

**AIR SAMPLING AND MONITORING
PROTOCOL**

FOR:

**130 CEDAR STREET
NEW YORK, NY 10006**

CLIENT:

**MASTERWORKS DEVELOPMENT CORP.
56 WEST 45th STREET
NEW YORK, NY 10036**

ROUGH DRAFT

JLC PROJECT No.: 04-3271

January 5, 2005

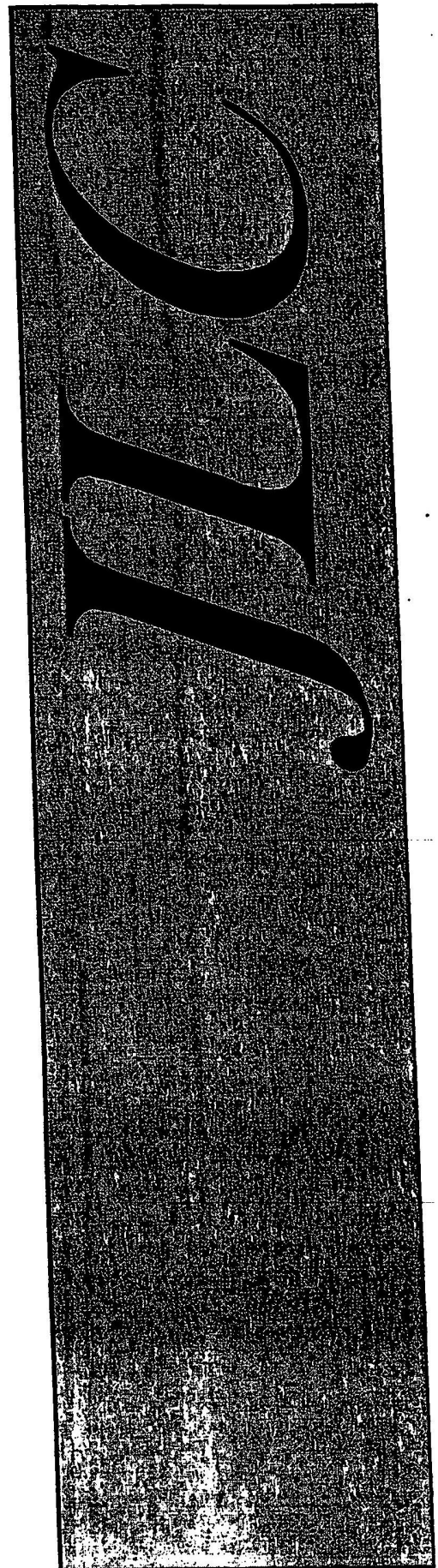


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APPENDIX A: REFERENCES

1.0 Introduction

JLC Environmental Consultants, Inc. (JLC) has been retained by Masterworks Development Corp. to prepare this proposed air-sampling plan for abatement/deconstruction work at 130 Cedar Street, New York, New York (hereby known as "the subject property"). This plan encompasses several types of monitoring that correspond with the complex nature of the deconstruction process. The demolition includes asbestos and lead based paint removal, roof and exterior façade renovation and interior construction. Source documents used for reference herein are listed in the footnotes and the attached Appendix A.

The following is a brief summary of the basic types of sampling work to be completed at the subject property. These definitions were outlined in the Proposed Ambient Air Monitoring Program for the 130 Liberty Street Deconstruction Project¹:

- Not JLC's responsibility*
- Level 1: The personnel performing deconstruction work will be responsible to collect personal air samples representative of various work activities. The purpose of this sampling is to determine airborne levels of contaminants generated at the source point.
 - Level 2: JLC will collect ambient air samples and wipe samples inside the building during deconstruction and abatement of known hazards. Sampling will also be conducted outside the isolation barriers of the work area and at exits points from contaminated spaces (i.e. the personnel and waste load out decontamination units).
 - Level 3: JLC will monitor the exterior ambient air of the site at street level.
 - Level 4: JLC will monitor at various points outside of the project boundary. Concurrent comprehensive meteorological monitoring to assist in data analysis will support this sampling.

2.0 Background

This proposed program has been developed to monitor for contaminants of potential concern (CPOC) as referenced by the Initial Building Characterization Study Report² prepared for a neighboring building located at 130 Liberty Street. Meetings and discussions with personnel from the United States Environmental Protection Agency (USEPA) and the New York City Department of Environmental Protection (NYCDEP) were also helpful in preparing this document as was the

¹Proposed Ambient Air Monitoring Program for the 130 Liberty Street Deconstruction Project, prepared by Weston Solutions, Inc., revision 12/10/2004

²Initial Building Characterization Study Report, prepared by The Louis Berger Group, Inc., 9/14/2004

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Amount of research information available at the Lower Manhattan Development Corporation (LMCD) website.

