plan may be made without written concurrence by the Contracting Officer.

B. Qualification Data: For testing agencies specified in “Quality Assurance” Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

C. Contractor's Quality Control Daily Reports: Submit showing all inspections and tests on the first workday following the date covered by the report. Quality Control Supervisor shall utilize the DSC forms available by accessing the DSC Workflows website, http://www.nps.gov/dscw/publicforms.htm.

1. Review CMR Dailies and reconcile any differences prior to posting CQC Dailies on the SharePoint Project Website.

D. Test Reports

1. Test reports shall be completed by the person performing the test.
2. Submit Daily Test Information Sheets with Quality Control Daily Reports.
3. Submit failing test results and proposed remedial actions within four hours of noted deficiency.
4. Submit three copies of complete test results no later than one calendar day after the test was performed.

E. Accessibility Inspection Report:

1. Fill out the applicable sections of the Accessibility Inspection Report and attach to the Quality Control Daily Report.
2. Utilize the attached Accessibility Inspection form to document compliance with the Architectural Barriers Act Accessibility Standards (ABAAS).
3. Inspect at various stages of construction as needed to insure the finished product meets the standards.
4. Submit report not later than one calendar day after the inspection was performed.

F. Off-Site Inspection Reports: Submit prior to shipment.

G. If the CQC plan and Quality Control Daily Reports are not submitted as specified, the Contracting Officer may retain all payments until such time a plan is accepted and implemented, or may retain payments for work completed on days there are no Quality Control Daily Reports.

H. Permits, Licenses, and Certificates: For NPS records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the work.

1.5 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Contractors Quality Control Staff:

1. The Contractor's Quality Control Supervisor may also perform other duties.
2. The Contractor's designated Quality Control Supervisor shall be on the project site whenever contract work is in progress.
3. The Contractor's job supervisory staff may be used to assist the Quality Control Supervisor supplemented, as necessary, by additional certified testing technicians.

C. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

D. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

E. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

F. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated (including Structural Tests and Special Inspections (STSI). Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.

G. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirement for specialists shall not supersede building codes and regulations governing the work.

H. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and where required by Contract, is acceptable to the Contracting Officer.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
3. All measuring devices, laboratory equipment, and instruments shall be calibrated at established intervals against certified standards in accordance with NIST requirements. Upon request, measuring and testing devices shall be made available for use by the Government for verification tests.

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

J. Mockups: Before installing portions of the work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed work:

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

1.6 QUALITY CONTROL

A. The Contractor is responsible for all testing and inspections, including Structural Tests and Special Inspections (STSI), as identified in the attached STSI. Inspect and test work as needed to ensure that the quality of materials, workmanship, construction, finish, and functional performance are in compliance with applicable specifications, drawings, and those required by the Building Code.

1. Engage a qualified testing agency to perform these quality-control services.
2. Submit the appropriate report, for each quality-control service.
3. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
4. The Contracting Officer may designate test locations.

B. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.

C. Re-testing/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that replaced work that failed to comply with the Contract Documents.

D. Testing Agency Responsibilities: Cooperate with NPS and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Contracting Officer and Contractor promptly of irregularities or deficiencies observed in the work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit 3 copies of the certified written report of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the work.

E. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

F. Coordination: Coordinate sequence of activities to accommodate required quality assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS

2.1 QUALITY CONTROL PLAN

A. The Quality Control Plan shall include:

1. A list of personnel responsible for quality control and assigned duties. Include each person's qualifications.
2. A copy of a letter of direction to the Contractor's Quality Control Supervisor outlining assigned duties.
3. Names, qualifications, and descriptions of laboratories to perform sampling and testing, and samples of proposed report forms.
4. Methods of performing, documenting, and enforcing quality control of all work.
5. Methods of monitoring and controlling environmental pollution and contamination as required by regulations and laws.

PART 3 - EXECUTION

3.1 OFF-SITE CONTROL

A. Items that are fabricated or assembled off-site shall be inspected for quality control at the place of fabrication.

3.2 ON-SITE CONTROL

A. Notification:

1. Notify the Contracting Officer at least 48 hours in advance of the preparatory phase meeting.
2. Notify the Contracting Officer at least 24 hours in advance of the initial and follow-up phases.

B. Preparatory Phase: Perform before beginning each feature of work.

1. Review control submittal requirements with personnel directly responsible for quality assurance and quantity control of the work. As a minimum, the Contractor's Quality Control Supervisor and the foreman responsible for the feature of work shall be in attendance.
2. Review all applicable specifications sections and drawings related to the feature of work.
3. Ensure that copies of all referenced standards related to sampling, testing, and execution for the feature of work are available on site.
4. Ensure that provisions have been made for field control testing.
5. Examine the work area to ensure that all preliminary work has been completed.

6. Verify all field dimensions and advise the Contracting Officer of discrepancies with contract documents.
7. Ensure that necessary equipment and materials are at the project site and that they comply with approved shop drawings and submittals.
8. Document all preparatory phase activities and discussions on the Contractor's Quality Control Daily Report.

C. Initial Phase:

1. As soon as work begins, inspect and test a representative portion of a particular feature of work for quality of workmanship.
2. Review control testing procedures to ensure compliance with contract requirements.
3. Document all initial phase activities and discussions on the Contractor's Quality Control Daily Report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.

D. Follow-Up Phase: Inspect and test as work progresses to ensure compliance with contract requirements until completion of work.

E. Additional Preparatory and Initial Phases: Additional preparatory and initial phases may be required on the same feature of work for the following reasons:

1. Quality of on-going work is unacceptable.
2. Changes occur in the applicable quality control staff, on-site production supervision, or work crew.
3. Work on a particular feature of work is resumed after a substantial period of inactivity.

3.3 DOCUMENTATION

A. Maintain Quality Control Daily Reports, Daily Test Report Information Sheets, and Accessibility Inspection Reports (Forms may be downloaded from the DSC Workflows website, http://www.nps.gov/dscw/publicforms.htm.) of quality control activities and tests.

B. Quality Control Daily Reports may not be substituted for other written reports required under clauses of the contract, such as Disputes, Differing Site Conditions, or Changes.

3.4 ENFORCEMENT

A. The Contractor shall stop work on any item or feature pending satisfactory correction of any deficiency noted by the quality control staff or the Contracting Officer.

3.5 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Comply with the Contract Document requirements for Division 01 Section “Cutting and Patching.”

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00

ATTACHMENT: STATEMENT OF SPECIAL INSPECTIONS

Statement of Structural Tests and Special Inspections

Denver Service Center
National Park Service

Park: Lowell National Historical Park; Lowell, MA

PMIS: 225866

Project Name: Rehabilitate Northern Canal Waste Gatehouse

Structural Engineering Firm: EYP, Inc.

This Statement of Structural Tests and Special Inspections (STSI) is being submitted as required by Chapter 17 of the 2015 International Building Code (IBC-15). It includes the following:

1. Seismic requirements
2. Wind requirements
3. Qualification requirements for Inspectors and Testing Technicians
4. Listing of Required Structural Tests and Special Inspections

The Construction Contractor's Quality Control Supervisor will provide copies of all special inspection reports and associated documentation to the Contracting Officer. The Construction Contractor will be required to correct all deficiencies discovered in the Special Inspection and Structural Testing program.

Prepared by:

Mark C. Kanonik, P.E.

_____
(Type or print name)

_____
Signature Date PE or SE Stamp

Seismic and Wind Requirements

Seismic Requirements, IBC-15 Section 1704.3

Description of seismic-force-resisting system and designated seismic systems subject to special inspections:

The seismic-force-resisting system within the Counting House consists of existing unreinforced masonry shear walls in both the north-south and east-west directions. The seismic loads acting on the Counting House are unchanged: no additional gravity loads are added, and none of the existing shear walls are modified, as part of this work. Therefore, special inspections of the existing seismic-force-resisting system are not required.

Wind Requirements, IBC-15 Section 1704.3

Description of wind-force-resisting system and designated wind systems subject to special inspections:

The wind-force-resisting system within the Counting House consists of existing unreinforced masonry shear walls in both the north-south and east-west directions. The wind loads acting on the Counting House are unchanged, and none of the existing shear walls are modified, as part of this work. Therefore, special inspections of the existing wind-force-resisting system are not required.

Instructions:

1. Place an “X” in the column titled “Required?” for all Special Inspections and Tests required for this project.
2. In the column marked “Required Qualifications” provide the qualifications for the special inspector, using the list beginning on page 4, for all required Structural Tests and Special Inspections.
3. For those items listed as “Continuous,” continuous special inspection shall be as defined in Section 1702.1 and Chapter 2, IBC-15.
4. For those items listed as “Periodic” provide the minimum number of tests, i.e. 20% of all field welds, or the amount of work to be inspected (e.g. 10% of all wall surfaces).
5. Attach completed STSI to the end of the Specification Section 01 40 00, Quality Requirements.

Qualification Requirements for Inspectors and Testing Technicians

PE/SE	Structural Engineer – licensed PE or SE specializing in the design of buildings and structures
PE/GE	Geotechnical Engineer – licensed PE specializing in soil mechanics and foundations
EIT	Engineer-In-Training – graduate engineer who has passed the Fundamentals of engineering examination

American Concrete Institute (ACI) Certification

ACI-CCSI	Concrete Construction Special Inspector
ACI-LTT	Concrete Laboratory Testing Technician Level 1 or 2
ACI-STT	Concrete Strength Testing Technician
ACI-FTT	Concrete Field Testing Technician – Grade I

American Society of Non-Destructive Testing (ASNT) Certification

Non-Destructive Testing Technician – Level II or III

American Welding Society (AWS) Certification

AWS-CWI	Certified Welding Inspector

Exterior Design Institute (EDI) Certification

EDI-EIFS	Certified EIFS inspector

International Code Council (ICC) Certification

ICC-PCSI	Prestressed Concrete Special Inspector
ICC-RCSI	Reinforced Concrete Special Inspector
ICC-SSI	Soils Special Inspector
ICC-SFSI	Spray-applied Fireproofing Special Inspector
ICC-SMSI	Structural Masonry Special Inspector
ICC-SSBSI	Structural Steel and Bolting Special Inspector
ICC-SWSI	Structural Welding Special Inspector

National Institute for Certification in Engineering Technologies (NICET) Certification

NICET-CT	Concrete Technician – Levels I, II, III and IV
NICET-GET	Geotechnical Engineering Technician - Levels I, II, III and IV
NICET-ST	Soils Technician - Levels I, II, III and IV

Listing of Required Structural Tests and Special Inspections

Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection
Steel Construction (ref: IBC-15 Section 1705.2, AISC 360-10 Chapter N, AISC 341-10 Chapter J)					
	Prior to Welding (AISC 360-10 Table N5.4-1)				
X	1. Welding procedure specifications (WPSs) available	AWS-CWI	X		
X	2. Manufacturer certifications for welding consumables available	AWS-CWI	X		
X	3. Material identification (type/grade)	AWS-CWI		X	
X	4. Welder identification system	AWS-CWI		X	
	5. Fit-up of groove welds (including joint geometry)	AWS-CWI			
	a. Joint preparation	AWS-CWI		X	
	b. Dimensions (alignment, root opening, root face, bevel)	AWS-CWI		X	
	c. Cleanliness (condition of steel surfaces)	AWS-CWI		X	
	d. Tacking (tack weld quality and location)	AWS-CWI		X	
	e. Backing type and fit (if applicable)	AWS-CWI		X	
	6. Configuration and finish of access holes	AWS-CWI		X	
X	7. Fit-up of fillet welds	AWS-CWI			
X	a. Dimensions (alignment, gaps at root)	AWS-CWI		X	
X	b. Cleanliness (condition of steel surfaces)	AWS-CWI		X	
X	c. Tacking (tack weld quality and location)	AWS-CWI		X	
X	8. Check welding equipment	AWS-CWI		X	
	During Welding (AISC 360-10 Table N5.4-2)				
X	1. Use of qualified welders	AWS-CWI		X	
X	2. Control and handling of welding consumables	AWS-CWI			
X	a. Packaging	AWS-CWI		X	
X	b. Exposure control	AWS-CWI		X	
X	3. No welding over cracked tack welds	AWS-CWI		X	
X	4. Environmental conditions	AWS-CWI			
X	a. Wind speed within limits	AWS-CWI		X	
X	b. Precipitation and temperature	AWS-CWI		X	
X	5. WPS followed				
X	a. Settings on welding equipment			X	
X	b. Travel speed			X	
X	c. Selected welding materials			X	
X	d. Shielding gas type/flow rate			X	

Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection
X	e. Preheat applied			X	
X	f. Interpass temperature maintained (min. /max.)			X	
X	g. Proper position (F, V, H, OH)			X	
X	h. Intermix of filler metals avoided unless approved (ref: AISC 341-10)			X	
X	6. Welding techniques	AWS-CWI			
X	a. Interpass and final cleaning	AWS-CWI		X	
X	b. Each pass within profile limitations	AWS-CWI		X	
X	c. Each pass meets quality requirements	AWS-CWI		X	
	After Welding (AISC 360-10 Table N5.4-3)				
X	1. Welds cleaned	AWS-CWI		X	
X	2. Size, length and location of welds	AWS-CWI	X		
X	3. Welds meet visual acceptance criteria	AWS-CWI	X		
X	a. Crack prohibition	AWS-CWI	X		
X	b. Weld/base-metal fusion	AWS-CWI	X		
X	c. Crater cross section	AWS-CWI	X		
X	d. Weld profiles	AWS-CWI	X		
X	e. Weld size	AWS-CWI	X		
X	f. Undercut	AWS-CWI	X		
X	g. Porosity	AWS-CWI	X		
X	4. Arc strikes	AWS-CWI	X		
X	5. k-area		X		
	6. Backing removed and weld tabs removed (if required)		X		
	7. Repair activities		X		
X	8. Document acceptance or rejection of welded joint or member	AWS-CWI	X		
	9. Placement of reinforcing or contouring fillet welds (if required) (ref: AISC 341-10)		X		
	10. Backing removed, weld tabs removed and finished, and fillet welds added (if required) (ref: AISC 341-10)		X		
	Nondestructive Testing (AISC 360-10 Section N5.5)				
	1. Risk Category II Structures - Perform Ultrasonic Testing on 10% of CJP groove welds in butt, T- and corner joints subject to transversely applied tension loading, in materials 5/16 in. thick or greater.			X	
	2. Risk Category III or IV Structures - Perform Ultrasonic Testing on all CJP groove welds subject to transversely applied tension loading in butt, T- and corner joints, in materials 5/16 in. thick or greater.	AWS-CWI	X		
	3. Access Holes – Perform Magnetic Particle Testing or Liquid Penetrant Testing when the flange thickness exceeds 2 in. for rolled shapes, or when the web thickness		X		

Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection
	exceeds 2 in. for built-up shapes.				
	4. Welded Joints Subject to Fatigue		X		
	Nondestructive Testing (AISC 341-10 Section J6.2)				
	1. k-area		X		
	2. CJP Groove weld		X		
	3. Lamellar tearing		X		
	4. Beam cope and access hole		X		
	5. Reduced beam section repair		X		
	6. Weld tab removal		X		
	Prior to Bolting (AISC 360-10 Table N5.6-1)				
	These inspections are not required for snug-tight joints				
	1. Manufacturer's certifications available for fastener materials		X		
	2. Fasteners marked in accordance with ASTM requirements			X	
	3. Proper fasteners selected for the joint detail (grade, type, bolt length if threads are to be excluded from shear plane)			X	
	4. Proper fasteners selected for the joint detail (grade, type, bolt length if threads are to be excluded from shear plane)			X	
	5. Connecting elements, including the appropriate faying surface condition and hole preparation, if specified, meet applicable requirements			X	
	6. Pre-installation verification testing by installation personnel observed and documented for fastener assemblies and methods used			X	
	7. Proper storage provided for bolts, nuts, washers and other fastener components			X	
	During Bolting (AISC 360-10 Table N5.6-2)				
	These inspections are not required for snug-tight joints. These inspections are not required for pretensioned joints and slip-critical joints, when the installer is using the turn-of-nut method with matchmarking techniques, the direct-tension-indicator method, or the twist-off-type tension control bolt method.				
	1. Fastener assemblies, of suitable condition, placed in all holes and washers (if required) are positioned as required			X	
	2. Joint brought to the snug-tight condition prior to the pretensioning operation			X	
	3. Fastener component not turned by the wrench prevented from rotating			X	
	4. Fasteners are pretensioned in accordance with the RCSC Specification, progressing systematically from the most			X	

Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection
	rigid point toward the free edges				
	After Bolting (AISC 360-10 Table N5.6-3)				
X	Document acceptance or rejection of bolted connections		X		
	Other Inspection Tasks (AISC 360-10 Section N5.7)				
X	1. Verify compliance of fabricated steel with the details shown on the approved shop drawings.	EIT		X	
	2. Verify compliance of the erected steel frame with the details shown on the approved erection drawings, including braces, stiffeners, member locations and joint details.	EIT		X	
X	3. Anchor rods and other embedments support structural steel				
X	a. Verify the diameter, grade, type and length of the anchor rod or embedded item.			X	
X	b. Verify the extent or depth of embedment into the concrete.			X	
	4. RBS requirements, if applicable (ref: AISC 341-10)				
	a. Contour and finish			X	
	b. Dimensional tolerances			X	
	5. Protected zone—no holes and unapproved attachments made by fabricator or erector, as applicable (ref: AISC 341-10)			X	
	6. H-piles - Protected zone—no holes and unapproved attachments made by the responsible contractor, as applicable (ref: AISC 341-10)			X	
	Cold-formed Steel Deck (IBC-15 1705.2.2)				
	1. Special inspections in accordance with QA/QC-2011 Standard for Quality control and Quality assurance for Installation of Steel Deck				
	Open-Web steel Joists and Joist Girders (IBC-15 Table 1705.2.3)				
	1. Installation of open-web steel joists and joist girders				
	a. End connections – welding or bolted			X	
	b. Bridging – horizontal or diagonal				
	1. Standard bridging			X	
	2. Bridging that differs from the SJI specifications listed in Section 2207.1			X	

	Inspection of Composite Structures Prior to Concrete Placement (AISC 341-10 Table J9-1)				
	1. Material identification of reinforcing steel (Type/Grade)			X	
	2. Determination of carbon equivalent for reinforcing steel other than ASTM A706			X	
	3. Proper reinforcing steel size, spacing and orientation			X	
	4. Reinforcing steel has not been rebent in the field			X	
	5. Reinforcing steel has been tied and supported as required			X	
	6. Required reinforcing steel clearances have been provided			X	
	7. Composite member has required size			X	
	Inspection of Composite Structures During Concrete Placement (AISC 341-10 Table J9-2)				
	1. Concrete: Material identification (mix design, compressive strength, maximum large aggregate size, maximum slump)			X	
	2. Limits on water added at the truck or pump			X	
	3. Proper placement techniques to limit segregation			X	
	Inspection of Composite Structures After Concrete Placement (AISC 341-10 Table J9-3)				
	1. Achievement of minimum specified concrete compressive strength at specified age			X	
	Cold-formed Steel Trusses Spanning 60-feet or Greater (ref: IBC-15 Section 1705.2.4)				
	1. Verify temporary installation restraint/bracing installed in accordance with the approved shop drawings.			X	
	2. Verify permanent individual truss member restraint/bracing installed in accordance with the approved shop drawings.			X	
Concrete Construction (ref: IBC-15 Table 1705.3)					
	1. Inspect reinforcing steel, including prestressing tendons, and placement.	ACI-LLT-1		X	
	2. Inspection of reinforcing steel welding in accordance with Steel Construction section above.			X	
	3. Inspection of anchors cast in concrete.			X	
	4. Inspection of anchors post-installed in hardened concrete members.		X		
	5. Verify use of approved design mix.	ACI-LLT-1		X	
	6. Prior to placement fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	ACI-LLT-1	X		
	7. Inspect concrete and shotcrete placement for proper application techniques.	ACI-LLT-1	X		
	8. Inspect for maintenance of specified curing temperature and techniques.	ACI-LLT-1		X	
	9. Inspection of prestressed concrete:				
	a. Application of prestressing forces		X		
	b. Grouting of bonded prestressing tendons in the		X		

	seismic-force-resisting system.				
	10. Erection of precast structural members			X	
	11. Verification of in-situ concrete strength, prior to stressing of tendons in post-tensioned concrete and prior to removal of shores and forms from beams and structural slabs.			X	
	12. Inspection formwork for shape, location and dimensions of the concrete member being formed.	ACI-LLT-1		X	
Masonry Construction (ref: IBC-15 Section 1705.4)					
	1. Inspect masonry construction in accordance with IBC-15 Section 1705.4 and TMS 602-13/ACI 530.1-13/ASCE 6-13 Article 1.6.	ICC-SMSI		X	
	Level A Quality Assurance				
	Tests: None.				
	Inspection: Verify compliance with the approved submittal and project specifications.			X	
	Level B Quality Assurance				
	Tests:				
	1. Verify slump flow and Visual Stability Index (VSI) as delivered to the project site in accordance with TMS 602-13/ACI 530.1-13/ASCE 6-13 Specification Article 1.5B.1.b.3 for self-consolidating grout.				
	2. Verify f'm and f'aac in accordance with TMS 602-13/ACI 530.1-13/ASCE 6-13 Specification Article 1.4B prior to construction, except where specifically exempted.				
	Inspection:				
	1. Verify compliance with the approved submittals and project specifications.	ICC-SMSI		X	
	2. At the start of masonry construction, verify:				
	a. Proportions of site-prepared mortar.			X	
	b. Construction of mortar joints.			X	
	c. Grade and size of prestressing tendons and anchorages.				
	d. Location of reinforcement, connectors, prestressing tendons and anchorages.			X	
	e. Prestressing technique.			X	
	f. Properties of thin-bed mortar for AAC masonry. (Continuous inspection is required for the first 5000 square feet of AAC masonry. Periodic inspection is required after the first 5000 square feet of AAC masonry.)		X	X	
	3. Prior to grouting, verify:				
	a. Grout space is clean.	ICC-SMSI		X	
	b. Grade, type and size of reinforcement and anchor bolts, and prestressing tendons and anchorages.			X	
	c. Placement of reinforcing and connectors, and			X	

	prestressing tendons and anchorages.				
	d. Proportions of site-prepared grout and prestressing grout for bonded tendons.			X	
	e. Construction of mortar joints.			X	
	4. During masonry construction, verify:				
	a. Size and location of structural members.			X	
	b. Type, size and location of anchors, including other details of anchorage of masonry to structural members, frames, or other construction.			X	
	c. Welding of reinforcement.		X		
	d. Preparation, construction and protection of masonry during cold weather (temperature below 40°F) or hot weather (temperature above 90°F).	ICC-SMSI		X	
	e. Application and measurement of prestressing force.		X		
	f. Placement of grout and prestressing grout for bonded tendons is in compliance.		X		
	g. Placement of AAC masonry units and construction of thin-bed mortar joints. (Continuous inspection is required for the first 5000 square feet of AAC masonry. Periodic inspection is required after the first 5000 square feet of AAC masonry.)		X	X	
	5. Observe preparation of grout specimens, mortar specimens and/or prisms.	ICC-SMSI		X	
	Level C Quality Assurance				
	Tests:				
	1. Verify f'm and f'aac in accordance with TMS 602-13/ACI 530.1-13/ASCE 6-13 Specification Article 1.4B prior to construction, and for every 5000 square feet during construction.				
	2. Verify proportions of materials in premixed or pre-blended mortar, prestressing grout, and grout other than self-consolidating grout as delivered to the project site.				
	3. Verify slump flow and Visual Stability Index (VSI) as delivered to the project site in accordance with TMS 602-13/ACI 530.1-13/ASCE 6-13 Specification Article 1.5B.1.b.3 for self-consolidating grout				
	Inspection:				
	1. Verify compliance with the approved submittals and project specifications.			X	
	2. Verify:				
	a. Proportions of site-prepared mortar, grout and prestressing grout for bonded tendons			X	
	b. Grade, type and size of reinforcement and anchor bolts, and prestressing tendons and anchorages			X	
	c. Placement of masonry units and construction of mortar joints.			X	
	d. Placement of reinforcement, connectors and prestressing tendons and anchorages.		X		
	e. Grout space prior to grouting.		X		

	f. Placement of grout and prestressing grout for bonded tendons.		X		
	g. Size and location of structural elements.			X	
	h. Type, size and location of anchors, including other details of anchorage of masonry to structural members, frames or other construction.		X		
	i. Welding of reinforcement.		X		
	j. Preparation, construction and protection of masonry during cold weather (temperature below 40°F) or hot weather (temperature above 90°F).			X	
	k. Application and measurement of prestressing force.		X		
	l. Placement of AAC masonry units and construction of thin-bed mortar joints.		X		
	m. Properties of thin-bed mortar for AAC masonry.		X		
	3. Observe preparation of grout specimens, mortar specimens and/or prisms.		X		
Wood Construction (ref: IBC-15 Section 1705.5)					
	1. Inspect prefabricated wood structural elements in accordance with Section 1704.2.5			X	
	2. High load diaphragms:				
	a. Verify sheathing grade and thickness.			X	
	b. Verify nominal size of framing members at adjoining panel edges.			X	
	c. Verify nail or staple diameter and length.			X	
	d. Verify number of fastener lines.			X	
	e. Verify spacing between fasteners in each line and at panel edges.			X	
	3. Shearwalls:				
	a. Verify sheathing grade and thickness.			X	
	b. Verify nominal size of framing members at adjoining panel edges.			X	
	c. Verify nail or staple diameter and length.			X	
	d. Verify number of fastener lines.			X	
	e. Verify spacing between fasteners in each line and at panel edges.			X	
	f. Location and size of holdowns.			X	
	4. Verify nailing, bolting, anchoring and fastening of:				
	a. Drag struts and collectors.			X	
	b. Braces.			X	
	c. Hold-downs.			X	
	5. Metal-plate-connected wood trusses spanning 60 feet or greater:				
	a. Verify temporary installation restraint/bracing installed in accordance with the approved shop drawings.			X	
	b. Verify permanent individual truss member restraint/bracing installed in accordance with the approved shop drawings.			X	

Soils (ref: IBC-15 Table 1705.6)					
	1. Verify materials below shallow foundations are adequate to achieve the required bearing capacity.			X	
	2. Verify excavations are extended to proper depth and have reached proper material.			X	
	3. Perform classification and testing of compacted fill materials.			X	
	4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill.		X		
	5. Prior to placement of controlled fill, observe subgrade and verify that site has been prepared properly.			X	
Driven Deep Foundation Elements (ref: IBC-15 Table 1705.7)					
	1. Verify materials, sizes and lengths.		X		
	2. Determine capacities of test elements and conduct additional load tests when required. Refer to project specifications.		X		
	3. Observe driving operations and maintain complete and accurate records for each element.		X		
	4. Verify element locations and plumbness.		X		
	a. Verify type and size of hammer.		X		
	b. Record number of blows per foot of penetration.		X		
	c. Determine required penetration to achieve specified capacity.		X		
	d. Record pile tip and butt elevations.		X		
	e. Document any damage to any foundation element.		X		
	5. For steel piling, perform additional inspection in accordance with Section 1705.2 and AISC 341-10, Table J10-1.				
	6. For concrete elements and concrete-filled elements, perform additional inspections in accordance with Section 1705.3.				
	7. For specialty elements, perform additional inspections as required in the project specifications.				
Cast-In-Place Deep Foundations (ref: IBC-15 Table 1705.8)					
	1. Observe drilling operations and maintain complete and accurate records for each element.		X		
	2. Verify element locations and plumbness.		X		
	a. Verify element diameter.		X		
	b. Verify bell diameter (if applicable).		X		
	c. Verify element lengths.		X		
	d. Verify embedment depth into bedrock (if applicable).		X		
	e. Verify adequate end-bearing strata capacity.		X		
	f. Record concrete or grout volumes.		X		
	3. For concrete elements, perform additional inspections in accordance with Section 1705.3.				

Helical Piles (ref: IBC-15 Section 1705.9)					
	1. Verify pile locations		X		
	a. Verify installation equipment used.		X		
	b. Verify pile dimensions.		X		
	c. Verify tip elevations.		X		
	d. Verify final depth.		X		
	e. Verify final installation torque.		X		
	f. Other data as required by the project specifications.		X		
Wind Resistance (ref: IBC-12 Section 1705.11)					
	1. Provide inspections when required by Section 1705.11.				
Seismic Resistance (ref: IBC-15 Section 1705.12)					
	1. Provide inspections when required by Section 1705.12.				
Testing and Qualification for Seismic Resistance (ref: IBC-12 Section 1705.13)					
	1. Test and qualify seismic resistance in accordance with IBC-12 Section 1705.13 and the project specifications.				
Sprayed Fire-Resistant Materials (ref: IBC-12 Section 1705.14)					
	1. Inspect sprayed fire-resistant materials in accordance with IBC-12 Section 1705.14 and the project specifications.				
Mastic and Intumescent Fire-Resistant Coatings (ref: IBC-12 Section 1705.15)					
	1. Perform inspections in accordance with AWCI 12-B and IBC-12 Section 1705.15.			X	
Exterior Insulation and Finish Systems (EIFS) (ref: IBC-12 Section 1705.16)					
	1. Perform inspections in accordance with project specifications and IBC-12 Section 1705.16.			X	
Fire-resistant Penetrations and Joints (ref: IBC-12 Section 1705.17)					
	1. Perform inspections in accordance with project specifications and IBC-12 Section 1705.17.			X	
Smoke Control (ref: IBC-12 Section 1705.18)					
	1. Perform testing in accordance with project specifications and IBC-12 Section 1705.18.				

SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.1 ENVIRONMENTAL DEFINITIONS

A. Definitions pertaining to sustainable development: As defined in ASTM E2114 and as specified herein.

B. Biobased Materials: As defined in the Farm Security and Rural Investment Act, for purposes of Federal procurement of biobased products, "biobased" means a "commercial or industrial product (other than food or feed) that is composed, in whole or in significant part, of biological products or renewable domestic agricultural materials (including plant, animal, and marine materials) or forestry materials." Biobased materials also include fuels, chemicals, building materials, or electric power or heat produced from biomass as defined by The Biomass Research and Development Act of 2000.

1. Biobased content: The amount of biobased carbon in the material or product as a percentage of weight (mass) of the total organic carbon in the material or product.

C. Chain-of-Custody: Process whereby a product or material is maintained under the physical possession or control during its entire life cycle.

D. Deconstruction: Disassembly of buildings for the purpose of recovering materials.

E. DFE (Design for the Environment): A technique that includes elements of resource conservation and pollution prevention as applied in various product sectors. A technique that incorporates approaches which are part of product (or assembly) concept, need and design. Considerations involve material selection, material and energy efficiency, reuse, maintainability and design for disassembly and recyclability. Refer to ISO Guide 64 for additional clarification.

F. Environmentally preferable products: Products and services that have a lesser or reduced effect on the environment in comparison to conventional products and services. Refer to EPA's Final Guidance on Environmentally Preferable Purchasing at http://www.epa.gov/oppt/epp/.

G. Non-Renewable Resource: A resource that exists in a fixed amount that cannot be replenished on a human time scale. Non-renewable resources have the potential for renewal only by geological, physical, and chemical processes taking place over of millions of years. Examples include: iron ore, coal, and oil.

H. Perpetual Resource: A resource that is virtually inexhaustible on a human time scale. Examples include solar energy, tidal energy, and wind energy.

I. Recycled Content Materials: Products that contain pre-consumer or post-consumer materials as all or part of their feedstock. Recycled content claim shall be consistent with Federal Trade Commission (FTC) Guide for the Use of Environmental Marketing Claims.

J. Renewable Resource: A resource that is grown, naturally replenished, or cleansed, at a rate which exceeds depletion of the usable supply of that resource. A renewable resource can be exhausted if improperly managed. However, a renewable resource can last indefinitely with proper stewardship. Examples include: trees in forests, grasses in grasslands, and fertile soil.

1.2 QUALITY ASSURANCE

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.

C. Conflicting Requirements: Where compliance with two or more standards is specified, and the standards may establish different or conflicting requirements for minimum quantities or quality levels comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Contracting Officer for a decision before proceeding.

1.3 INDUSTRY STANDARDS

A. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Thomson Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."