The objects of this air sampling and monitoring protocol are to:

- Record meteorological conditions which may affect analytical results;
- Conduct real time monitoring to gauge migration, if any, of contaminants from the site;
- Conduct air and wipe sampling for target compounds

3.0 Methodology

A) Monitoring meteorological variables and their significance is important in modeling air quality. A Rain Wise Weather log meteorological station will log the following variables:

- a. Wind Speed, Direction and Standard Deviation of Wind Speed Direction
- b. Barometric Pressure
- c. Rainfall

B) Real Time Monitoring and/or Periodic Integrated Sampling methods will be utilized to conduct sampling for:

- a) Respirable Dust (PM¹⁰)
- b) Total Suspended Particulates (TSPs)
- c) Metals (as TSPs)
- d) Mercury
- e) Asbestos ((utilizing Phase Contrast Microscopy (PCM) and Transmission Electron Microscopy (TEM))
- f) Silica
- g) Polycyclic Aromatic Hydrocarbons (PAHs)
- h) Dioxins (and Furans)
- i) Polychlorinated Biphenyls (PCBs)

C) Sampling Sites

A total of three (3) exterior, perimeter locations of the subject property will be selected to perform on-going monitoring during exterior deconstruction activities (i.e. façade removal). Possible sampling locations include:

- 1) Southeast corner of the subject property at ground level.
- 2) Southwest corner of the subject property at ground level.

3) Northwest corner of the subject property at ground level

A total of one (1) exterior, perimeter location that is adjacent to the subject property will be selected on the downwind side of established prevailing winds at an elevated location. Masterworks Development will arrange access to this sampling location.

D) Sampling Phases

Sampling phases shall be broken down as follows: exterior background, interior background, continuous/during and clearance.

- a) Exterior Background Samples: ambient/background sampling shall be conducted at exterior locations for one (1) sampling day consisting of one (1) eight (8) hour sampling period. This sampling will be conducted prior to the commencement of deconstruction activities.

Background samples will be collected at all four exterior sampling locations for the following types of compounds:

- Particulates as Total Suspended Particulates (TSPs)
- Metals as Total Suspended Particulates (TSPs)
- Asbestos – PCM analysis (5% of total by TEM analysis)
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Dioxins and Furans
- PCBs
- Mercury
- Silica

- b) Interior Background Samples: interior ambient/background samples shall be conducted at various locations prior to deconstruction activities within the subject property.

Interior background sampling for asbestos shall be conducted as per federal, state and local regulations and as outlined in the JLC Asbestos Abatement Technical Specification dated July 15, 2004, p. 59. Asbestos air samples will be collected for analysis by PCM with 5% of the total number of samples reanalyzed utilizing TEM methodology.

Interior background samples will also be collected for the following analytes: RCRA wipe samples for the following metals: aluminum (Al), arsenic, cadmium (Cd), copper (Cu), iron (Fe) manganese (Mn), lead (Pb) and Zinc (Zn); Mercury (Hg), Silica (Si), dioxins and furans; and PAHs. The wipe methodology is outlined in the New York City Department of Environmental Protection Bureau of Environmental Compliance, WTC Unoccupied Building Cleaning Program Scope of Work, Project #WTC LBA (found in the contract document known as Supply

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and Service Contract, Emergency Air Monitoring at the World Trade Center Site,
114 Liberty Street).

c) Continuous/During Samples:

Exterior samples will be collected for Particulates (as TSP's), Metals (as TSP's), PAHs, D/Fs, PCBs, Mercury (Hg), Silica (Si) and Asbestos. Real time particulate monitoring will be conducted at the four exterior sampling locations for PM¹⁰ (particulate matter of less than 10 microns in size).

During work activities, ambient asbestos air sampling will be conducted for one (1) eight (8) hour period each day. These samples will be analyzed by PCM with 5% of the total reanalyzed by TEM analysis.

d) Clearance Samples:

Interior samples for asbestos will be collected as per federal, state and local regulations by PCM with 5% of the total reanalyzed by TEM analysis. Silica samples will be collected and analyzed from each work location.

Interior wipe samples for RCRA metals, D/Fs, PCBs, Mercury (Hg), Silica (Si) and PHA's will be collected (see background/ambient sampling section D, parts a and b).

E) Sampling and Monitoring

1. Continuous Monitoring: The monitors selected to continuously measure PM¹⁰ during the exterior façade deconstruction work shall be beta-attenuation monitors or an equivalent, acceptable method. Real time monitors are currently not an EPA reference method, one reference method PM¹⁰ sampler will be co-located along side the real-time PM¹⁰ as a quality assurance (QA) check. This QA sampler will be rotated daily through all real-time PM¹⁰ monitoring locations for the duration of the sampling period.

2) Integrated Samplers: The monitors selected to measure TSP's, Metals and Silica shall be Federal Reference Method (FRM) samplers or an equivalent methodology. These are the samplers that are routinely used by USEPA and state agencies to measure compliance with ambient air quality standards. The TSP's are collected on an 8-inch x 10-inch micro quartz filter. The sampler flow rate is generally set to run at 40 actual cubic feet per minute (acfm) and held at a constant flow rate by a volumetric flow orifice for the sample period. TSP filters will be analyzed using inductively coupled plasma spectroscopy (ICP) for eight RCRA metals.

3) Asbestos Sampling Units: Asbestos samples will be collected according to NIOSH 7400 using Phase Contrast Light Microscopy. Filter sampling media is a

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.45-micron mixed cellulose ester (MCE) membrane 25mm in diameter with a conductive cowl on a cassette. Sample volumes will vary due to various site-specific conditions.

4) Silica Sampling: Silica samples will be collected according to NIOSH 7500 Method using XRD analysis.

5) Fibrous Glass Sampling: Fibrous Glass samples will be collected according to NIOSH 7400 Method using counting method "B".

6) Dioxin/Furan Wipe Sampling: D/F samples will be collected according to ASTM method 6661-01 and analyzed by EPA Method SW-846-8290.

7) Poly Cyclic Aromatic Hydrocarbon Sampling: PAH samples will be collected using ASTM method D6661-01 and analyzed using EPA method SW-846-8270C.

8) RCRA Metals Sampling: RCRA metals samples will be collected using wipe samples pre-moistened with de-ionized water.

9) Mercury will be sampled Utilizing EPA modified method 7471A.

10) Poly chlorinated bi Phenols will be sampled utilizing EPA modified method 8082.

4.0 Quality Assurance and Quality Control

Quality Assurance (QA) includes the systematic actions necessary to provide adequate confidence that a measurement will satisfy a given requirement for accuracy. Quality Control (QC) is the operation techniques that are used to fulfill requirements for quality. The QC procedures for the air sampling and monitoring sections of this protocol include planned equipment calibrations, preventative maintenance of equipment, co-located sampling to evaluate precision and analysis of QC samples consisting of field blanks and lab blanks.

5.0 Alarm and Action Levels

The goal of the air sampling and monitoring protocol is to ensure the deconstruction operations at the subject property do not have a negative impact on the airborne environment of the surrounding community. Any action and alarm levels that may be established and utilized for the COPC would be solely for that purpose rather than providing compliance with any known health standard.

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Appendix A: References

Proposed Ambient Air Monitoring Program for the 130 Liberty Street
Deconstruction Project, prepared by Weston Solutions, Inc., revision 12/10/2004

Initial Building Characterization Study Report, prepared by The Louis Berger
Group, Inc., 9/14/2004 → 130 Liberty

New York City Department of Environmental Protection Bureau of Environmental
Compliance, WTC Unoccupied Building Cleaning Program Scope of Work,
Project #WTC LBA (Supply and Service Contract, Emergency Air Monitoring at
the World Trade Center Site, 114 Liberty Street)

130 LIBERTY STREET

Archit. Spec.

**130 Cedar Street
New York, New York**

**ARCHITECTURAL SPECIFICATION
SECTIONS 1 - 14**

Masterworks Development Corporation

56 West 45th Street, Suite 802

New York, New York 10036

Tel: (212) 944 - 9353

Fax: (212) 391 - 5453

Koenen Associates

Architects and Planning Consultants

6 West 18th Street

New York, NY 10011

Tel: (212) 206 - 8333

Fax: (212) 633 - 6476

EXISTING BRICK AREA										EXISTING CONCRETE PANEL/STOREFRONT						
				Total surface area not including parapet	Existing Parapet length ft	Existing parapet area	Brick Spandrel width 4-12 ft	Brick Spandrel area sq	Brick Plaster width ft	Brick Plaster area 4-12 sq	Existing Window area (4-12) sq	Floors 1-3 facade area (bottom 33'-0") s.f.	Floors 1-3 concrete area/stone	1st & 2nd floor area/window existing	2nd & 3rd floor spandrels	3rd floor windows
Exposed Facades																
NORTH - CEDAR																
	60.8	41.0	19.8	8,557.0	130.0	455.0	348.5	1,212.8	174.0	2,188.9	2,945.3	1,999.1	638.3	840.5	287.0	348.5
EAST - WASHINGTON Albany corner	151.8	104.0	47.8	21,880.0	297.0	1,039.5	914.3	3,199.9	454.0	5,638.2	7,771.1	5,010.4	1,549.0	2,132.0	728.0	884.0
	9.2	3.6	5.6	1,272.2	7.8	27.3	33.0	115.5	45.6	568.2	280.5	302.3	178.8	73.8	25.2	30.8
SOUTH - ALBANY																
	70.7	47.3	23.4	11,142.0	138.0	483.0	413.5	1,447.2	219.5	2,727.8	3,514.7	2,332.0	761.2	968.8	330.8	401.8
	282.2	185.9	98.4	42,651.2	572.8	2,004.8	1,707.2	5,976.3	893.1	11,102.1	14,511.5	9,843.8	3,127.2	4,014.9	1,371.0	1,684.7
WEST - 90W COURT																
Building Totals	53.3	18.0	37.3	6,000.0	124.0	434.0	144.0	504.0	na	4,272.0	1,224.0	0.0	0.0	0.0		
				48,651.2	696.8	2,438.8	1,851.2	6,479.3	893.1	15,374.1	15,735.5	9,843.8	3,127.2	4,014.9		
Total surface area including parapets				51,080.0												