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

AA	Aluminum Association (The) www.aluminum.org	(703) 358-2960
AABC	Associated Air Balance Council www.aabchq.com	(202) 737-0202
AAMA	American Architectural Manufacturers Association	(847) 303-5664

	www.aamanet.org	
AASHTO	American Association of State Highway and Transportation Officials www.transportation.org	(202) 624-5800
AATCC	American Association of Textile Chemists and Colorists www.aatcc.org	(919) 549-8141
ABAA	Air Barrier Association of America www.airbarrier.org	(866) 956-5888
ABMA	American Bearing Manufacturers Association www.abma-dc.org	(202) 367-1155
ACI	American Concrete Institute www.concrete.org	(248) 848-3700
ACPA	American Concrete Pipe Association www.concrete-pipe.org	(972) 506-7216
AEIC	Association of Edison Illuminating Companies, Inc. (The) www.aeic.org	(205) 257-2530
AF&PA	American Forest & Paper Association www.afandpa.org	(800) 878-8878 (202) 463-2700
AGA	American Gas Association www.aga.org	(202) 824-7000
AHAM	Association of Home Appliance Manufacturers www.aham.org	(202) 872-5955
AHRI	Air-Conditioning, Heating, andRefrigeration Institute, The www.ahrinet.org	(703) 524-8800
AI	Asphalt Institute www.asphaltinstitute.org	(859) 288-4960
AIA	American Institute of Architects (The) www.aia.org	(800) 242-3837 (202) 626-7300
AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
AITC	American Institute of Timber Construction www.aitc-glulam.org	(303) 792-9559

ALSC	American Lumber Standard Committee, Incorporated www.alsc.org	(301) 972-1700
AMCA	Air Movement and Control Association International, Inc. www.amca.org	(847) 394-0150
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
AOSA	Association of Official Seed Analysts, Inc. www.aosaseed.com	(405) 780-7372
APA	APA - The Engineered Wood Association www.apawood.org	(253) 565-6600
APA	Architectural Precast Association www.archprecast.org	(239) 454-6989
API	American Petroleum Institute www.api.org	(202) 682-8000
ARI	Air-Conditioning & Refrigeration Institute www.ari.org	(703) 524-8800
ARMA	Asphalt Roofing Manufacturers Association www.asphaltroofing.org	(202) 207-0917
ASCE	American Society of Civil Engineers www.asce.org	(800) 548-2723 (703) 295-6300
ASCE/SEI	American Society of Civil Engineers/Structural Engineering Institute (See ASCE)	
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers www.ashrae.org	(800) 527-4723 (404) 636-8400
ASME	ASME International (American Society of Mechanical Engineers International) www.asme.org	(800) 843-2763 (973) 882-1170
ASSE	American Society of Sanitary Engineering www.asse-plumbing.org	(440) 835-3040
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	(610) 832-9500
ATIS	Alliance for Telecommunications Industry Solutions www.atis.org	(202) 628-6380

AWCMA	American Window Covering Manufacturers Association (Now WCMA)	
AWCI	Association of the Wall and Ceiling Industry www.awci.org	(703) 534-8300
AWI	Architectural Woodwork Institute www.awinet.org	(571) 323-3636
AWPA	American Wood Protection Association (Formerly: American Wood Preservers' Association) www.awpa.com	(205) 733-4077
AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
AWWA	American Water Works Association www.awwa.org	(800) 926-7337 (303) 794-7711
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 297-2122
BIA	Brick Industry Association (The) www.bia.org	(703) 620-0010
BICSI	BICSI, Inc. www.bicsi.org	(800) 242-7405 (813) 979-1991
BIFMA	BIFMA International (Business and Institutional Furniture Manufacturer's Association International) www.bifma.com	(616) 285-3963
BISSC	Baking Industry Sanitation Standards Committee www.bissc.org	(866) 342-4772
CCC	Carpet Cushion Council www.carpetcushion.org	(610) 527-3880
CDA	Copper Development Association www.copper.org	(800) 232-3282 (212) 251-7200
CEA	Canadian Electricity Association www.canelect.ca	(613) 230-9263
CEA	Consumer Electronics Association www.ce.org	(866) 858-1555 (703) 907-7600
CFFA	Chemical Fabrics & Film Association, Inc. www.chemicalfabricsandfilm.com	(216) 241-7333

CGA	Compressed Gas Association www.cganet.com	(703) 788-2700
CIMA	Cellulose Insulation Manufacturers Association www.cellulose.org	(888) 881-2462 (937) 222-2462
CISCA	Ceilings & Interior Systems Construction Association www.cisca.org	(630) 584-1919
CISPI	Cast Iron Soil Pipe Institute www.cispi.org	(423) 892-0137
CLFMI	Chain Link Fence Manufacturers Institute www.chainlinkinfo.org	(301) 596-2583
CPA	Composite Panel Association www.pbmdf.com	 (703) 724-1128
CRI	Carpet and Rug Institute (The) www.carpet-rug.com	(800) 882-8846 (706) 278-3176
CRRC	Cool Roof Rating Council www.coolroofs.org	(866) 465-2523 (510) 485-7175
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(847) 517-1200 (800) 328-6306
CRRC	Cool Roof Rating Council www.coolroofs.org	(866) 465-2523 (510) 485-7175
CSA	Canadian Standards Association www.csa.ca	(800) 463-6727 (416) 747-4000
CSA	CSA International (Formerly: IAS - International Approval Services) www.csa-international.org	(866) 797-4272 (416) 747-4000
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
CSSB	Cedar Shake & Shingle Bureau www.cedarbureau.org	(604) 820-7700
CTI	Cooling Technology Institute (Formerly: Cooling Tower Institute) www.cti.org	(281) 583-4087
DHI	Door and Hardware Institute www.dhi.org	(703) 222-2010

ECA	Electrical Components Association www.ec-central.org	(703)907-8024
EIA	Electronic Industries Alliance www.eia.org	(703) 907-7500
EIMA	EIFS Industry Members Association www.eima.com	(800) 294-3462 (770) 968-7945
EJCDC	Engineers Joint Contract Documents Committee http://content.asce.org/ejcdc/	(703) 295-6000
EJMA	Expansion Joint Manufacturers Association, Inc. www.ejma.org	(914) 332-0040
ESD	ESD Association (Electrostatic Discharge Association) www.esda.org	(315) 339-6937
ETL SEMCO	Intertek ETL SEMCO (Formerly: ITS - Intertek Testing Service NA) www.intertek-etlsemko.com	(800) 967-5352
FIBA	Federation Internationale de Basketball (The International Basketball Federation) www.fiba.com	41 22 545 00 00
FIVB	Federation Internationale de Volleyball (The International Volleyball Federation) www.fivb.ch	41 21 345 35 35
FM Approvals	FM Approvals LLC www.fmglobal.com	(781) 762-4300
FM Global	FM Global (Formerly: FMG - FM Global) www.fmglobal.com	(401) 275-3000
FRSA	Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc. www.floridaroof.com	(407) 671-3772
FSA	Fluid Sealing Association www.fluidsealing.com	(610) 971-4850
FSC	Forest Stewardship Council www.fsc.org	49 228 367 66 0
GA	Gypsum Association www.gypsum.org	(301) 277-8686

GANA	Glass Association of North America www.glasswebsite.com	(785) 271-0208
GRI	(Part of GSI)	
GS	Green Seal www.greenseal.org	(202) 872-6400
GSI	Geosynthetic Institute www.geosynthetic-institute.org	(610) 522-8440
HI	Hydronics Institute www.gamanet.org	(908) 464-8200
HI/GAMA	Hydronics Institute/Gas Appliance Manufacturers Association Division of Air-Conditioning, Heating, and Refrigeration Institute (AHRI) www.ahrinet.org	(908) 464-8200
HMMA	Hollow Metal Manufacturers Association (Part of NAAMM)	
HPVA	Hardwood Plywood & Veneer Association www.hpva.org	(703) 435-2900
HPW	H. P. White Laboratory, Inc. www.hpwhite.com	(410) 838-6550
IAPSC	International Association of Professional Security Consultants www.iapsc.org	(515) 282-8192
ICBO	International Conference of Building Officials www.iccsafe.org	(888) 422-7233
ICEA	Insulated Cable Engineers Association, Inc. www.icea.net	(770) 830-0369
ICRI	International Concrete Repair Institute, Inc. www.icri.org	(847) 827-0830
ICPA	International Cast Polymer Association www.icpa-hq.org	(703) 525-0320
IEC	International Electrotechnical Commission www.iec.ch	41 22 919 02 11
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The) www.ieee.org	(212) 419-7900
IES	Illuminating Engineering Society of North America www.iesna.org	(703) 525-0320

IEST	Institute of Environmental Sciences and Technology www.iest.org	(847) 255-1561
IGMA	Insulating Glass Manufacturers Alliance www.igmaonline.org	(613) 233-1510
ILI	Indiana Limestone Institute of America, Inc. www.iliai.com	(812) 275-4426
ISA	Instrumentation, Systems, and Automation Society, The www.isa.org	(919) 549-8411
ISO	International Organization for Standardization www.iso.ch	41 22 749 01 11
ISSFA	International Solid Surface Fabricators Association www.issfa.net	(877) 464-7732 (801) 341-7360
ITS	Intertek Testing Service NA (Now ETL SEMCO)	
ITU	International Telecommunication Union www.itu.int/home	41 22 730 51 11
KCMA	Kitchen Cabinet Manufacturers Association www.kcma.org	(703) 264-1690
LGSEA	Light Gauge Steel Engineers Association www.arcat.com	(202) 263-4488
LMA	Laminating Materials Association (Now part of CPA)	
LPI	Lightning Protection Institute www.lightning.org	(800) 488-6864
MBMA	Metal Building Manufacturers Association www.mbma.com	(216) 241-7333
MCA	Metal Construction Association www.metalconstruction.org	(847) 375-4718
MFMA	Maple Flooring Manufacturers Association, Inc. www.maplefloor.org	(888) 480-9138
MFMA	Metal Framing Manufacturers Association, Inc. www.metalframingmfg.org	(312) 644-6610
MH	Material Handling (Now MHIA)	

MHIA	Material Handling Industry of America www.mhia.org	(800) 345-1815 (704) 676-1190
MIA	Marble Institute of America www.marble-institute.com	(440) 250-9222
MPI	Master Painters Institute www.paintinfo.com	(888) 674-8937 (604) 298-7578
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc. www.mss-hq.com	(703) 281-6613
NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(630) 942-6591
NACE	NACE International (National Association of Corrosion Engineers International) www.nace.org	(800) 797-6223 (281) 228-6200
NADCA	National Air Duct Cleaners Association www.nadca.com	(202) 737-2926
NAGWS	National Association for Girls and Women in Sport www.aahperd.org/nagws/	(800) 213-7193, ext. 453
NAIMA	North American Insulation Manufacturers Association www.naima.org	(703) 684-0084
NBGQA	National Building Granite Quarries Association, Inc. www.nbgqa.com	(800) 557-2848
NCAA	National Collegiate Athletic Association (The) www.ncaa.org	(317) 917-6222
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900
NCTA	National Cable & Telecommunications Association www.ncta.com	(202) 222-2300
NEBB	National Environmental Balancing Bureau www.nebb.org	(301) 977-3698
NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NeLMA	Northeastern Lumber Manufacturers' Association www.nelma.org	(207) 829-6901

NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NETA	InterNational Electrical Testing Association www.netaworld.org	(888) 300-6382 (269) 488-6382
NFHS	National Federation of State High School Associations www.nfhs.org	(317) 972-6900
NFPA	NFPA (National Fire Protection Association) www.nfpa.org	(800) 344-3555 (617) 770-3000
NFRC	National Fenestration Rating Council www.nfrc.org	(301) 589-1776
NGA	National Glass Association www.glass.org	(866) 342-5642 (703) 442-4890
NHLA	National Hardwood Lumber Association www.natlhardwood.org	(800) 933-0318 (901) 377-1818
NLGA	National Lumber Grades Authority www.nlga.org	(604) 524-2393
NOFMA	NOFMA: The Wood Flooring Manufacturers Association (Formerly: National Oak Flooring Manufacturers Association) www.nofma.org	(901) 526-5016
NOMMA	National Ornamental & Miscellaneous Metals Association www.nomma.org	(888) 516-8585
NRCA	National Roofing Contractors Association www.nrca.net	(800) 323-9545 (847) 299-9070
NRMCA	National Ready Mixed Concrete Association www.nrmca.org	(888) 846-7622 (301) 587-1400
NSF	NSF International (National Sanitation Foundation International) www.nsf.org	(800) 673-6275 (734) 769-8010
NSSGA	National Stone, Sand & Gravel Association www.nssga.org	(800) 342-1415 (703) 525-8788
NTMA	National Terrazzo & Mosaic Association, Inc. (The) www.ntma.com	(800) 323-9736 (540) 751-0930
NWFA	National Wood Flooring Association www.nwfa.org	(800) 422-4556 (636) 519-9663

PCI	Precast/Prestressed Concrete Institute www.pci.org	(312) 786-0300
PDI	Plumbing & Drainage Institute www.pdionline.org	(800) 589-8956 (978) 557-0720
PGI	PVC Geomembrane Institute http://pgi-tp.cee.uiuc.edu	(217) 333-3929
PTI	Post-Tensioning Institute www.post-tensioning.org	(248) 848-3180
RCSC	Research Council on Structural Connections www.boltcouncil.org	
RFCI	Resilient Floor Covering Institute www.rfci.com	(706) 882-3833
RIS	Redwood Inspection Service www.redwoodinspection.com	(925) 935-1499
SAE	SAE International www.sae.org	(877) 606-7323 (724) 776-4841
SCAQMD	South Coast Air Quality Management District www.aqmd.com	(909) 396-2000
SCTE	Society of Cable Telecommunications Engineers www.scte.org	(800) 542-5040 (610) 363-6888
SDI	Steel Deck Institute www.sdi.org	(847) 458-4647
SDI	Steel Door Institute www.steeldoor.org	(440) 899-0010
SEFA	Scientific Equipment and Furniture Association www.sefalabs.com	(877) 294-5424 (516) 294-5424
SEI/ASCE	Structural Engineering Institute/American Society of Civil Engineers (See ASCE)	
SIA	Security Industry Association www.siaonline.org	(866) 817-8888 (703) 683-2075
SJI	Steel Joist Institute www.steeljoist.org	(843) 626-1995
SMA	Screen Manufacturers Association	(561) 533-0991

	www.smacentral.org	
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980
SMPTE	Society of Motion Picture and Television Engineers www.smpte.org	(914) 761-1100
SPFA	Spray Polyurethane Foam Alliance (Formerly: SPI/SPFD - The Society of the Plastics Industry, Inc.; Spray Polyurethane Foam Division) www.sprayfoam.org	(800) 523-6154
SPIB	Southern Pine Inspection Bureau (The) www.spib.org	(850) 434-2611
SPRI	Single Ply Roofing Industry www.spri.org	(781) 647-7026
SSINA	Specialty Steel Industry of North America www.ssina.com	(800) 982-0355 (202) 342-8630
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(877) 281-7772 (412) 281-2331
STI	Steel Tank Institute www.steeltank.com	(847) 438-8265
SWI	Steel Window Institute www.steelwindows.com	(216) 241-7333
SWPA	Submersible Wastewater Pump Association www.swpa.org	(847) 681-1868
TCA	Tilt-Up Concrete Association www.tilt-up.org	(319) 895-6911
TCNA	Tile Council of North America, Inc. www.tileusa.com	(864) 646-8453
TEMA	Tubular Exchanger Manufacturers Association www.tema.org	(914) 332-0040
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance www.tiaonline.org	(703) 907-7700
TMS	The Masonry Society www.masonrysociety.org	(303) 939-9700

TPI	Truss Plate Institute, Inc. www.tpinst.org	(703) 683-1010
TPI	Turfgrass Producers International www.turfgrasssod.org	(800) 405-8873 (847) 649-5555
TRI	Tile Roofing Institute www.tileroofing.org	(312) 670-4177
UL	Underwriters Laboratories Inc. www.ul.com	(877) 854-3577 (847) 272-8800
UNI	Uni-Bell PVC Pipe Association www.uni-bell.org	(972) 243-3902
USAV	USA Volleyball www.usavolleyball.org	(888) 786-5539 (719) 228-6800
USGBC	U.S. Green Building Council www.usgbc.org	(800) 795-1747
USITT	United States Institute for Theatre Technology, Inc. www.usitt.org	(800) 938-7488 (315) 463-6463
WASTEC	Waste Equipment Technology Association www.wastec.org	(800) 424-2869 (202) 244-4700
WCLIB	West Coast Lumber Inspection Bureau www.wclib.org	(800) 283-1486 (503) 639-0651
WCMA	Window Covering Manufacturers Association www.wcmanet.org	(212) 297-2122
WDMA	Window & Door Manufacturers Association (Formerly: NWWDA - National Wood Window and Door Association) www.wdma.com	(800) 223-2301 (312) 321-6802
WI	Woodwork Institute (Formerly: WIC - Woodwork Institute of California) www.wicnet.org	(916) 372-9943
WMMPA	Wood Moulding & Millwork Producers Association www.wmmpa.com	(800) 550-7889 (530) 661-9591
WSRCA	Western States Roofing Contractors Association www.wsrca.com	(800) 725-0333 (650) 570-5441
WWPA	Western Wood Products Association www.wwpa.org	(503) 224-3930

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

DIN	Deutsches Institut fur Normung e.V. www.din.de	49 30 2601-0
IAPMO	International Association of Plumbing and Mechanical Officials www.iapmo.org	(909) 472-4100
ICC	International Code Council www.iccsafe.org	(888) 422-7233
ICC-ES	ICC Evaluation Service, Inc. www.icc-es.org	(800) 423-6587 (562) 699-0543

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

ADAAG	Americans with Disabilities Act (ADA) Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities Available from U.S. Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
COE	Army Corps of Engineers www.usace.army.mil	(202) 761-0011
CPSC	Consumer Product Safety Commission www.cpsc.gov	(800) 638-2772 (301) 504-7923
DOC	Department of Commerce www.commerce.gov	(202) 482-2000
DOD	Department of Defense http://dodssp.daps.dla.mil	(215) 697-6257
DOJ	Department of Justice www.justice.gov	(202) 514-2000
DOE	Department of Energy www.energy.gov	(202) 586-9220
EPA	Environmental Protection Agency www.epa.gov	(202) 272-0167
FAA	Federal Aviation Administration	(866) 835-5322

	www.faa.gov	
FCC	Federal Communications Commission www.fcc.gov	(888) 225-5322
FDA	Food and Drug Administration www.fda.gov	(888) 463-6332
GSA	General Services Administration www.gsa.gov	(800) 488-3111
HUD	Department of Housing and Urban Development www.hud.gov	(202) 708-1112
LBL	Lawrence Berkeley National Laboratory www.lbl.gov	(510) 486-4000
NCHRP	National Cooperative Highway Research Program (See TRB)	
NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742 (202) 693-1999
PBS	Public Buildings Service (See GSA)	
PHS	Office of Public Health and Science http://www.hhs.gov/ophs/	(202) 690-7694
RUS	Rural Utilities Service (See USDA)	(202) 720-9540
SD	State Department www.state.gov	(202) 647-4000
TRB	Transportation Research Board http://gulliver.trb.org	(202) 334-2934
USDA	Department of Agriculture www.usda.gov	(202) 720-2791
USP	U.S. Pharmacopeia www.usp.org	(800) 227-8772
USPS	Postal Service www.usps.com	(202) 268-2000