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Existing window opening/spandrel length in Linear Feet													
Floor	Cedar			Washington			Albany corner			Albany			West Court
	Width of bay: 3 bays of 13'-8"	Window area	spandrel area	Width of bay: 6 bays of 16'-1-1/2"; 2 bays of 8"	Window area	spandrel area	Width of 1 bay of 3'-8"	Window area	spandrel area	Width of 1 bay of 3'-8"; 2 bays of 16'-1-1/2"; 1 bay of 11'-4"	Window area	spandrel area	
Concrete panels													
1	41.00	492.00	0.00	104.00	1248.00	0.00	3.67	44.00	0.00	47.25	567.00	0.00	0.00
2	41.00	348.50	143.50	104.00	884.00	364.00	3.67	31.17	12.83	47.25	401.63	165.38	14.60
3	41.00	348.50	143.50	104.00	884.00	364.00	3.67	31.17	12.83	47.25	401.63	165.38	16.00
	123.00	1045.50	430.50	312.00	2652.00	1092.00	11.00	93.50	38.50	141.75	1204.88	496.13	30.60
Brick cladding													
4	41.00	348.50	143.50	104.00	884.00	364.00	3.67	31.17	12.83	47.25	401.63	165.38	16.00
5	41.00	348.50	143.50	104.00	884.00	364.00	3.67	31.17	12.83	47.25	401.63	165.38	16.00
6	41.00	348.50	143.50	104.00	884.00	364.00	3.67	31.17	12.83	47.25	401.63	165.38	16.00
7	41.00	348.50	143.50	104.00	884.00	364.00	3.67	31.17	12.83	47.25	401.63	165.38	16.00
8	41.00	348.50	143.50	104.00	884.00	364.00	3.67	31.17	12.83	47.25	401.63	165.38	16.00
9	41.00	348.50	143.50	104.00	884.00	364.00	3.67	31.17	12.83	47.25	401.63	165.38	16.00
10	33.50	284.75	117.25	96.75	822.38	338.63	3.67	31.17	12.83	43.33	368.31	151.66	16.00
11	33.50	284.75	117.25	96.75	822.38	338.63	3.67	31.17	12.83	43.33	368.31	151.66	16.00
12	33.50	284.75	117.25	96.75	822.38	338.63	3.67	31.17	12.83	43.33	368.31	151.66	16.00
I.f.	346.50	2945.25	1212.75	914.25	7771.13	3199.88	33.00	280.49	115.50	413.49	3514.67	1447.22	144.00

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Area take-offs are for reference only; Contractors are responsible for verifying amounts prior to bid

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Existing Pilaster Length in Linear Feet									
Floor	Cedar		Washingt on	Albany corner		Albany		West Court	
	4 bays of 59" (4.91 lf)		5 bays of 68"; 4 bays of 58"	2 bays of 33		1 bay of 3'-8"; 2 bays of 16'-0"; 1 bay of 11'- 4"			
Concrete panels									
1	19.64	245.50	47.66	5.50	68.75	23.42	292.75		0.00
2	19.64	235.68	47.66	5.50	66.00	23.42	281.04		14.60
3	19.64	157.12	47.66	5.50	44.00	23.42	187.36		16.00
	58.92	638.30	142.98	16.50	178.75	70.26	761.15		30.60
Brick cladding									
4	19.64	314.24	47.66	5.50	88.00	23.42	374.72		16.00
5	19.64	235.68	47.66	5.50	66.00	23.42	281.04		16.00
6	19.64	235.68	47.66	5.50	66.00	23.42	281.04		16.00
7	19.64	235.68	47.66	5.50	66.00	23.42	281.04		16.00
8	19.64	235.68	47.66	5.50	66.00	23.42	281.04		16.00
9	19.64	235.68	47.66	5.50	66.00	23.42	281.04		16.00
10	18.73	224.76	56.00	4.20	50.40	26.33	315.96		16.00
11	18.73	224.76	56.00	4.20	50.40	26.33	315.96		16.00
12	18.73	224.76	56.00	4.20	50.40	26.33	315.96		16.00
	174.03	2166.92	453.96	45.60	569.20	219.51	2727.80	0.00	144.00

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SECTION 01010

SUMMARY OF WORK

PART 1.00 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.02 WORK INCLUDED

- A. Work of this Section includes the following descriptions:
 - 1. Contractor's duties.
 - 2. Codes.
 - 3. Abbreviations and symbols.
 - 4. Color schedule

1.03 CONTRACTOR'S DUTIES

- A. Except as specifically noted, provide and pay for
 - 1. Labor, materials and equipment.
 - 2. Tools, construction equipment and machinery.
 - 3. Other facilities and services necessary for proper execution and completion of the work.
- B. Pay required sales, consumer and use taxes, except as specifically excluded by the Supplementary Conditions.
- C. Secure and pay for, as necessary for proper execution and completion of work, and as applicable at time of Contract Award.
 - 1. Permits
 - 2. Government fees.
 - 3. Licenses.
- D. Give required notices.
- E. Comply with codes, ordinances, rules, regulations, orders and other legal requirements of public authorities which bear on performance of work
- F. Promptly submit written notice to Architect of observed variance of Contract Documents from the Building Code and other requirement of Public Authorities having jurisdiction.

1.04 APPLICABLE CODES

- A. All references to codes, specifications and standards referred to in the Specification Sections and on the Drawings shall mean, and are intended to be, the latest edition, amendment and/or revision of such reference standard in effect as of the date of these Contract Documents.

1.05 ABBREVIATIONS AND SYMBOLS

A. Reference to a technical society, institution, association, or governmental authority is made in the Specifications in accordance with the following abbreviations.

1.	AA	Aluminum Association
2.	AAMA	Architectural Aluminum Manufacturers Association
3.	AASHTO	American Association of State Highway and Transportation Officials
4.	ABMA	American Boiler Manufacturers Association
5.	ACI	American Concrete Institute
6.	ACRI	Air Conditioning and Refrigerator Institute
7.	ADC	Air Diffusion Council
8.	AFI	Air Filter Institute
9.	AGI	American Gas Institute
10.	AGCA	Associated General Contractors of America, Inc.
11.	AGMA	American Gear Manufacturers Association
12.	AIA	American Institute of Architects
13.	AIA	American Insurance Association
14.	AIMA	Acoustical and Insulating Materials Association
15.	AISC	American Institute of Steel Construction
16.	AISI	American Iron and Steel Institute
17.	AITC	American Institute of Timber Construction
18.	ALS	American Lumber Standards
19.	AMCA	Air Moving and Conditioning Association
20.	ANSI	American National Standards Institute, Inc.
21.	APA	American Plywood Association
22.	API	American Petroleum Institute
23.	AREA	American Railway Engineering Association
24.	ARI	Air Conditioning and Refrigeration Institute
25.	ASAH	American Society of Architectural Hardware Consultants
26.	ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
27.	ASME	American Society of Mechanical Engineers
28.	ASTM	American Society for Testing and Materials
29.	ATI	Asphalt Tile Institute
30.	AWI	Architectural Woodwork Institute
31.	AWPA	American Wood Preserves Association
32.	AWPI	American Wood Preserves Institute
33.	AWS	American Welding Society
34.	AWWA	American Waterworks Association
35.	BHMA	Builders Hardware Manufacturers Association
36.	BIA	Brick Institute of America
37.	BRI	Building Research Institute
38.	CABRA	Copper and Brass Research Association
39.	CAGI	Compressed Air and Gas Institute
40.	CE	Corps of Engineers (Army)
41.	CRSI	Concrete Reinforcing Steel Institute
42.	CS	U.S. Commercial Standard
43.	CSI	Construction Specification Institute
44.	CTI	Cooling Tower Institute
45.	DFPA	Douglas Fir Plywood Association
46.	ETL	Electrical Testing Laboratories
47.	FGMA	Flat Glass Marketing Association
48.	FHA	Federal Housing Administration
49.	FIA	Factory Insurance Association
50.	FM	Factory Mutual Engineering Division Association of Factory Mutual Fire Insurance Companies

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51.	FPL	Forest Products Laboratories
52.	FS	Federal Specifications
53.	FSIWA	Federation of Sewage and Industrial Waste Association
54.	FTI	Facing Tile Institute
55.	GA	Gypsum Association
56.	GTA	Glass Tempering Association
57.	HPMA	Hardwood Plywood Manufacturers Association
58.	IBRM	Institute of Boiler and Radiator Manufacturers
59.	IEEE	Institute of Electrical and Electronics Engineering
60.	IES	Illuminating Engineering Society
61.	IPCEA	Insulated Power Cable Engineers Association
62.	JAN	Joint Army-Navy Specifications
63.	MAC	Masonry Advisory Council
64.	MIA	Marble Institute of America
65.	MLMA	Metal Lath Manufacturers Association
66.	MS	Military Specifications
67.	MSS	Manufacturer's Standardization Society of the Valves and Fitting Industries
68.	MSTD	Military Standard
69.	NAAMM	National Association of Architectural Metal Manufacturers
70.	NAFM	National Association of Fan Manufacturers
71.	NAPM	National Association of Plastic Manufacturers
72.	NBHA	National Builders Hardware Association
73.	NBS	National Bureau of Standards
74.	NCMA	National Concrete Masonry Association
75.	NEC	National Electric Code (NFPA Pamphlet No. 70)
76.	NELMA	Northeastern Lumber Manufacturers Association, Inc.
77.	NEMA	National Electric Manufacturers Association
78.	NEMI	National Elevator Manufacturing Industry, Inc.
79.	NFC	National Fire Code
80.	NFPA	National Fire Protection Association
81.	NFPA	National Forest Products Association
82.	NHLA	National Hardwood Lumber Association
83.	NHPMA	Northern Hardwood and Pine Manufacturers Association
84.	NPA	National Particleboard Association
85.	NPCA	National Point and Coatings Association
86.	NRMCA	National Ready Mixed Concrete Association
87.	NSC	National Safety Council
88.	NSF	National Sanitation Foundation
89.	NSSEA	National School Supplies and Equipment Association
90.	NTMA	The National Terrazzo and Mosaic Association, Inc.
91.	NWMA	National Woodwork Manufacturers Association
92.	OSHA	Occupational Safety and Health Administration
93.	PCA	Portland Cement Association
94.	PCI	Prestressed Concrete Institute
95.	PEI	Porcelain Enamel Institute, Inc.
96.	PS	Product Standard, U.S. Department of Commerce
97.	RIS	Redwood Inspection Service
98.	RTI	Resilient Tile Institute
99.	SAE	Society of Automotive Engineers
100.	SBI	Steel Boiler Institute
101.	SCMA	Southern Cypress Manufacturers Association
102.	SDI	Steel Deck Institute
103.	SDI	Steel Door Institute
104.	SJI	Steel Joist Institute