E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAABAAG	Americans with Disabilities Act, Architectural Barriers Act, Accessibility Guidelines www.access-board.gov	(202) 272-0080
CFR	Code of Federal Regulations Available from Government Printing Office www.gpoaccess.gov/cfr/index.html	(866) 512-1800 (202) 512-1800
DOD	Department of Defense Military Specifications and Standards Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-2664
DSCC	Defense Supply Center Columbus (See FS)	
FED-STD	Federal Standard (See FS)	
FS	Federal Specification Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil/	(215) 697-2664
	Available from Defense Standardization Program www.dsp.dla.mil	
	Available from General Services Administration www.gsa.gov	(202) 619-8925
	Available from National Institute of Building Sciences www.wbdg.org/ccb	(202) 289-7800
FTMS	Federal Test Method Standard (See FS)	
MIL	(See MILSPEC)	
MIL-STD	(See MILSPEC)	
MILSPEC	Military Specification and Standards Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-2664
UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080

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

CBHF	State of California, Department of Consumer Affairs Bureau of Home Furnishings and Thermal Insulation www.dca.ca.gov/bhfti	(800) 952-5210 (916) 574-2041
CCR	California Code of Regulations www.calregs.com	(916) 323-6815
CDHS	California Department of Health Services www.dhcs.ca.gov	(916) 445-4171
CDPH	California Department of Public Health, Indoor Air Quality Section www.cal-iaq.org	
CPUC	California Public Utilities Commission www.cpuc.ca.gov	(415) 703-2782
TFS	Texas Forest Service Forest Resource Development http://txforestservice.tamu.edu	 (979) 458-6606

1.5 ENVIRONMENTAL REFERENCE STANDARDS

A. American Forest and Paper Association:

1. Sustainable Forestry Initiative

B. American Society of Heating Refrigerating and Air Conditioning Engineers (ASHRAE):
ASHRAE 52.2, Method of Testing General Ventilation Air Cleaning Devices for Removal Efficiency by Particle Size
ASHRAE 55, Thermal Environmental Conditions for Human Occupancy
ASHRAE 62.1, Ventilation for Acceptable Indoor Air Quality
ASHRAE 62.2, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings
ASHRAE/IESNA 90.1, Energy Standard for Buildings, Except Low-Rise Residential Buildings
ASHRAE 90.2, Energy Efficient Design of Low-Rise Residential Buildings

C. American Association of State Highway and Transportation Officials (AASHTO): AASHTO M288 Geotextile Specification for Highway Applications
MP009-06 Standard Specification for Compost for Erosion/Sediment Control (Filter Berms and Filter Socks)
MP010-03 Standard Specification for Compost for Erosion/Sediment Control (Compost Blankets)

D. American Society for Testing and Materials International (ASTM):

A478 Standard Specification for Chromium-Nickel Stainless Steel Weaving and Knitting Wire
A580/A580M Standard Specification for Stainless Steel Wire
A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
B813 Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube
C1240 Standard Specification for Silica Fume Used in Cementitious Mixtures
C128 Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate
C131 Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
C1319 Standard Specification for Concrete Grid Paving Units
C1338 Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings
C136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
C1371 Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers
C1386 Standard Specification for Precast Autoclaved AERATED Concrete (PAAC) Wall Construction Units
C1483 Standard Specification for Exterior Solar Radiation Control Coatings on Buildings
C1549 Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer
C1601 Standard Test Method for Field Determination of Water Penetration of Masonry Wall Surfaces
C289 Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method)
C311 Test Methods for Sampling and Testing Fly Ash or Natural Possolans for Use as a Mineral Admixture in Portland-Cement Concrete
C33 Standard Specification for Concrete Aggregates
C593 Standard Specification for Fly Ash and Other Pozzolans for Use With Lime
C595 Standard Specification for Blended Hydraulic Cements
C618 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
C67 Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile
C739 Standard Specification for Cellulosic Fiber (Wood-Base) Loose-Fill Thermal Insulation
C936 Standard Specification for Interlocking Concrete Paver Units
C989 Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars
D1435 Standard Practice for Outdoor Weathering of Plastics
D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3(2,700 kN-m/m3))
D1972 Standard Practice for Generic Marking of Plastic Products
D198 Standard Test Methods of Static Tests of Lumber in Structural Sizes
D2103 Standard Specification for Polyethylene Film and Sheeting
D217 Standard Test Methods for Cone Penetration of Lubricating Grease
D2369 Standard Test Method for Volatile Content of Coatings
D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber

D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method
D3792 Standard Test Method for Water Content of Coatings by Direct Injection Into a Gas Chromatograph
D3864 Standard Guide for Continual On-Line Monitoring Systems for Water Analysis
D3960 Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings
D4017 Standard Test Method for Water in Paints and Paint Materials by Karl Fischer Method
D4263 Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
D4444 Standard Test Methods for Use and Calibration of Hand-Held Moisture Meters
D4491 Standard Test Methods for Water Permeability of Geotextiles by Permittivity
D4552 Standard Practice for Classifying Hot-Mix Recycling Agents
D4632 Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
D4716 Test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head
D4833 Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Product
D4840 Standard Guide for Sampling Chain-of-Custody Procedures
D4887 Standard Test Method for Preparation of Viscosity Blends for Hot Recycled Bituminous Materials
D5106 Standard Specification for Steel Slag Aggregates for Bituminous Paving Mixtures
D5116 Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products
D5199 Standard Test Method for Measuring the Nominal Thickness of Geosynthetics
D5261 Standard Test Method for Measuring Mass per Unit Area of Geotextiles
D5268 Standard Specification for Topsoil Used for Landscaping Purposes
D5359 Standard Specification for Glass Cullet Recovered from Waste for Use in Manufacture of Glass Fiber
D5505 Standard Practice for Classifying Emulsified Recycling Agents
D5509 Standard Practice for Exposing Plastics to a Simulated Compost Environment
D5512 Standard Practice for Exposing Plastics to a Simulated Compost Environment Using an Externally Heated Reactor
D5539 Standard Specification for Seed Starter Mix
D5957 Standard Guide for Flood Testing Horizontal Waterproofing Installations
D5603 Standard Classification for Rubber Compounding Materials—Recycled Vulcanizate Particulate Rubber
D5663 Standard Guide for Validating Recycled Content in Packaging Paper and Paperboard
D5759 Standard Guide for Characterization of Coal Fly Ash and Clean Coal Combustion Fly Ash for Potential Uses
D5792 Standard Practice for Generation of Environmental Data Related to Waste Management Activities: Development of Data Quality Objectives
D5834 Standard Guide for Source Reduction Reuse, Recycling, and Disposal of Solid and Corrugated Fiberboard (Cardboard)
D5851 Standard Guide for Planning and Implementing a Water Monitoring Program
D5852 Standard Test Method for Erodibility Determination of Soil in the Field or in the Laboratory by the Jet Index Method
D6002 Standard Guide for Assessing the Compostability of Environmentally Degradable Plastics

D6006 Standard Guide for Assessing Biodegradability of Hydraulic Fluid
D6007 Standard Test Method for Determining Formaldehyde Concentration in Air from Wood Products Using a Small Scale Chamber
D6046 Standard Classification of Hydraulic Fluids for Environmental Impact
D6081 Standard Practice for Aquatic Toxicity Testing of Lubricants: Sample Preparation and Results Interpretation
D6108 Standard Test Method for Compressive Properties of Plastic Lumber and Shapes
D6109 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastic Lumber
D6112 Standard Test Methods for Compressive and Flexural creep and Creep-Rupture of Plastic Lumber and Shapes
D6117 Standard Test Methods for Mechanical Fasteners In Plastic Lumber and Shapes
D6155 Standard Specification for Nontraditional Coarse Aggregates for Bituminous Paving Mixtures
D6245 Standard Guide for Using Indoor Carbon Dioxide Concentrations to Evaluate Indoor Air Quality and Ventilation
D6261 Standard Specification for Extruded and Compression Molded Basic Shapes Made from Thermoplastic Polyester (TPES)
D6262 Standard Specification for Extruded, Compression Molded, and Injection Molded Basic Shapes of Poly(aryl ether ketone) (PAEK)
D6270 Standard Practice for Use of Scrap Tires in Civil Engineering Applications
D6329 Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers
D6330 Standard Practice for Determination of Volatile Organic Compounds (Excluding Formaldehyde) Emissions from Wood-Based Panels Using Small Environmental Chambers Under Defined Test Conditions
D6345 Standard Guide for Selection of Methods for Active, Integrative Sampling of Volatile Organic Compounds in Air
D6400 Standard Specification for Compostable Plastics
D6435 Standard Test Method for Shear Properties of Plastic Lumber and Plastic Lumber Shapes
D6629 Standard Guide for Selection of Methods for Estimating Soil Loss by Erosion
D6662 Standard Specification for Polyolefin-Based Plastic Lumber Decking Boards
D6712 Standard Specification for Ultra-High-Molecular-Weight Polyethylene (UHMW-PE) Solid Plastic Shapes
D6886 Standard Test Method for Speciation of the Volatile Organic Compounds (VOCs) in Low VOC Content Waterborne Air-Dry Coatings by Gas Chromatograpy
D692 Standard Specification for Coarse Aggregate for Bituminous Paving Mixtures
D696 Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C With a Vitreous Silica Dilatometer
D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3))
D7186 Standard Practice for Quality Assurance Observation of Roof Construction and Repair
E1021 Standard Test Methods for Measuring Spectral Response of Photovoltaic Cells
E1038 Standard Test Method for Determining Resistance of Photovoltaic Modules to Hail by Impact with Propelled Ice Balls
E1039 Standard Test Method for Calibration of Silicon Non-Concentrator Photovoltaic Primary Reference Cells Under Global Irradiation
E1040 Standard Specification for Physical Characteristics of Nonconcentrator Terrestrial Photovoltaic Reference Cells

E1105 Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference
E1171 Standard Test Method for Photovoltaic Modules in Cyclic Temperature and Humidity Environments
E1333 Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates from Wood Products Under Defined Test Conditions Using a Large Chamber
E1362 Standard Test Method for Calibration of Non-Concentrator Photovoltaic Secondary Reference Cells
E1433 Standard Guide for Selection of Standards on Environmental Acoustics
E1462 Standard Test Methods for Insulation Integrity and Ground Path Continuity of Photovoltaic Modules
E1596 Standard Test Methods for Solar Radiation Weathering of Photovoltaic Modules
E1597 Standard Test Method for Saltwater Pressure Immersion and Temperature Testing of Photovoltaic Modules for Marine Environments
E1609 Standard Guide for Development and Implementation of a Pollution Prevention Program
E1686 Standard Guide for Selection of Environmental Noise Measurements and Criteria
E1690 Standard Test Method for Determination of Ethanol Extractives in Biomass
E1721 Standard Test Method for Determination of Acid-Insoluble Residue in Biomass
E1755 Standard Test Method for Ash in Biomass
E1758 Standard Test Method for Determination of Carbohydrates in Biomass by High Performance Liquid Chromatography
E1780 Standard Guide for Measuring Outdoor Sound Received from a Nearby Fixed Source
E1799 Standard Practice for Visual Inspections of Photovoltaic Modules
E1802 Standard Test Methods for Wet Insulation Integrity Testing of Photovoltaic Modules
E1821 Standard Test Method for Determination of Carbohydrates in Biomass by Gas Chromatography
E1827 Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door
E1830 Standard Test Methods for Determining Mechanical Integrity of Photovoltaic Modules
E1861 Standard Guide for Use of Coal Combustion By-Products in Structural Fills
E1918 Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field
E1971 Standard Guide for Stewardship for the Cleaning of Commercial and Institutional Buildings
E1980 Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces
E1991 Standard Guide for Environmental Life Cycle Assessment of Building Materials/Products
E2047 Standard Test Method for Wet Insulation Integrity Testing of Photovoltaic Arrays
E2114 Standard Terminology for Sustainability Relative to the Performance of Buildings
E2128 Standard Guide for Evaluating Water Leakage of Building Walls
E2129 Standard Practice for Data Collection for Sustainability Assessment of Building Products
E2397 Standard Practice for Determination of Dead Loads and Live Loads associated with Green Roof Systems

E2398 Standard Test Method for Water Capture and Media Retention of Geocomposite Drain Layers for Green Roof Systems
E2399 Standard Test Method for Maximum Media Density for Dead Load Analysis of Green Roof Systems
E2400 Standard Guide for Selection, Installation, and Maintenance of Plants for Green Roof Systems
E241 Standard Guide for Limiting Water-Induced Damage to Buildings
E2432 Standard Guide for General Principles of Sustainability Relative to Buildings
E408 Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques
E413 Standard Classification for Rating Sound Insulation
E477 Standard Test Method for Measuring Acoustical and Airflow Performance of Duct Liner Materials and Prefabricated Silencers
E648 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
E683 Standard Practice for Installation and Service of Solar Space Heating Systems for One- and Two-Family Dwellings
E779 Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
E781 Standard Practice for Evaluating Absorptive Solar Receiver Materials When Exposed to Conditions Simulating Stagnation in Solar Collectors With Cover Plates
E782 Standard Practice for Exposure of Cover Materials for Solar Collectors to Natural Weathering Under Conditions Simulating Operational Mode
E823 Standard Practice for Nonoperational Exposure and Inspection of a Solar Collector
E881 Standard Practice for Exposure of Solar Collector Cover Materials to Natural Weathering Under Conditions Simulating Stagnation Mode
E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
E903 Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres
E948 Standard Test Method for Electrical Performance of Photovoltaic Cells Using Reference Cells Under Simulated Sunlight
F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
F2034 Standard Specification for Sheet Linoleum Floor Covering
F2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

E. Bat Conservation International:
Bat Approved Bat Houses

F. Carpet and Rug Institute
Green Label Testing Programs
Green Label Plus Testing Programs

G. Center for Resource Solutions
Green-e program

H. EPA:
Comprehensive Procurement Guidelines
ENERGY STAR
Environmentally Preferable Purchasing Program Final Guidance

GreenScapes program
Heat Island Initiative
Indoor Air Quality Building Education and Assessment Model (I-BEAM)
National Environmental Performance Track
Pollution Prevention (P2)
Product Stewardship Program
Significant New Alternatives Policy (SNAP) Program

I. Federal Trade Commission:
Guide for the Use of Environmental Marketing Claims

J. J. Forest Stewardship Council:
Chain-Of-Custody
Forest Management

K. Green Building Initiative (GBI):
Green Globes - US

L. Green Seal:
GC-03 Anti-Corrosive Paints
GC-12 Occupancy Sensors
GC-13 Split-Ductless Air-Source Heat Pumps
GS-05 Compact Fluorescent Lamps
GS-11 Paints
GS-13 Windows
GS-14 Window Films
GS-31 Electric Chillers
GS-32 Photovoltaic Modules
GS-36 Commercial Adhesives
GS-37 Industrial & Institutional Cleaners

M. International Iron and Steel Institute:
CO2 Breakthrough Program

N. International Organization of Standardization:
Guide 64; Guide for Inclusion of Environmental Aspects in Product Standards
9660 Information processing -- Volume and file structure of CD-ROM for information interchange
14001 Environmental management systems – Specification with guidance for use
14004 Environmental Management Systems – General Guidelines on Principles, Systems and Supporting Techniques
14020 Environmental labels and declarations – General principles
14024 Environmental labels and declarations – Type I environmental labelling - Principles and procedures
14040 Environmental management – Life cycle assessment – Principles and framework

O. National Association of Home Builders:
Advanced Framing Techniques: Optimum Value Engineering

P. National Institute of Building Sciences:
MOIST program for transfer of heat and moisture

Whole Building Design Guide

Q. National Institute of Standards and Technology:
BEES (Building for Environmental and Economic Sustainability) Lifecycle Decision Support Tool

R. Sheet Metal and Air Conditioning Contractors' National Association:

IAQ Guidelines for Occupied Buildings Under Construction

S. Southcoast Air Quality Management District:
1168 Adhesive And Sealant Applications

T. US Composting Council:
Seal of Testing Assurance Program

U. US Department of Agriculture:
Biobased Products – Definitions and Descriptions

V. US Green Building Council:
LEED™ 2009 Green Building Rating System

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.2 DEFINITIONS

A. Permanent Enclosure: As determined by Contracting Officer, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.3 USE CHARGES

A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum as required.

1.4 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Environmental Protection: Provide environmental protection as required by agency(ies) with jurisdiction and as indicated in the Contract Documents. Coordinate with requirements of the following:

1. Regulatory Requirements.
2. Indoor Air Quality (IAQ) Management.
3. Noise & Acoustics Management.
4. Environmental Management.
5. Construction Waste Management.

C. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board’s ABAAS Accessibility Guidelines.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Temporary materials may be new or used, but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

B. Safety Barrier Fence: Orange plastic fence, minimum height, 4 feet.

C. Barrier Tape: Yellow tape Imprinted with "CAUTION: CONSTRUCTION AREA", manufactured by Reef Industries, Inc., Houston, Texas, or approved equal.

2.2 TEMPORARY FACILITIES

A. Toilets: Sufficiently lighted and ventilated toilet facilities in weatherproof, sight proof, handicap accessible, sturdy enclosures with privacy locks.

1. Provide separate toilet facilities for men and women.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, NPS, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services. Acquire all necessary permits.

B. Storm Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system as directed by the agency(ies) with jurisdiction.

C. Non-potable water for construction is not available within the park boundaries. The Contractor shall furnish non-potable water from a source outside the park boundary.

D. Potable water is not available on site. Furnish cool, potable water for construction personnel in locations convenient to work stations.

E. Sanitary Facilities: Provide temporary toilets, and wash facilities for use by construction personnel.

1. Place in approved locations secluded from public observation and convenient to work stations. Relocate as work progress requires.
2. Maintain and clean toilet facilities at least weekly.
3. Completely remove sanitary facilities on completion of work.

F. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

1. Install electric power service overhead, unless otherwise indicated.

G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Maintain support facilities until near Substantial Completion. Remove structures, equipment, and furnishings, and terminate services after punch list is 100 percent completed or when directed by Contracting Officer. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Contracting Officer.

B. Traffic Controls: Erect and maintain barricades, lights, danger signals, and warning signs in accordance with Manual on Uniform Traffic Control Devices (MUTCD), Part IV, latest edition.

1. Maintain access for fire-fighting equipment and access to fire hydrants.
2. Illuminate barricades and obstructions at night; keep safety lights burning from sunset to sunrise.
3. Adequately barricade and post open cuts in or adjacent to thoroughfares.
4. Protect pedestrian traffic by guardrails or fences.
5. Cover pipes, hoses, and power lines crossing sidewalks and walkways with troughs using beveled edge boards.
6. Install Barrier Tape where directed by Contracting Officer. Keep a minimum of two rolls on site at all times

C. Parking: Use areas of existing parking areas for construction personnel, as designated by Contracting Officer.

D. Dewatering Facilities and Drains: Comply with requirements of the agency(ies) with jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.

2. Remove snow and ice as required to minimize accumulations.

E. Project Identification and Temporary Signs: Provide Project identification and other signs. Fence, barricade, or otherwise block off the immediate work area to prevent unauthorized entry.

1. Provide temporary, directional signs for construction personnel.
2. Maintain and touchup signs so they are legible at all times.

F. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of agency(ies) with jurisdiction.

G. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

B. Cleaning of Equipment: The Contractor shall ensure that prior to moving on to the Project Area, all equipment, is free of soil, seeds, vegetative matter, or other debris that could contain or hold seeds. Ensure that all equipment has been pressure washed and is free of exotic species prior to start-up of operations and moving of equipment to Project Area. Equipment shall be considered free of soil, seeds, and other debris when a visual inspection does not disclose such material. Disassembly of equipment components or specialized inspection tools are not required.

C. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

D. Barricades, Warning Signs, and Lights: Comply with requirements of MUTCD, Part IV for erecting structurally adequate barricades, including warning signs and lighting.

E. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.

1. Responsible Person: A capable and qualified person shall be placed in charge of fire protection. The responsibilities shall include locating and maintaining fire protective equipment and establishing and maintaining safe torch cutting and welding procedures.
2. Smoking: Smoking within buildings or temporary storage sheds is prohibited.
3. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of NPS. Check with park; many require “burn permits” for welding.

4. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
5. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.
6. Hazard Control: Take all necessary precautions to prevent fire during construction. Do not store flammable or combustible liquids in existing buildings. Provide adequate ventilation during use of volatile or noxious substances.
7. Spark Arresters: Equip all gasoline or diesel powered equipment used during periods of potential fire hazards or in potential forest and grass fire locations with spark arresters approved by the USDA Forest Service.

    a. Written determinations of periods and areas of potential fire hazard will be issued by Contracting Officer.

8. Buildings: Furnish a minimum of one extinguisher for each 1,500 square feet of area or major fraction thereof.

    a. Travel distance from any work station to the nearest extinguisher shall not exceed 75 feet.

9. Vehicles and Equipment: Provide one extinguisher on each vehicle or piece of equipment.
10. Service and Refueling Areas: Locate areas a minimum of 50 feet from buildings. Shut down equipment before refueling.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. NPS reserves right to take possession of Project identification signs.
2. At Substantial Completion, clean and renovate permanent facilities used during construction period.

END OF SECTION 01 50 00

SECTION 01 57 19.12 – NOISE & ACCOUSTICS MANAGEMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Special requirements for noise and acoustics management during renovation operations.

1.2 DEFINITIONS

A. Ambient noise level: The total noise associated with a given environment, being usually a composite of normal or existing sounds from all sources near and far, excluding the noise source at issue.

B. Daytime: The hours from 7 a.m. to 9 p.m. on weekdays and 9 a.m. to 9 p.m. on weekends and holidays.

C. Nighttime: All non-daytime hours.

D. Property line: The real or imaginary line along the ground surface and its vertical extension, which separates real property owned or controlled by one person from contiguous real property owned or controlled by another person or from any public right-of-way or from any public space.

E. Receiving noise area: Any real property where people live or work and where noise is heard, excluding the project or source area.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 NOISE MANGEMENT

A. Noise Control: Perform renovation operations to minimize noise. Perform noise-producing work in less sensitive hours of the day or week as directed by the Contracting Officer.

B. Repetitive and/or intermittent, high-level noise: Permitted only during Daytime.

1. Do not exceed the following dB(A) limitations at 50 feet:

Sound Level in dB(A)	Time Duration of Impact Noise
70	More than 12 minutes in any hour
80	More than 3 minutes in any hour

2. Maximum permissible construction equipment noise levels at 50 feet:

EARTHMOVING	dB(A)	MATERIALS HANDLING	dB(A)
Front Loaders	75	Concrete Mixers	75
Backhoes	75	Concrete Pumps	75
Dozers	75	Cranes	75
Tractors	75	Derricks Impact	75
Scrapers	80	Pile Drivers	95
Graders	75	Jack Hammers	75
Trucks	75	Rock Drills	80
Pavers, Stationary	80	Pneumatic Tools	80
Pumps	75	Saws	75
Generators	75	Vibrators	75
Compressors	75		

C. Ambient Noise:

1. Maximum noise levels (dB) for receiving noise area at property line shall be as follows:

a.	Residential receiving area	Daytime: 65 dB Nighttime: 45 dB
b.	Commercial/Industrial receiving area	Daytime: 67 dB Nighttime: 65 dB

2. In the event the existing local ambient noise level exceeds the maximum allowable receiving noise level (dB), the receiving noise level maximum for construction operations shall be adjusted as follows:

   a. Residential receiving area: Maximum 3 additional dB above the local ambient as measured at property line.
   b. Commercial/Industrial receiving area: Maximum 5 additional dB above the local ambient as measured at the property line.

3.2 FIELD QUALITY CONTROL

A. Assess potential effects of construction noise on adjacent neighbors in accordance with ASTM E1686 and as follows:

1. Ambient noise measurement: Measure at the property line at a height of at least four (4) feet above the immediate surrounding surface. Average the ambient noise level over a period of at least 15 minutes.
2. Ambient noise measurement at urban sites: Conduct during morning peak traffic hour between 7 A.M. and 9 A.M. and afternoon peak traffic hour between 4 P.M. and 6 P.M. In addition, conduct a 24-hour measurement at the proposed project site to document the noise pattern throughout the day. Adjust and weight for seasonal and climatic variations.

B. Monitor noise produced from construction operations in accordance with ASTM E1780.

END OF SECTION 01 57 19.12

SECTION 01 67 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

C. Definitions pertaining to sustainable development: As defined in ASTM E2114.

D. Biobased Materials: As defined in the Farm Security and Rural Investment Act, for purposes of Federal procurement of biobased products, “biobased” means a “commercial or industrial product (other than food or feed) that is composed, in whole or in significant part, of biological products or renewable domestic agricultural materials (including plant, animal, and marine materials) or forestry materials.” Biobased materials also include fuels, chemicals, building materials, or electric power or heat produced from biomass as defined by The Biomass Research and Development Act of 2000.

1. Biobased content: The amount of biobased carbon in the material or product as a percentage of weight (mass) of the total organic carbon in the material or product.

E. Environmentally preferable products: Products and services that have a lesser or reduced effect on the environment in comparison to conventional products and services. Refer to EPA’s Final

Guidance on Environmentally Preferable Purchasing for more information http://www.epa.gov/oppt/epp/.

F. Stewardship: Responsible use and management of resources in support of sustainability.

G. Sustainability: The maintenance of ecosystem components and functions for future generations.

1. Recycled Content Materials: Products that contain pre-consumer or post-consumer materials as all or part of their feedstock. Recycled content claim shall be consistent with ISO 140001 Standard for the Use of Environmental Marketing Claims.
2. Rapidly Renewable Material: Material made from plants that are typically harvested within a ten-year cycle.
3. Regional Materials: Materials that are manufactured and extracted, harvested, or recovered within a radius of 500 miles from the Project location.

1.3 SUBMITTALS

A. Record Submittals as specified in – Sustainable Design Close-Out Documentation, submit the following:

1. Affirmative Procurement Reporting Form. Submit on form in Appendix A of this Section, or similar form as approved by Contracting Officer.
2. Submit environmental data in accordance with Table 1 of ASTM E2129 for the following products:

    a. Masonry
    b. Finish Carpentry
    c. Roofing
    d. Wood Doors
    e. Windows
    f. Paints & Coatings

3. Material Safety Data Sheets (MSDS): For each product required by OSHA to have a MSDS, submit an MSDS. MSDS shall be prepared within the previous five years. Include information for MSDS Sections 1 – 16 in accordance with ANSI Z400.1 and as follows:

    a. Section 1: Chemical Product and Company Identification.
    b. Section 2: Composition/Information on Ingredients.
    c. Section 3: Hazards Identification.
    d. Section 4: First Aid Measures.
    e. Section 5: Fire Fighting Measures.
    f. Section 6: Accidental Release Measures.
    g. Section 7: Handling and Storage.
    h. Section 8: Exposure Controls/Person Protection.
    i. Section 9: Physical and Chemical Properties.
    j. Section 10: Stability and Reactivity Data.
    k. Section 11: Toxicological Information. Include data used to determine the hazards cited in Section 3. Identify acute data, carcinogenicity, reproductive effects, and target organ effects.

l. Section 12: Ecological Information. Include data regarding environmental impacts during raw materials acquisition, manufacture, and use. Include data regarding environmental impacts in the event of an accidental release.
m. Section 13: Disposal Considerations. Include data regarding the proper disposal of the chemical. Include information regarding recycling and reuse. Indicate whether or not the product is considered to be "hazardous waste" according the US EPA Hazardous Waste Regulations 40 CFR 261.
n. Section 14: Transportation Information. Identify hazard class for shipping.
o. Section 15: Regulatory Information. Identify federal, state, and local regulations applicable to the material.
p. Section 16: Other Information. Include additional information relative to recycled content, biobased content, and other information regarding environmental and health impacts. Identify the date MSDS was prepared.

1.4 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
5. Contractor is encouraged to obtain materials in biodegradable or recyclable/reusable packaging which uses the minimum amount of packaging possible.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weather tight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store cementitious products and materials on elevated platforms.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.

6. Protect stored products from damage and liquids from freezing.
7. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.

1.6 PACKAGING

A. Where Contractor has the option to provide one of the listed products or equal, preference shall be given to products with minimal packaging and easily recyclable packaging as defined in ASTM D5834.

B. Maximize use of source reduction and recycling procedures outlined in ASTM D5834.

1.7 ENVIRONMENTALLY PREFERABLE PRODUCTS

A. Provide environmentally preferable products to the greatest extent possible.

1. To the greatest extent possible, provide products and materials that have a lesser or reduced effect on the environment considering raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, and/or disposal of the product.
2. Eliminate the use of ozone depleting compounds during and after construction where alternative environmentally preferable products are available, consistent with either the Montreal Protocol and Title VI or the Clean Air Act Amendments of 1990, or equivalent overall air quality benefits that take into account life cycle impacts.

1.8 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
3. Refer to Divisions 02 through 49 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Government reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Contracting Officer will make selection.
5. Where products are accompanied by the term "match sample," sample to be matched is Governments.
6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.

B. Product Selection Procedures:

1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements or approved equal.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements or approved equal.
3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements or approved equal.
4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements or approved equal.
5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product, system, or approved equal.
8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other

named manufacturers, or approved equal. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named.

9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Architect's sample. Contracting Officers decision will be final on whether a proposed product matches.

    a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.

10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.

    a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Contracting Officer will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
    b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Contracting Officer will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions: Contracting Officer will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Contracting Officer will return requests without action, except to record noncompliance with these requirements:

    1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
    2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
    3. Evidence that proposed product provides specified warranty.
    4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
    5. Samples, if requested.

PART 3 - EXECUTION

3.1 PROTECTION AFTER INSTALLATION

A. Provide adequate coverings as necessary to protect installed materials from damage resulting from natural elements, traffic, and subsequent construction. Remove when no longer needed.

END OF SECTION 01 67 00

SECTION 01 73 29 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes procedural requirements for cutting and patching on non-Historic Fabric.

1.2 SUBMITTALS

A. Cutting and Patching Plan: Submit a Plan describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:

1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
3. Products: List products to be used and firms or entities that will perform the Work.
4. Dates: Indicate when cutting and patching will be performed.
5. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure. Do not cut and patch structural elements in a manner that could change their load carrying capacity or increase deflection.
6. Contracting Officer's: Obtain approval of cutting and patching plan before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.3 QUALITY ASSURANCE

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

B. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

C. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Contracting Officer's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

3.3 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
3. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
4. Proceed with patching after construction operations requiring cutting are complete.

C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
2. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather tight condition.

D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 01 73 29

SECTION 01 73 40 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. General installation of products.
2. Progress cleaning.
3. Protection of installed construction.
4. Correction of the Work.

1.2 SUBMITTALS

A. Quantity Surveys: Submit 2 copies showing quantities of work performed and actual construction completed and in place.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of site improvements, and other construction indicated as existing are not guaranteed.

B. Existing Utilities: The existence and location of underground and other utilities and construction is unknown. Before beginning work, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Verify compatibility with and suitability of substrates.
2. Examine roofs for suitable conditions where products and systems are to be installed.
3. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

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

C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of the Contractor, submit a request for information to the Contracting Officer in accordance with Division 01 Specification 01 31 00 “Project Management and Coordination”.

3.3 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

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

F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

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

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by the Contracting Officer.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

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

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

J. Quantity surveys: Shall be conducted, and the data derived from these surveys shall be used in computing the quantities of work performed and the actual construction completed and in place.

1. The Contractor shall conduct the original and final surveys and surveys for any periods for which progress payments are requested. All these surveys shall be conducted under the direction of a representative of the Contracting Officer, unless the Contracting Officer waives this requirement in a specific instance. The Government shall make such computations as are necessary to determine the quantities of work performed or finally in place. The Contractor shall make the computations based on the surveys for any periods for which progress payments are requested.
2. Promptly upon completing a survey, the Contractor shall furnish the originals of all field notes and all other records relating to the survey or to the layout of the work to the Contracting Officer, who shall use them as necessary to determine the amount of progress payments. The Contractor shall retain copies of all such material furnished to the Contracting Officer.

3.4 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
3. Contractor shall provide progress cleaning that minimizes sources of food, water, and harborage available to pests.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

1. Utilize non-toxic cleaning materials and methods.

    a. Comply with GS 37 for general purpose cleaning and bathroom cleaning.
    b. Use natural cleaning materials where feasible. Natural cleaning materials include:

        1) Abrasive cleaners: substitute 1/2 lemon dipped in borax.
        2) Ammonia: substitute vinegar, salt and water mixture, or baking soda and water.
        3) Disinfectants: substitute 1/2 cup borax in gallon water.
        4) Drain cleaners: substitute 1/4 cup baking soda and 1/4 cup vinegar in boiling water.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

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

G. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

H. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

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

J. Final Cleaning: At completion of Work, remove all remaining waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all exposed surfaces; leave Project clean and ready for occupancy.

    1. Provide final cleaning in accordance with ASTM E1971.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

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

3.6 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section "Cutting and Patching."

    1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

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

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

END OF SECTION 01 73 40

SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for the following:

1. Recycling nonhazardous demolition and construction waste.
2. Disposing of nonhazardous demolition and construction waste.

1.2 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Solid Waste: Garbage, debris, sludge, or other discharged material (except hazardous waste) including solid, liquid, semisolid, or contained gaseous materials resulting from domestic, industrial, commercial, mining, or agricultural operations.

D. Debris: Non-hazardous solid waste generated during the construction, demolition, or renovation of a structure which exceeds 2.5 inch (60 mm) particle size that is: a manufactured object; plant or animal matter; or natural geologic material (e.g. cobbles and boulders). A mixture of debris and other material such as soil or sludge is also subject to regulation as debris if the mixture is comprised primarily of debris by volume, based on visual inspection.

E. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

F. Environmental Pollution and Damage: The presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances; or degrade the utility of the environment for aesthetic, cultural, or historical purposes.

G. Garbage: Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

H. Hazardous Materials: Any material that is regulated as a hazardous material in accordance with 49 CFR 173, requires a Material Safety Data Sheet (MSDS) in accordance with 29 CFR 1910.1200, or which during end use, treatment, handling, storage, transportation or disposal meets or has components which meet or have the potential to meet the definition of a Hazardous Waste in accordance with 40 CFR 261.

I. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

1.3 PERFORMANCE REQUIREMENTS

A. General: Project shall minimize creation of construction and demolition waste. Factors that contribute to waste such as over packaging, improper storage, ordering error, poor planning, breakage, mishandling, and contamination shall be minimized. A Waste Management Plan shall be developed to ensure that existing site and building materials are recycled. Waste disposal in landfills shall be minimized.