Summary of Work

01010-3

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105.	SMACNA	Sheet Metal and Air Conditioning Contractors National Association
106.	SMFMA	Sprayed Mineral Fiber Manufacturers Association, Inc.
107.	SPIB	Southern Pine Inspection Bureau
108.	SPR	Simplified Practice Recommendations, U.S. Department of Commerce
109.	SSPC	Steel Structures Painting Council
110.	SWFPA	Structural Wood Fiber Products Association
111.	TCA	Tile Council of America
112.	TEMA	Tubular Exchange Manufacturing Association
113.	TIMA	Thermal Insulation Manufacturers Association
114.	TPI	Truss Plate Institute
115.	UL	Underwriter's Laboratories, Inc.
116.	UPC	Uniform Plumbing Code
117.	USCGS	U.S. Coast and Geodesic Survey
118.	WCLIB	West Coast Lumber Inspection Bureau
119.	WRI	Wire Reinforcement Institute
120.	WWPA	Western Wood Products Association

END OF SECTION

130 Cedar Street
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SECTION 01202

PROGRESS MEETINGS

PART 1.00 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.02 WORK INCLUDED

- A. To enable orderly review of progress during construction and to provide for systematic discussions of problems, the General Contractor will conduct project meetings throughout the construction period.
- B. In general, project meetings will be held at the job site in accordance with a mutually acceptable schedule.
- C. The purpose of the project meetings is analysis of problems that might arise between the Owner and the Contractor relative to execution of the work.

1.03 RELATED WORK

- A. The Contractor's relations with his subcontractors and materials suppliers, and discussions relative thereto, are the Contractor's responsibility as described in the Contract and are not part of project meetings content.

1.04 QUALITY ASSURANCE

- A. Persons designated by the Contractor to attend and participate in project meetings shall have all required authority to commit the Contractor to solutions as agreed upon in the project meetings.

1.05 SUBMITTALS

- A. Agenda Items: To the maximum extent possible, advise the Architect at least twenty-four (24) hours in advance of the project meeting regarding all items to be added to the agenda.
- B. Minimum Agenda
 - 1. Review work progress since last meeting.
 - 2. Note field observations, problems and decisions.
 - 3. Identify problems which impede planned progress.
 - 4. Review off-site fabrication problems.
 - 5. Develop corrective measures and procedures to regain schedule.
 - 6. Coordinate projected progress with other prime contractors.
 - 7. Review submittal schedules, expedite as required to maintain schedule.
- C. Minutes: The Contractor will compile minutes of each project meeting and will distribute copies to the Owner and the Architect. The Contractor shall make and distribute such other copies as he wishes.

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PART 2.00 - PRODUCTS

(Not used)

PART 3.00 - EXECUTION

3.01 MEETING SCHEDULE

- A. Coordinate with the Architect as required to establish a mutually acceptable schedule for project meetings.

3.02 MEETING LOCATION

- A. To the maximum extent practicable, project meetings shall be held at the job site. Provide adequate space and facility including table, chairs, and lighting for proper conduct of meeting.

3.03 ATTENDANCE

- A. To the maximum extent practicable, assign the same person or persons to represent the Contractor at project meetings throughout the construction period. Subcontractors, material suppliers, and others may be invited to attend those project meetings in which their aspects of the work are involved.

END OF SECTION

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SECTION 01300

SUBMITTALS

PART 1.00 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.02 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete submittal requirements as specified herein, including, but not limited to, the following:
 - 1. Shop drawings and samples.
 - 2. Manuals.
 - 3. Integrated drawings.

1.03 RELATED WORK

- A. Section 01600 – MATERIALS AND EQUIPMENT.
- B. General submittal requirements - General Conditions.

PART 2.00 - PRODUCTS

2.01 SHOP DRAWINGS AND SAMPLES

A. General

1. The Contractor shall be responsible for coordinating the schedule for submittal of shop drawings and samples with his progress schedule and the requirements of the Contract Schedule, and submit a coordinated schedule of submission of all shop drawings and samples to the Architect.
2. Failure of the Contractor to schedule and submit shop drawings and samples in ample time for checking, correction, and rechecking will not justify any delay in the Contract Schedule. Allow ample time for items to be tested, including time for retesting if the tests or mock-ups fail.
3. Samples, shop drawings, manufacturers' literature, and other required information shall be submitted in sufficient time to permit proper consideration and action on same before any materials and items are delivered on the work. Stagger submissions so that the Architect can review the documents in an orderly and timely manner. All samples of materials requiring laboratory tests

shall be submitted to the laboratory for testing not less than 90 days before such materials are required to be used in the work. All other samples, Manufacturers' literature, and other sample information shall be submitted for approval not less than 30 days before such materials are required to be used in the work.