B. Recycle Requirements: The following waste categories, at a minimum, shall be diverted from a landfill:

1. Clean dimensional wood, palettes
2. Plywood, OSB, and particle board
3. Concrete
4. Cardboard, paper, packaging, newsprint
5. Metals (from banding, stud trim, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze)
6. Non-hazardous paint and paint cans
7. Beverage containers: Aluminum, glass, and plastic containers
8. Other mixed construction and demolition waste as appropriate

C. If any waste materials encountered during the demolition or construction phase are found to contain lead, asbestos, PCBs, or other harmful substances, they are to be handled and removed in accordance with local, state, and federal laws and requirements concerning hazardous waste.

1.4 SUBMITTALS

A. Waste Management Plan: After award of contract and prior to the scheduled Pre-Construction Conference, Contractor shall submit a draft Waste Management Plan to the Contracting Officer for approval. Submit 3 copies of plan. Revise and resubmit Plan as required by the Contracting Officer. Approval of Contractor's Plan will not relieve Contractor of responsibility for compliance with applicable environmental regulations.

B. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

C. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

D. Qualification Data: For Waste Management Coordinator.

E. Progress payment requirements:

1. With each Application for Payment, submit manifests, weight tickets, receipts, and invoices specifically identifying the Project and waste material.

1.5 QUALITY ASSURANCE

A. Waste Management Coordinator Qualifications: Experienced firm, with a record of successful waste management coordination of projects with similar requirements.

B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Waste Management Meeting: Conduct separate meeting or cover in the Pre-Construction Conference and comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:

1. Review and discuss waste management plan including responsibilities of Waste Management Coordinator.
2. Review requirements for documenting quantities of each type of waste and its disposition.
3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
5. Review waste management requirements for each trade.

PART 2 - PRODUCTS

2.1 WASTE MANAGEMENT PLAN

A. General: Develop plan consisting of waste identification and waste reduction work plan. Include separate sections in plan for demolition and construction waste.

B. Waste Identification: Indicate anticipated types and quantities of demolition and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
2. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
3. Handling and Transportation Procedures: Include method used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement waste management plan as approved by the Contracting Officer. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

B. Waste Management Coordinator: Engage a waste management coordinator responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.

C. Contractor shall establish contacts with local recycling and reuse companies to set up lines of responsibility. Contractor shall be responsible for coordination in terms of identifying materials, pickup schedules, and standard quality for recycled materials.

D. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.

1. Distribute waste management plan to everyone concerned within three days of submittal return.
2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

E. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

F. Separation facilities:

1. Contractor shall designate and Contracting Officer shall approve a specific area or areas to facilitate separation of materials for potential reuse, salvage, recycling, and return.
2. Waste and recycling bins are to be placed near each other, and close to the point of waste generation but out of the traffic pattern.
3. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid co-mingling of materials.
4. Bins shall be protected during non-working hours from off-site contamination.
5. Garbage dumpsters should be checked periodically to monitor recyclables being thrown away or if there are undocumented materials that could be recycled.

G. Materials handling procedures: Materials to be recycled shall be protected from contamination and shall be handled, stored, and transported in a manner that meets the requirements set by the designated facilities for acceptance. Establish a defined area for the operations of each trade, especially woodcutting so that off-cuts will be kept in one area and can be sorted by dimension for future reuse.

3.2 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.

C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.

1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Remove recyclable waste off Governments property and transport to recycling receiver or processor.

3.3 RECYCLING DEMOLITION WASTE

A. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.

1. Pulverize concrete to maximum 4-inch size.

B. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.

C. Metals: Separate metals by type.

1. Structural Steel: Stack members according to size, type of member, and length.
2. Remove and dispose of bolts, nuts, washers, and other rough hardware.

D. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.

3.4 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

3.5 DISPOSAL OF WASTE

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

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Transport waste materials off Governments property and legally dispose of them.

END OF SECTION 01 74 19

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Project Record Drawings
2. Closeout Submittals
3. Substantial Completion and Final Inspection
4. Permit Closure and Transfer
5. Final Acceptance of the Work
6. Warranties

1.2 PROJECT RECORD DRAWINGS

A. Maintain one complete full-size set of contract drawings and one full-size set of vendor-supplied drawings. Clearly mark changes, deletions, and additions using National Park Service drafting standards to show actual construction conditions. Show additions in red, deletions in green and special instructions in blue.

B. Keep record drawings current. Make record drawings available to the Contracting Officer for inspection at the time of monthly progress payment requests. If project record drawings are not current, the Contracting Officer may retain an appropriate amount of the progress payment.

C. On completion of the total project, submit complete record drawings. Include shop drawings, sketches, and additional drawings that are to be included in the final set, with clear instructions showing the location of these drawings.

1.3 CLOSEOUT SUBMITTALS

A. Submit the following before requesting final inspection:

1. Specific warranties, guarantees, final certifications, and similar documents.
2. NPS required forms for occupancy, and any other similar forms or certificates.
3. Project Record Documents, operation and maintenance manuals, final completion construction digital images recorded on CD-R or DVD-R with index and descriptions, and similar final record information.
4. Environmental Record Documents: As follows:

a. Final Summary Of Solid Waste Disposal And Diversion: As specified in Section 017419 Construction Waste Management.

5. Deliver tools, spare parts, extra materials, and similar items to location designated by Contracting Officer. Label with manufacturer's name and model number where applicable.

6. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
7. Complete final cleaning requirements, including touchup painting.
8. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
9. Instruct NPS personnel in maintenance of products.

1.4 FINAL INSPECTION, SUBSTANTIAL COMPLETION AND ACCEPTANCE PROCEDURES

A. Request a final inspection in writing when a project or designated portion of a project is substantially complete. The Contracting Officer will proceed with the inspection within 10 days of receipt of the written request or will advise the Contractor of items that prevent the project from being substantially complete.

B. If the work is determined to be substantially complete, following the final inspection. Contracting Officer will prepare a Punch List and issue a Letter of Substantial Completion.

C. If the work is not determined to be substantially complete following the final inspection, Contracting Officer will notify Contractor in writing. Contractor shall request a new final inspection after completing the work. Re-inspection costs may be charged against the Contractor in accordance with the Inspection of Construction contract clause.

D. Contractor shall complete the Punch List within 30 calendar days, documented weather permitting.

E. If Contractor completes all items of work on the Punch List and all contractually required items, Contracting Officer will issue Letter of final acceptance of work.

F. If the Contractor fails to complete the work within the time frame, the Contracting Officer may correct the work with an appropriate reduction in contract price or charge for re-inspection costs in accordance with the Inspection of Construction contract clause.

1.5 PERMIT CLOSURE AND TRANSFER

A. When the construction work covered by the permits is complete, create a list of tasks required to close or transfer the permits to the Park. Submit to Contracting Officer for approval.

B. After substantial completion and the Punch List has been completed, the permits shall be closed and documented by the Agency(ies) with Jurisdiction for the permit.

C. If responsibility for permits is to be transferred to the Park, the Park shall be informed of the permit provisions completed and responsibilities that will transfer to park staff.

1.6 WARRANTIES

A. Submittal Time: Submit written warranties on request of Contracting Officer for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at the beginning of document.

C. Provide additional copies of each warranty to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. See Division 01 Specification Section “Execution” for information on cleaning agents.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Conduct final cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.

e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces.
g. Remove debris and surface dust from limited access spaces, including roofs, attics, and similar spaces.
h. Sweep floors broom clean in unoccupied spaces.
i. Clean transparent materials, including glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish glass, taking care not to scratch surfaces.
j. Remove labels that are not permanent.
k. Touch up and otherwise repair and restore marred, exposed finishes and surfaces.
l. Leave Project clean and ready for occupancy.

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

D. Waste Disposal: Comply with requirements of Division 01 section, "Construction Waste Management and Disposal.

END OF SECTION 01 77 00

SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

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

B. Related Requirements:

1. Section 01 1000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 01 7329 "Cutting and Patching" for cutting and patching procedures.
3. Section 01 3591 "Historic Preservation Treatment Procedures" for protection and work procedures for historic preservation projects.

1.3 DEFINITIONS

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

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

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

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

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

1.4 MATERIALS OWNERSHIP

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

1.5 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at Project site.

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review structural load limitations of existing structure.

3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review areas where existing construction is to remain and requires protection.

1.6 INFORMATIONAL SUBMITTALS

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

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

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's and other tenants' on-site operations are uninterrupted.
2. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

C. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Section 01 3233 "Photographic Documentation." Submit before Work begins.

1.7 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

1.8 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

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

C. Notify Government Representative of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If suspected hazardous materials are encountered, do not disturb; immediately notify Government Representative and Owner. Hazardous materials will be removed by Owner under a separate contract.

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

F. Utility Service: Maintain existing utilities and protect them against damage during selective demolition operations.

1.9 COORDINATION

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

B. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

C. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

D. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.

1. Comply with requirements specified in Section 01 3233 "Photographic Documentation."
2. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

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

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Owner will locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
2. Arrange to shut off utilities with utility companies.
3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3.3 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 5000 "Temporary Facilities and Controls."

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

C. Remove temporary barricades and protections where hazards no longer exist.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches.
5. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
6. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
7. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
8. Dispose of demolished items and materials promptly.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area on-site.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Government Representative, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 41 19

SECTION 05 12 00 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Structural steel.
2. Grout.

B. Extent of structural steel work is shown on the drawings. Provide all materials, labor, hardware, equipment, transportation, and services to perform structural steel work.

C. Cooperation with work of other sections.

1. Review contract drawings and specifications which affect structural steel work.
2. Perform work in a manner which will not interfere or delay work of other contractors. Cooperate with other trades a necessary.
3. Inform those performing work of other sections, in writing or by schedules, of requirements for services, materials, or other items prepared or supplied by other sections which affect work of this sections.

D. Related Sections:

1. Division 01 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.

1.3 ACTION SUBMITTALS

A. Product Data and Test Reports: Submit copies of manufacturer's specifications and installation instructions for each proprietary product, including laboratory test reports and such other data as may be required to show compliance with the specifications. Indicate by transmittal form that copies of such data have been distributed to Fabricator/Installer and the Owner's Testing Agency.

1. Certified copies of mill reports covering the chemical and physical properties of the steel.
2. High-strength bolts, nuts, and washers, each type, including mechanical properties and chemical analysis.
3. Direct-tension indicators.
4. Tension-control, high-strength bolt-nut-washer assemblies.
5. Unfinished bolts and nuts.
6. Welding electrodes, each type.
7. Non-shrink grout.

B. Shop Drawings: Show fabrication of structural-steel components.

1. Include drawing index sheets, including updated sheets, at the same time that details are submitted.
2. Include detail drawings showing complete details for the fabrication of all structural steel members and components, including but not limited to: identification marks, dimensions, size, type, weight, grade of steel, cuts, connections, splices, camber, holes, requirements for installation of other materials or parts of construction, cleaning requirements prior to priming, type and dry-thickness of primer, and other pertinent data.
3. Include erection plans (minimum 1/8" = 1'-0" scale) showing type, size, weight and identification marks of all structural steel members. Include temporary members required for erection, dimensions locating all members relative to column grid lines, elevations of all members, and clear cross references with all other related Drawings.
4. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
5. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installer, fabricator, and testing agency.

B. Welding certificates.

C. Source Quality-Control Reports.

1. Contractor's Shop Testing Reports: Submit directly to the Government Representative with copies to the Contractor, Testing Agency and others as indicated. Document all of the certifications, tests and inspections specified.
2. Testing Agency Reports: Submit directly to the Government Representative, with copies to the Contractor and others as indicated. Document all of the certifications, tests and inspections specified.
3. Source quality-control reports shall clearly indicate all pertinent data, including but not limited to the following: date; time; weather conditions; name and qualifications of inspector; certifications, tests and/or inspections performed; equipment used; location of structural member or assembly within the building; whether or not the test results indicate compliance with the specifications, etc.

D. Field Quality-Control Reports:

1. Testing Agency Reports: Submit directly to the Government Representative, with copies to the Contractor and others as indicated. Document all of the certifications, tests and inspections specified.
2. Field quality-control reports shall clearly indicate all pertinent data, including but not limited to the following: date; time; weather conditions; name and qualifications of inspector; certifications, tests and/or inspections performed; equipment used; location of structural member or assembly within the building; whether or not the test results indicate compliance with the specifications, etc.

E. Substitutions: Substitutions for the member sizes, type(s) of steel, connection details, or any other modifications proposed by the Contractor will be considered by the Government Representative under the following conditions:

1. The revisions in no case result in additional cost to the Owner. In considering cost savings to the Owner, adequate compensation for the Government Representative review of these substitutions should be considered.
2. The request is made in writing and accepted prior to the submission of shop drawings.
3. It is suitably demonstrated that there is a substantial cost advantage or time advantage to the Owner.
4. Sufficient drawings, engineering calculations by a licensed professional engineer registered in the Commonwealth of Massachusetts, and other data are submitted to facilitate review by the Government Representative.

F. Corrective Work: Report any structural steel members or assemblages having fabrication errors, installation errors, or deformations preventing proper assembly and fitting of parts to Architect/Engineer upon discovery. Corrective work proposed by the Contractor will be considered by the Architect/Engineer under the following conditions:

1. Corrective work will in no case result in additional cost to the Owner.
2. The request is made in writing and accepted prior to performing corrective work.
3. Sufficient drawings, engineering calculations by a licensed professional engineer registered in the Commonwealth of Massachusetts, and other data are submitted to facilitate review by the Government Representative.

G. Minutes of preconstruction conference.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD. If the Fabricator's facility is not AISC certified, the Testing Agency will perform all shop testing and inspection work, and the fabricator will be backcharged for this work. Refer to Paragraph “Source Quality Control” for additional information.

B. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE. If the installer is not AISC certified, refer to Paragraph “Erection Quality Control” for additional information.

C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code - Steel."

D. Preconstruction Conference: Conduct conference at Project site.

1. Conduct a meeting prior to the preparation of shop drawings to review the detailed requirements for preparing calculations and shop drawings, sequence of submittals, erection tolerances, welding qualifications, inspection procedures, surveys and other similar matters.
2. Responsible representatives from all concerned parties are required to attend the meeting including, but not limited to, the following:

    a. Government Representative.

b. Construction Manager’s superintendent.
c. Contractor's Superintendent.
d. Erector.

3. Record and distribute legible meeting minutes to all parties in attendance at the meeting and an additional copy to the Government Representative.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion to, damage to, or overload members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Testing Agency observes repackaging and seals containers.
2. Clean and relubricate bolts and nuts that become dry or rusty before use.
3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A 992.

B. Channels and Angles: ASTM A 36.

C. Plate and Bar: ASTM A 36.

D. Welding Electrodes: Conform to AWS D1.1, including addenda and the following requirements:

1. Shielded metal-arc welding (SMAW): AWS A5.1 and A5.5, E70 series.
2. Submerged arc welding (SAW): AWS 5.17 and A5.23.
3. Flux core arc welding (FCAW): AWS 5.20 and 5.29
4. Metal inert gas welding (MIG) of structural steel is not permitted.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. Zinc-Coated High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers.

1. Finish: Hot-dip or mechanically deposited zinc coating.
2. Direct-Tension Indicators: ASTM F 959, Type 325, compressible-washer type with mechanically deposited zinc coating finish.

B. Threaded Rods: ASTM A 36.

1. Nuts: ASTM A 563.
2. Washers: ASTM F 436, Type 1, hardened.
3. Finish: to match connected construction.

C. Epoxy Adhesive Anchors: Install in accordance with manufacturer's printed instructions. Properly account for fastener spacing, embedment, edge distance, and strength of substrate. Use only with prior review and acceptance by Architect/Engineer for the specific applications indicated.

1. Manufacturer: Subject to compliance with requirements, provide products by one of the following:

a. Hilti North America.
b. Simpson Strong-Tie Co., Inc.
c. Powers Fasteners.
d. ITW Redhead.

2.3 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: Factory premixed grout with no drying, shrinkage or settlement at any age. Compressive strength per ASTM C-1107 of not less than 5,000 psi at 7 days and 7,500 psi at 28 days when placed in flowable consistency.

1. Product: Subject to compliance with requirements, provide one of the following, or approved comparable product:

a. BASF; Masterflow 555..
b. Euclid Chemical Co.; Flow Grout.
c. L & M Construction Chemicals; Duragrout.
d. Bonded Materials Co.; 10K Grout.
e. Five Star Products, Inc.; Five Star Grout.

2.4 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303 and AISC 360.

1. Fabricate beams with rolling camber up.
2. Identify high-strength structural steel according to ASTM A 6 and maintain markings until structural steel has been erected.
3. Mark and match-mark materials for field assembly. Use marks which agree with those indicated on the Shop Drawings and Erection Drawings.
5. Complete structural-steel assemblies, including welding of units, before starting galvanizing operations.

B. Thermal Cutting:

1. Perform manual oxygen cutting only with a mechanically guided torch, except as permitted below:

    a. Gas cut edges which are not to be welded and which will be free of substantial stresses may be cut manually with an unguided torch provided that specified AISC edge distances to holes are maintained.
    b. Gas cut edges which will be subjected to substantial stress (over 1/2 the allowable stress), or which are to be welded may be cut manually with an unguided torch to a line not within 1/8-inch of the finished dimension. Complete the final removal of material by chipping or grinding to produce a surface quality equal to that of the base metal edges.