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4. Shop drawings for each Section of the work shall be numbered consecutively, and the numbering system shall be retained throughout all revisions. Each drawings shall have a clear space for the stamps of the Contractor, Architect, and one of the Architect's consultants.
5. All shop drawings shall be thoroughly checked by the Contractor for compliance with the Contract Documents before submitting them to the Architect and shall bear the Contractor's stamp of approval certifying that they have been so checked. Any shop drawings submitted without this stamp of approval and certification, and shop drawings which, in the Architect's opinion, are incomplete, contains errors or have not been checked, or only checked superficially, will be returned unchecked by the Architect for re-submission by the Contractor.
6. In checking shop drawings, the Contractor shall verify all dimensions and field conditions and shall check and coordinate the shop drawings of any Section or trade with the requirements of all other Sections or trades whose work is related thereto, as required for proper and complete installation of the work. The Architect will review shop drawings. The Architect's acceptance of shop drawings is for design only and not method of assembly or erection. Acceptance shall in no way be construed as (1) permitting any departure whatsoever from the Contract Documents; (2) relieving the Contractor of full responsibility for any error in details, dimensions, omissions, or otherwise that may exist; (3) relieving the Contractor of full responsibility for adequate field connections, erection techniques, bracing, or deficiencies in strength; (4) relieving the Contractor of full responsibility for satisfactory performance of all work and coordination with the work of all subcontractors and other contractors; or (5) permitting departure from additional details or instructions previously furnished by the Architect. Acceptance of such drawings shall not be construed as a complete check, nor shall it relieve the Contractor from responsibility for proper fitting of the work, nor from the necessity of furnishing any work which may not be indicated on shop drawings when approved. The Contractor shall be solely responsible for any quantities which may be shown on the shop drawings.
7. No work shall be fabricated, manufactured, or installed from shop drawings stamped "Revise and Resubmit" or "Rejected", and such shop drawings shall be corrected and resubmitted by the Contractor until accepted by the Architect. At least one complete set of "No Exceptions Taken", "Make Correction Noted" or "In General Conformance With Design Concept", "In General Conformance With Design Concept Except As Noted" shop drawings shall be kept at the site in the contractor's field office for reference at all times. "Revise and Resubmit" or "Rejected" shop drawings shall not be permitted at the site.
8. Submittals marked "No Exceptions Taken" or "In General Conformance With Design Concept":
 - a. Submittals which require no corrections by the Architect will be marked "No Exceptions Taken" or "In General Conformance With Design Concept".
9. Submittals marked "Make Corrections", "Noted" or "In General Conformance With Design Concept Except As Noted":
 - a. Submittals which require only a minor amount of correcting shall be marked "Make Corrections Noted" or "In General Conformance With Design Concept Except as Noted". This mark shall mean that checking is complete and all corrections are obvious without ambiguity. Fabrication will be allowed on work marked "Make

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Corrections Noted" or "In General Conformance With Design Concept Except As Noted", provided such action will expedite construction and noted corrections are adhered to. If fabrication is not made strictly in accordance with corrections noted, the item shall be rejected in the field, and the Contractor will be required to replace such work in accordance with corrected submittals.

10. Submittals marked "Revise and Resubmit" or "Rejected":
 - a. When submittals are contrary to contract requirements or too many corrections are required, they shall be marked "Revise and Resubmit" or "Rejected". No work shall be fabricated under this mark. The Architect shall list his reasons for rejection on the submittals or in the transmittal letter accompanying their return. The submittals must be corrected and resubmitted for approval.
11. All shop drawing and samples shall be identified as follows.
 - a. Date of submittal.
 - b. Title of project.
 - c. Name of Contractor and date of his approval.
 - d. Name of subcontractor or supplier and date of submittal to Contractor.
 - e. Number of submission.
 - f. Any qualification, departure, or deviation from the requirements of the Contract.
 - g. Federal Specification or ASTM number where required.
 - h. Such additional information as may be required by the Specifications for the particular material being furnished.
12. If the Contractor wishes to deviate from the materials or details as shown in Specifications or Drawings, he shall submit the proposed deviation with shop drawings and/or samples stating the extent and the materials or details being replaced. The Contractor shall also submit information on the allowed credit or extra cost required for the proposed deviation, and also all information relating to the work of other Sections revised by the proposed deviation.
13. The Architect will review and approve shop drawings and samples for approval with reasonable promptness, but only for conformance with the design concept of the work and with information contained in the Contract Documents.
14. Incomplete shop drawings will be returned without checking for proper submission, and this shall not be considered as cause for delay of the work or extra compensation to the Contractor.
15. The Contractor shall submit appropriate transmittal forms with every submittal of Shop drawings, manufacturer's literature, and samples. All sepia reproductions shall be rolled on cardboard tubes for resubmittal. The Contractor shall submit all required shop drawings, manufacturer's literature and samples in accordance with the procedures outlined below.
16. Unless otherwise specifically directed by the Architect, make all shop drawings accurately to a scale sufficiently large to show all pertinent features of the item and its method of connection to the work.