2. Do not oxygen cut holes for bolted connections; components prepared in this manner will be rejected.
3. Shape all re-entrant corners notch-free to a radius of at least 1/2 inch.
4. Cut only those openings of the size and location indicated on the reviewed Shop Drawings.

C. Punching, Drilling, and Reaming:

1. Material may be punched 1/16-inch larger than the nominal diameter of the bolts. Wherever the thickness of metal is greater than 7/8-inch or is greater than the diameter of the bolts plus 1/8-inch, drill or subpunch holes and ream. The diameter for subpunched holes shall be 1/16-inch smaller than nominal diameter of bolt accommodated. Locate finished holes to insure passage of bolts through assembled materials without drifting. Enlarge holes to receive bolts by reaming. Remove burrs caused by punching or reaming before assembly of bolted joints or members.
2. Drill or punch holes at right angles to the surface of the metal. Do not make or enlarge holes by burning. Clean-cut holes without torn or ragged edges.
3. Punch and drill steel for attachment of other materials indicated on the Drawings or noted in the Specifications to be attached to the steel. Use suitable templates for proper location of this work. Provide slotted holes for adjustment where indicated.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads. Completely assemble and weld member attachments prior to milling of surfaces.

E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 3, "Power Tool Cleaning."

2.5 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Use bolts of a length that will extend at least 1/4-inch beyond the nuts in the completed connection. Enter bolts into the holes without damaging the thread.
2. Provide a calibrated bolt tension indicating device at the jobsite. Use the device to confirm the suitability both of the component parts of the fastener assembly and of the selected installation techniques. Tighten representative samples of each bolt type and size in the device to demonstrate both proper snug tight conditions and the additional tightening necessary to develop the bolt pretension prescribed in Table 8.1 of the RCSC

"Specification." Use the device to insure that the installation wrenches and pneumatic supply are of adequate capacity.

3. Correct poor matching of holes by drilling hole to the next larger bolt size and using the larger size bolt, if approved by the Architect/Engineer.
4. Assemble joints without the use of separate erection bolts. Install bolts using powered impact wrenches of sufficient capacity and with an adequate supply of air.
5. Bring all plies of the connection into firm contact by tightening all bolts to a snug tight condition. Progress systematically from the most rigid portion of the joint out to the joint free edges. Retighten any bolts which may have loosened during the assembly process. Protect bolt heads and nuts during assembly and tightening.
6. Tighten bolts in connections identified as tension or slip-critical connections to the pretension levels specified in Table 8.1 of the RCSC "Specification." Acceptable methods of tightening pretensioned bolts include Direct Tension Indicators or the turn-of-the-nut method. Twist-off torque bolts are not an acceptable alternate fastener for slip critical connections. Follow the manufacturer's written instructions for the proper installation of Direct Tension Indicators.

B. Weld Connections: Comply with AWS D1.1 for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.
2. Use shielded metal arc welding or submerged arc welding for all shop welding. Flux core arc welding may be used provided AWS procedure qualification tests are made for the specific intended application of the process.
3. Prepare joint welding procedures and a program of welding sequences (for each component and component connections) and submit to the Architect/Engineer for review before any welding is done. Use detailing and procedures which reduce residual stresses to a minimum. Consider the toughness and notch sensitivity of the steel in formulating welding sequences to prevent brittle and premature fracture. After review, follow the welding procedures and sequences without deviation unless specific approval for change is obtained from the Architect/Engineer. Perform all welding in compliance with the AWS "Structural Welding Code" using AWS qualified welders. The Architect/Engineer may require re-qualification of operators by tests prescribed in the AWS "Standard Qualification Procedures" for changes in welding procedure.
4. Remove paint, grease, loose scale and foreign matter from the surfaces to be welded. Clean the welds each time the electrode is changed or a new pass is started. Chip clean burned or flame cut edges before depositing welds.
5. Do not begin structural welding until joint elements are bolted or tacked in intimate contact and adjusted to the dimensions indicated, with allowance for any weld shrinkage that is expected. Hold component parts of built-up members with clamps or other means to keep parts straight and in close contact. Take precautions to minimize "lock-up" stress and distortion due to heat.
6. Welds not otherwise specified are continuous fillet welds. Use the minimum fillet size in accordance with AISC unless specifically noted otherwise.
7. Weld heavy sections and those having a high degree of restraint with low hydrogen electrodes. Perform intermittent welding, continuous welding and straightening of built-up sections to minimize internal stresses.
8. The same electrode may be used with various thicknesses of plate, but adjust the current used and the number of passes proportionately.
9. Do not weld in a wind unless wind protection is provided. Do not splice members without prior approval or review by the Architect/Engineer.

10. After being deposited, brush welds with wire brushes. Make welds which exhibit uniform section, smoothness of welded metal, feather edges without undercuts or overlays and which are free of porosity and clinkers. Visual inspection of the edges and ends of fillets and butt joint welds must indicate good fusion, with penetration into the base metal. Cut out and replace defective welds.
11. Adjustable Veneer Anchors: Welders attaching adjustable veneer ties to structural steel shall hold current AWS certification.

2.6 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123.

1. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.

2.7 SOURCE QUALITY CONTROL

A. For AISC-certified facilities, submit a written program for the proposed fabrication quality control testing and inspection. After review and acceptance of these documents by the Architect/Engineer, perform all shop testing and inspection as specified herein and as required for Fabricator's quality control testing and inspection program.

B. For facilities not AISC-certified, the Testing Agency will perform all shop testing and inspection work listed herein, and the fabricator will be backcharged for this work.

C. Testing Agency: Engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports. Provide the testing agency with the following:

1. Complete set of current reviewed shop and erection drawings.
2. Full and ample means and assistance for testing.
3. Access to and proper facilities (e.g., scaffolding, temporary work platforms, hoisting facilities, etc.) for inspection of the Work in the shop and field.

D. Correct deficiencies in Work that test reports and inspections indicate do not comply with the Contract Documents.

E. Structural Steel Fabrication Shop Quality Control Program: As a minimum, perform the following shop tests and inspections and submit daily reports of the results of all tests. State in each report whether the tested specimens conform to all requirements of the Contract Documents, and specifically note any discrepancies. If the inspections indicate defects in the Work, increase the degree of testing to insure that the full extent of defects in the joint are found and that similar defects are not present in similar joints.

1. Submit evidence that all welders employed in the Work hold current AWS certification for the welding procedures that each will perform. If recertification of welders is required, the retesting is the Fabricator's responsibility.

a. Visually inspect all fabrication operations, including dimensional and fit-up/alignment and control.
b. Visually inspect all plate edges and rolled shape edges for material defects.
c. Visually inspect material in accordance with AWS D1.1

d. Bolted Connections: Test and inspect shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
e. Welded Connections: Test and inspect shop-welded connections according to AWS D1.1 and the following inspection procedures:

1) Visual Inspection :

a) Inspect all welding operations and welds, including edge preparation, fit-up, preheat, and adherence to welding procedures. Inspect welds prior to shop painting of steel.
b) Measure the weld profiles for 20% of the length of each weld, at random.

2) Non-Destructive Testing: Test welds using either Magnetic Particle Testing in accordance with ASTM E 709 or Ultrasonic Testing in accordance with ASTM E 164, at Inspecting Agency's option, as follows:

a) 20% of all fillet welds, root and final passes, at random, except as noted below.
b) 100% of fillet welds in tension, root and final passes, full length of each weld.

2. Schedule all work to allow the testing requirements listed above to be completed.
3. Testing and inspection do not relieve the Contractor of the responsibility for providing materials and fabrication procedures in compliance with the specified requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Report any discrepancies to the Government Representative before proceeding with erection. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, flooring, planking, scaffolding, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

1. The design, strength, safety and adequacy of all temporary bracing and methods of construction are the responsibility of the Contractor. This responsibility includes the safety and stability of the work at all stages of erection until the permanent lateral load resisting system of the structure becomes fully effective. No action by the Government Representative will eliminate, lessen, or restrict this responsibility in any manner.
2. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION QUALITY CONTROL

A. If the steel installer is not AISC certified, submit the following:

1. Evidence that all welders to be employed in the work hold current AWS certification for the welding procedures that each will perform.
2. Written welding procedures. A copy of all welding procedures shall be kept on-site at all times. Confirm that written welding procedures are compliant with AWS specifications. Submit evidence that welding procedures are used by welders.
3. Written bolt-tightening procedures. A copy of all bolt-tightening procedures shall be kept on-site at all times. Confirm that written bolt-tightening procedures are compliant with the Research Council on Structural Connections (RCSC) specifications. Submit evidence that bolt-tightening procedures are used by workers.
4. Evidence that crane operators are certified by the National Commission for the Certification of Crane Operators or are equivalently trained and experienced.
5. Evidence that project-specific erection plans with hoisting and erection requirements are communicated and implemented in the field.

3.4 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Maintain erection tolerances of structural steel within AISC 303.

C. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.

2. Use drift pins only to bring parts together; do not use drift pins in a manner which distorts or damages structural members.Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

D. Splice members only where indicated.

E. Do not use thermal cutting during erection.

F. Do not enlarge misaligned holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.5 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

B. Weld Connections: Comply with AWS D1.1 for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.

2. Use shielded metal arc or flux core welding for all field welding.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

B. Bolted Connections: Test and inspect bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1. Assign an identification symbol or mark to each bolting crew working on the project. Use this identification on each joint completed.
2. Visually inspect all anchor-rod nut installation and tightening.
3. Inspect the job site calibration of each size bolted fastener assembly and installation technique in the calibrated tension measuring device. Verify that the proper bolt pretension listed in Table 8.1 of the RCSC "Specification" is achieved and that installation equipment is of sufficient capacity.
4. Periodically monitor field bolting procedures during bolt installation. Verify that all bolts in all connections are brought to a "snug tight" condition with all plies of the connection in firm contact. Verify that bolts in connections identified as either slip-critical or direct tension connections are being additionally tightened by the proper technique(s) determined in the tension testing device described above.
5. Confirm that all bolted connections are being installed in accordance with the procedures outlined in the RCSC "Specification."

C. Welded Connections: Visually inspect all field welds according to AWS D1.1.

1. Provide temporary enclosures, shielding, etc, to protect joints to be welded against the elements during all welding operations.
2. Non-Destructive Testing: Test welds using either Magnetic Particle testing in accordance with ASTM E 709 or Ultrasonic testing in accordance with ASTM E 164, at Testing Agency’s option, as follows:

    a. 20% of all fillet welds, root and final passes, at random.
    b. 100% of complete joint penetration welds, full length of weld.

D. Testing agency shall submit inspection reports promptly and in writing to Owner, and Contractor.

E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.7 FABRICATION AND ERECTION TOLERANCES

A. Unless otherwise noted, level and plumb individual members of the structure to an accuracy of 1 in 500, and erect structural steel to within the tolerances specified in the AISC 303. Base all leveling and plumbing on the mean operating temperature of the structure. Make allowances for the differences in temperature at time of erection and the mean temperature at which the structure will be when completed and in service. Base all measurements relating to tolerances on the theoretical centerline of the columns.

3.8 GROUTING OF STRUCTURAL STEEL MEMBERS

A. Grout Mixture: Use the specified grout mix with the minimum amount of water required to produce a flowable grout. Extend grout with 3/8 inch coarse aggregate for grout placements over 2-inches thick. The proposed grout mix with the 3/8 inch aggregate must be reviewed and approved by the grout manufacturer and the Architect/Engineer prior to use.

B. Mixing: In accordance with grout manufacturer's printed instructions. Do not mix more grout than can be placed within 20 minutes.

C. Preparation:

1. Remove all defective concrete, laitance, dirt, etc. from the concrete surface. Saturate the surface of the concrete thoroughly with clean water for at least 24 hours. Remove free water just prior to placing the grout.
2. Clean, align, and level the base plate into final position and maintain that position during grouting. Bring the concrete and plate to be grouted to a temperature of 65 degrees to 90 degrees F just prior to grouting.

D. Grouting:

1. Place the grout quickly and continuously to provide complete bearing and avoid air entrapment.
2. After the grout has acquired its initial set, cut off all unconfined, exposed edges, leaving sloping "shoulders." Cure the grout for a minimum of 3 days by application of a curing compound applied to the exposed shoulders. Maintain temperature above 50 degrees F for this time period.

3.9 CORRECTIVE WORK

A. Report to the Government Representative any structural steel members or assemblages having fabrication errors, erection errors, or deformations preventing proper assembly and fitting of parts.

B. Submit Drawings and Calculations to the Government Representative showing the reasons for and details of proposed corrective work. Perform the corrective work only after the Government Representative has reviewed and accepted the corrective procedures.

C. Corrective work, including any additional tests that may be necessary to show compliance of corrected work, shall be performed at no additional cost to the Owner.

3.10 REPAIRS AND PROTECTION

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.

END OF SECTION 05 12 00

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Framing with timber.
3. Framing with engineered wood products.

1.3 DEFINITIONS

A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.

B. Dimension Lumber: Lumber of 2 inches nominal size or greater but less than 5 inches nominal size in least dimension.

C. Exposed Framing: Framing not concealed by other construction.

D. Timber: Lumber of 5 inches nominal size or greater in least dimension.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension boards, lumber, and/or timber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

B. Material Certificate: For plastic lumber.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 15 percent.

2.2 DIMENSION LUMBER FRAMING

A. Dimension Lumber Framing: Hand-select material for uniformity of appearance and freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot-holes, shake, splits, torn grain, and wane.

1. Species and Grade: Douglas fir, Douglas, fir/larch, hem fir, or spruce pine fir (SPF), No. 2 or better.

2.3 TIMBER FRAMING

A. Comply with the following requirements, according to grading rules of grading agency indicated:

1. Species and Grade: Douglas fir-larch, Douglas fir-larch, hem fir, or spruce pine fir (SPF), No. 2 or better.
2. Maximum Moisture Content: 20 percent.
3. Additional Restriction: Free of heart centers.

2.4 ENGINEERED WOOD PRODUCTS

A. Source Limitations: Obtain each type of engineered wood product from single source from a single manufacturer.

B. Plastic Lumber: Basis of Design – American Plastic Lumber, Inc., or accepted comparable product.

2.5 FASTENERS

A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.

1. Provide fasteners of Type 304 stainless steel.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

D. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC58 or ICC-ES AC308 as appropriate for the substrate.

1. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

C. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

D. Do not splice structural members between supports unless otherwise indicated.

E. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

F. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

G. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
2. ICC-ES evaluation report for fastener.

H. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

END OF SECTION 06 1000

SECTION 06 20 13 - EXTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Exterior wood trim.
2. Lumber siding.

1.3 ACTION SUBMITTALS

A. Samples for Verification:

1. For each species and cut of lumber products, with half of exposed surface finished; 50 sq. in. for lumber.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers between each bundle to provide air circulation.

1. Protect materials from weather by covering with waterproof sheeting, securely anchored.
2. Provide for air circulation around stacks and under coverings.

1.5 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecast weather conditions permit work to be performed and at least one coat of specified finish can be applied without exposure to rain, snow, or dampness.

B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with applicable rules of any rules-writing agency certified by the American Lumber Standard Committee's (ALSC) Board of Review. Grade lumber by an agency certified by the ALSC's Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of inspection agency, indicating grade, species, moisture content at time of surfacing, and mill.
2. For exposed lumber, mark grade stamp on end or back of each piece.

2.2 EXTERIOR TRIM

A. Lumber Trim for Painted Finish:

1. Species and Grade: Provide one of the following:

a. Western red cedar; NLGA, WCLIB, or WWPA Grade B.
b. Northern white cedar; NeLMA or NLGA 1 Common.

2. Maximum Moisture Content: 19 percent.
3. Finger Jointing: Not allowed.
4. Face Surface: Surfaced (smooth).
5. Factory Priming: Factory coated on both faces and all edges, with exterior primer compatible with topcoats specified.

2.3 LUMBER SIDING

A. Provide kiln-dried lumber siding complying with DOC PS 20, factory coated with exterior primer compatible with topcoats specified.

B. Species and Grade: Provide one of the following:

1. Western red cedar; NLGA, WCLIB, or WWPA Grade B.
2. Northern white cedar; NeLMA or NLGA 1 Common.

C. Pattern: Match existing.

2.4 MISCELLANEOUS MATERIALS

A. Fasteners for Exterior Finish Carpentry: Provide nails or screws, in sufficient length to penetrate not less than 1-1/2 inches into wood substrate.

1. For face-fastening siding, provide ringed-shank siding nails or hot-dip galvanized-steel siding nails.
2. For applications not otherwise indicated, provide hot-dip galvanized-steel fasteners.

B. Wood Glue: Waterproof resorcinol glue recommended by manufacturer for exterior carpentry use.

C. Flashing: Comply with requirements in Section 07 62 00 "Sheet Metal Flashing and Trim" for flashing materials installed in exterior finish carpentry.

D. Sealants: Latex, complying with ASTM C 834 Type OP, Grade NF and applicable requirements in Section 07 92 00 "Joint Sealants," and recommended by sealant and substrate manufacturers for intended application.

2.5 FABRICATION

A. Back out or kerf backs of standing and running trim wider than 5 inches, except members with ends exposed in finished work.

B. Ease edges of lumber less than 1 inch in nominal thickness to 1/16-inch radius and edges of lumber 1 inch or more in nominal thickness to 1/8-inch radius.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.

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

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

B. Prime lumber to be painted, including both faces and edges, unless factory primed.

1. Cut to required lengths and prime ends.
2. Comply with requirements in Section 09 91 13 "Exterior Painting."

3.3 INSTALLATION, GENERAL

A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.

B. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials.

1. Use concealed shims where necessary for alignment.
2. Scribe and cut exterior finish carpentry to fit adjoining work.
3. Refinish and prime cuts as recommended by manufacturer.
4. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining exterior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
5. Coordinate exterior finish carpentry with materials and systems in or adjacent to it.

3.4 STANDING AND RUNNING TRIM INSTALLATION

A. Install flat-grain lumber with bark side exposed to weather.

B. Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 36 inches long, except where necessary.

1. Use scarf joints for end-to-end joints.
2. Stagger end joints in adjacent and related members.

C. Fit exterior joints to exclude water.

1. Cope at returns and miter at corners to produce tight-fitting joints, with full-surface contact throughout length of joint.
2. Plane backs of casings to provide uniform thickness across joints, where necessary for alignment.

D. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.

3.5 SIDING INSTALLATION

A. Install siding to comply with manufacturer's written instructions.

B. Horizontal Lumber Siding:

1. Apply starter strip along bottom edge of sheathing or sill.
2. Install first course of siding, with lower edge at least 1/8 inch below starter strip and subsequent courses lapped 1 inch over course below, matching existing lumber siding.

    a. Nail at each stud.
    b. Do not allow nails to penetrate more than one thickness of siding.

3. Leave 1/8-inch gap at trim and corners unless otherwise recommended by manufacturer, and apply sealant.
4. Butt joints only over framing or blocking, nailing top and bottom on each side and staggering joints in subsequent courses.

3.6 ADJUSTING

A. Replace exterior finish carpentry that is damaged or does not comply with requirements.

1. Exterior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

B. Adjust joinery for uniform appearance.

3.7 CLEANING

A. Clean exterior finish carpentry on exposed and semiexposed surfaces.

3.8 PROTECTION

A. Protect installed products from damage from weather and other causes during construction.

B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 06 20 13

SECTION 07 53 23 - ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Adhered ethylene-propylene-diene-terpolymer (EPDM) roofing system.
2. Substrate board.

1.3 DEFINITIONS

A. Roofing Terminology: Definitions in ASTM D 1079 and glossary of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to work of this Section.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Conduct conference at Project site.

1. Meet with COR, roofing Installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:

1. Base flashings and membrane terminations.
2. Flashing details at penetrations.

C. Samples for Verification: For the following products:

1. Roof membrane and flashings of color required.

D. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Manufacturer Certificates:

1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

a. Submit evidence of complying with performance requirements.

2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.

C. Product Test Reports: For components of roof membrane, for tests performed by a qualified testing agency, indicating compliance with specified requirements.

D. Field quality-control reports.

E. Sample Warranties: For manufacturer's special warranties.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is UL listed and listed in FM Approvals' RoofNav for roofing system identical to that used for this Project.

B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.10 FIELD CONDITIONS

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

1.11 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.

1. Special warranty includes roof membrane, base flashings, fasteners, cover boards, and other components of roofing system.
2. Warranty Period: 20 years from Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing system and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and flashings shall remain watertight.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:

1. Zone 1 (Roof Area Field): As indicated on Structural Drawing S1.
2. Zone 2 (Roof Area Perimeter): As indicated on Structural Drawing S1.
3. Zone 3 (Roof Area Corners):As indicated on Structural Drawing S1.

D. FM Approvals' RoofNav Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and shall be listed in FM Approvals' RoofNav for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals Certification markings.

1. Fire/Windstorm Classification: Class 1A-60.
2. Hail-Resistance Rating: MH.

2.2 ETHYLENE-PROPYLENE-DIENE-TERPOLYMER (EPDM) ROOFING

A. EPDM Sheet: ASTM D 4637, Type I, nonreinforced, self-adhering EPDM sheet.

1. Thickness: 60 mils, nominal.
2. Exposed Face Color: Black.
3. Source Limitations: Obtain components for roofing system from roof membrane manufacturer.

2.3 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.

B. Sheet Flashing: 60-mil-thick EPDM, partially cured or cured, according to application.

C. Bonding Adhesive: Manufacturer's standard.

D. Seaming Material: Manufacturer's standard, synthetic-rubber polymer primer and 3-inch-wide minimum, butyl splice tape with release film.

E. Lap Sealant: Manufacturer's standard, single-component sealant, colored to match membrane roofing.

F. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.

G. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8-inch-thick; with anchors.

H. Miscellaneous Accessories: Provide pourable sealers, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

2.4 COVER BOARDS

A. Cover Board: ASTM C 1177, glass-mat, water-resistant gypsum board or ASTM C 1278/C 1278M, fiber-reinforced gypsum board.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Georgia-Pacific Building Products; Dens Deck.
b. National Gypsum Company; Glass Mat Roof Board.
c. United States Gypsum Company; Securock Glass Mat Roof Board.

2. Thickness: 1/2 inch.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate panel to roof deck.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

1. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at terminations.

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

3.2 PREPARATION

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

3.3 ROOFING INSTALLATION, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions, FM Approvals' RoofNav assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.4 COVER BOARD INSTALLATION

A. Install cover board with long joints in continuous straight lines, with end joints staggered not less than 24 inches in adjacent rows.

1. Tightly butt substrate boards together.

3.5 ADHERED ROOFING INSTALLATION

A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.

B. Unroll membrane roof membrane and allow to relax before installing.

C. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Bonding Adhesive: Apply to substrate and underside of roof membrane at rate required by manufacturer, and allow to partially dry before installing roof membrane. Do not apply to splice area of roof membrane.

E. Apply roof membrane with side laps shingled with slope of roof deck where possible.

F. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement.

1. Firmly roll side and end laps of overlapping roof membrane to ensure a watertight seam installation.
2. Apply lap sealant and seal exposed edges of roofing terminations.
3. Apply a continuous bead of in-seam sealant before closing splice if required by roofing system manufacturer.

G. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape.

1. Firmly roll side and end laps of overlapping roof membrane to ensure a watertight seam installation.
2. Apply lap sealant and seal exposed edges of roofing terminations.

H. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.

3.6 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.7 FIELD QUALITY CONTROL

A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion, in presence of COR, and to prepare inspection report.

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

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.8 PROTECTING AND CLEANING

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

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

END OF SECTION 07 53 23

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Formed steep-slope roof sheet metal fabrications.
2. Formed wall sheet metal fabrications.

1.3 COORDINATION

A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Samples for Verification: For each type of exposed finish.

1. Sheet Metal Flashing: 12 inches long by actual width of unit, including finished seam and in required profile and finish. Include fasteners, cleats, clips, closures, and other attachments.

1.5 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.9 WARRANTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Metallic-Coated Steel Sheet: Provide [zinc-coated (galvanized) steel sheet according to ASTM A 653, G90 coating designation; prepainted by coil-coating process to comply with ASTM A 755/A 755M.

1. Surface: Smooth, flat.
2. Exposed Coil-Coated Finish:

    a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

3. Color: As selected by COR from manufacturer's full range.
4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

2.3 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

    a. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.

2. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153 or ASTM F 2329.

C. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

2.4 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
2. Obtain field measurements for accurate fit before shop fabrication.
3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.

4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.

G. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use.

2.5 STEEP-SLOPE ROOF SHEET METAL FABRICATIONS

A. Drip Edges: Fabricate from the following materials:

1. Galvanized Steel: 0.022 inch thick.

2.6 WALL SHEET METAL FABRICATIONS

A. Opening Flashings in Frame Construction: Fabricate head, sill, and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch-high, end dams. Fabricate from the following materials:

1. Galvanized Steel: 0.022 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

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

3.2 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
5. Torch cutting of sheet metal flashing and trim is not permitted.
6. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
2. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 "Joint Sealants."

3.3 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

3.4 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Opening Flashings in Frame Construction: Install continuous head, sill, and similar flashings to extend 4 inches beyond wall openings.

3.5 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

3.6 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean off excess sealants.

C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 62 00

SECTION 09 91 13 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following exterior substrates:

1. Existing steel railings.
2. Wood trim and windows.

1.3 DEFINITIONS

A. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.

B. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

C. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide products by one of the following:

1. Benjamin Moore & Co.
2. PPG Architectural Coatings.
3. Sherwin-Williams Company.

2.2 PAINT, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

B. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

C. Colors: As selected by COR from manufacturer's full range.

2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: COR reserves the right to invoke the following procedure:

1. COR may engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. COR may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Wood: 15 percent.

C. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

D. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Existing Steel Substrates: Remove rust, loose mill scale, and existing coatings if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. SSPC-SP 7/NACE No. 4.

E. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

F. Wood Substrates:

1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
4. Paint entire exposed exterior surface of window frames and sashes.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: COR may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

A. Existing Steel Substrates:

1. Epoxy System:

a. Prime Coat: Primer, epoxy, anti-corrosive, for metal, MPI #101.
b. Intermediate Coat: Epoxy, matching topcoat.
c. Topcoat: Epoxy, gloss, MPI #77.

B. Wood Substrates: Wood trim, windows.

1. Water-Based Light Industrial Coating System:

a. Prime Coat: Primer, alkyd for exterior wood, MPI #5.
b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
c. Topcoat: Light industrial coating, exterior, water based, semi-gloss (MPI Gloss Level 5), MPI #163.

END OF SECTION 09 91 13

Project Scoping Report

Task Order #P17PD03094; Contract #P15PC00036; PMIS #225866

Northern Canal Waste Gatehouse

13 November 2017

EYP Architecture & Engineering, PC
Independence Wharf
470 Atlantic Avenue, 7th Floor
Boston, MA 02210

T 617 305 9800
www.eypae.com

Introduction

On 17 August 2017, architects and engineers from EYP (Eric Ward, RA; Rebecca Young, RA; and Mark Kanonik, PE) visited the site to observe the general condition of the Northern Canal Waste Gatehouse. On 19 and 20 October 2017, Mark Kanonik and Chuck Volans of EYP again visited the site to observe the general condition of the building. The Gatehouse is a single-story, heavy-timber-framed building that measures approximately 70' by 15' in plan. The building was built circa 1872 atop a dam that was built circa 1847 and houses the canal gates, including the machinery that operates the gates. Refer to Photograph 1 for additional information.

We understand that the canals and gatehouse structure are owned by the Commonwealth of Massachusetts but maintained by Lowell National Historical Park and that the operational machinery within the gatehouse is controlled and maintained by Enel Green Power North America, Inc. It is our understanding that the wood siding, the roofing membrane, and a portion of the sill at the northeast corner of the building were replaced in the 1980s by NPS staff. At an unknown time in the past, supplemental steel shoring was installed to support both the south and north walls of the building.

Please note that no calculations were performed to determine the load-carrying capacity of any of the elements of the gatehouse building; furthermore, no destructive tests were performed, and no material samples were collected. Lastly, no evaluations of any of the utilities inside or outside of the building were made.

Observations

The Northern Canal Waste Gatehouse is a single-story, heavy-timber-framed, building that measures approximately 70' by 15' in plan. The gatehouse building is built atop a horizontally-curved masonry dam that separates the Northern Canal above from the Merrimack River below. The sills of the sidewalls do not bear directly on the dam; the sill of the north (downstream) wall bears on iron posts which are themselves bolted into the masonry dam, and the sill on the south (upstream) side bears on a wooden ledger that was bolted into the masonry dam. The sills of the endwalls bear directly on the dam.

The roofing is not original and is estimated to be about 30 years old; while it appears to be generally watertight, the edges of the roof membrane are delaminating around the perimeter of the roof. Refer Photograph 2 for additional information. The roofing has reached the end of its useful life and should be replaced. The siding appears to be original, but some siding boards at the eastern end of the north wall were replaced about 30 years ago. The siding is in remarkably good condition except for a few missing siding boards at the eastern end of the north wall. Refer to Photograph 3 for additional information. The paint is reaching the end of its useful life, and the siding should be repainted.

Except for the sills under the north and south walls, the wood framing is in very good condition. The sills themselves are in very poor condition. The eastern end of the north sill was replaced about 30 years ago, but it is now completely missing in some areas. Refer to Photographs 3 and 4 for additional information.

It appears that the normal operating elevation of the Northern Canal was raised when the hydroelectric power plant was installed to the east of the gatehouse building. Photograph 5 (Historic American Engineering Record [HAER] Photograph MA-8C-2, taken in either 1974 or 1975) shows the south face of the dam and gatehouse when the Northern Canal was dewatered and the walkway decking was removed. Photograph 6 is a close-up of the southeast corner of the building, showing the heavy timber ledger which supports the south (upstream) sidewall. Staining of the large masonry units under the gatehouse, as well as vegetation growing in a few masonry joints, indicate that the elevation of the Northern Canal was typically about 4 feet below the top of the dam. However, it appears that the "normal" canal elevation is now only a few inches below the top of the dam, and the heavy timber ledger is now nearly constantly partially submerged. Refer to Photograph 5 for additional information. Not surprisingly, the heavy timber ledger and the wall sill plate atop the ledger are badly deteriorated and are completely missing in some areas. Refer to Photographs 7 and 8 for additional information. At an unknown time in the recent past, 12 shoring posts (with shoring beams and cable ties) were installed throughout the gatehouse building, presumably to redistribute the load away from the deteriorated walls. Given the level of deterioration of the wood framing, it is possible that the building would have partially collapsed if these shoring posts were not installed. Please note that it is impossible to repair the deteriorated heavy timber ledger and south wall sill to match the original design without permanently lowering the elevation of the canal; we assume that this is not feasible, so an alternate method to repair / restore the south (upstream) sidewall will be detailed in the construction documents that are currently progressing.

HAER Photograph MA-8C-2 (Photograph 5) appears to indicate several open joints in the larger masonry units at the top of the dam, directly underneath the eastern half of the gatehouse building. Inside the gatehouse building, the capping stones atop the dam are separated and have settled a couple of inches, and water can be both seen and heard flowing through the open joints. At some time in the recent past, steel staples were installed in the capping stones, presumably to stop the stones from separating further. Refer to Photograph 9 for additional information. Vegetation is growing on the north face of the dam, and a significant quantity of water can be seen flowing through the side of the dam. Refer to Photograph 10 for additional information. It seems very likely that the water flowing through the dam is eroding the mortar joints, thus causing both the lateral movement and the settlement seen in the capping stones at the top of the dam. It seems very unlikely that the issues in the capping stones are caused by uneven settlement of the dam as a whole since bedrock is visible throughout the bed of the Merrimack River. We understand that NPS does not "own" the dam and is not, therefore, responsible for maintaining and/or repairing the dam; however, we recommend that NPS share our concerns expressed in this Report with the Enel Green Power North America, Inc., at which point they may choose to commission a detailed engineering study. Our concerns expressed in this Report are based solely on very limited information; it should be noted that we did not perform an analysis of the dam to determine its load-carrying capacity, nor did we perform any destructive tests or any investigations of the dam.

Recommendations

The deterioration noted in the bases of the walls is adversely affecting the structural stability of the gatehouse building, although it is not yet affecting the operation of the gates. If no action is taken to address these areas of deterioration, the deterioration will continue to worsen until the building settles

or shifts to such an extent that the operation of the canal gates is compromised. Consequently, we recommend the following:

1. Shore the building until all loads are removed from the wall framing and/or the temporary shoring posts.
2. Remove all deteriorated sections of the wall framing (such as wall studs, sill plates, etc.) at the north and south walls, estimated to be about 6 to 12" above the top of the dam.
3. Install new steel framing to support the north wall.
4. Install additional steel framing to support the south wall.
5. Provide wood decking atop the steel framing along both the south and north walls.
6. Remove all temporary shoring posts, beams, and cables.
7. Remove and replace the roofing with an adhered EPDM roof membrane.
8. Repair all windows on the north wall so that the windows may be opened if desired.

No work will be performed to the gates or the gate-operating machinery, including active utilities serving the gate-operating machinery.

Refer to Appendix A for a Class C cost estimate corresponding to the recommended work listed above.

Photographs

Photograph 1 – Northern Canal Waste Gatehouse, viewed from the southeast.

Photograph 2 – Delaminated edge of roof membrane at northeast corner of roof.

Photograph 3 – Deteriorated / missing sill and missing siding boards at eastern end of north wall; entire building has settled in this area, as evidenced by the downward curvature of the siding boards under the left-most window.

Photograph 4 – Deteriorated / missing sill under eastern edge of north wall; note large gap between dam and wall.

Photograph 5 – HAER Photograph MA-8C-2, taken in 1974 or 1975; note staining in wall and vegetation in joints below gatehouse, indicating that the normal elevation of the Northern Canal was several feet below what it is today. Also, note many open joints in larger masonry units at the top of the dam.

Photograph 6 – Close-up of HAER Photograph MA-8C-2, taken from Photograph 5, showing heavy timber ledger and wall sill.

Photograph 7 – Underside of walkway along south side of gatehouse; the deteriorated sill that is now partially submerged in water is visible in Photographs 5 and 6.

Photograph 8 – Deteriorated heavy timber ledger and wall sill plate at eastern end of south wall.

Photograph 9 – Capping stones atop dam, inside gatehouse building; several units have separated, and water can be seen flowing through open joints.

Photograph 10 – North face of dam and gatehouse building; note vegetation growing on face of dam and significant water flowing through dam.