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17. The Contractor shall submit one copy of each standard referred to in the Specifications (ASTM, Fed. Spec., etc.) with the submission of each respective shop drawing, sample, or literature.

B. Submission of Shop Drawings

1. **Architectural Work:** Submit one (1) sepia reproducible and three (3) black line of each shop drawing to the Architect for approval. If approved, the Architect will return one (1) sepia stamped "No Exceptions Taken" or "Make Corrections Noted", and the Contractor shall print the required number of copies. In the event the Architect returns one (1) sepia stamped "Revise and Resubmit" or "Rejected", the Contractor shall make indicated changes and resubmit one (1) sepia reproducible and two (2) black line prints to the Architect.
2. **Structural work and Mechanical Work:** Submit one (1) sepia reproducible and three (3) black line prints of each shop drawing to the Engineer, with one (1) black line print (for first submission only) and copy of the transmittal to the Architect. If Accepted, the Engineer shall return one (1) sepia stamped "In General Conformance With Design Concept" or "In General Conformance With Design Concept Except As", and the Contractor shall print the required number of copies. In the event the Architect returns one (1) sepia stamped "Revise and Resubmit" or "Rejected", the Contractor shall make indicated changes and resubmit one (1) sepia reproducible and two (2) black line prints to the Engineer, with a copy of the Transmittal form to the Architect.
3. **Prints:** The Contractor shall provide all prints or shop drawings as reasonably required by subcontractors, material suppliers, superintendents, inspectors, and others as required for the work, or as directed by the Architect. The Contractor shall pay all costs in connection with printing and distribution of shop drawings.

C. Submission of Manufacturer's Literature, including Catalog, Catalog Cuts, Brochures, Charts, Test Data and Similar Information

1. Manufacturer's literature will receive consideration only when accompanied by the transmittal form properly filled out, as indicated, and listing each item of literature, as well as the Specification Section and paragraph numbers describing such materials. Any deviations from contract requirements shall be stated on the above form or attached to it.
2. **Architectural Work:** Submit six (6) copies of Manufacturer's literature to the Architect for acceptance. If accepted, the Architect will return four (4) copies stamped "No Exceptions Taken" or "Make Corrections Noted". In the event the Architect returns the literature stamped "Revise and Resubmit" or "Rejected", he will return two (2) copies only. The Contractor shall resubmit six (6) copies of correct or corrected literature of all submissions stamped "Revise and Resubmit" or "Rejected", with one (1) copy of correct or corrected literature with copy of the transmittal form to the Architect.
3. **Structural Work and Mechanical Work:** Submit six (6) copies of Manufacturer's literature to the Engineer, with one (1) copy of the literature and copy of the transmittal form to the Architect. If accepted, the Architect will return four (4) copies stamped "In General Conformance With Design Concept" or "In General Conformance With Design Concept Except As Noted". In the event the Architect stamps the literature "Revise and Resubmit" or "Rejected", he will return two (2) copies only. The Contractor shall resubmit six (6) copies of correct or corrected literature to the Engineer for all submissions stamped "Revise and Resubmit" or

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"Rejected", with one (1) copy of correct or corrected literature with copy of the transmittal for the Architect.

4. All copies of Manufacturer's literature required to be resubmitted hereunder shall be original printed material. Reproductions of printed material will not receive consideration.

D. Submissions of Samples

1. All samples shall be submitted in triplicate unless otherwise indicated in the Specifications.
2. Samples will receive consideration only when accompanied by the transmittal form properly filled out, as indicated, and listing each sample, as well as the listing of any ASTM, Federal or other standard references specified or applicable and such additional information as may be required by the Specifications for the materials being submitted. Any deviation from the contract requirements shall be so stated on the above form or attached to it.
3. The Architect shall have the right to require submission of samples of any materials, whether or not specifically indicated in the various Sections of the Specifications.
4. Unless otherwise specified, samples of sufficient size to indicate general visual effect shall be submitted. Where samples must show a range of color, texture finish, graining, or other similar property, the Contractor shall submit sets of pairs illustrating the full scope of the range.
5. One (1) sample of each submission will be returned to the Contractor. Samples stamped "Revise and Resubmit" or "Rejected" by the Architect shall be resubmitted in triplicate by the Contractor.
6. All samples stamped "No Exceptions Taken", "Make Corrections Noted", "In General Conformance With Design Concept" or "In General Conformance With design Concept Except As Noted" shall be kept at the site in the Contractor's field office facilities for reference at all times. "Revise and Resubmit" or "Rejected" samples shall not be kept at the site.

2.02 MANUALS

- A.** Where manuals are required to be submitted covering items included in this work, prepare all such manuals in durable plastic binders approximately 8-1/2" x 11" in size with at least the following:
1. Identification on, or readable through, the front cover stating general nature of the manual.
 2. Nearly typewritten index near the front of the manual furnishing immediate information as to location in the manual of all emergency data regarding the installation.
 3. Complete instructions regarding operation and maintenance of all equipment involved.
 4. Complete nomenclature of all replaceable parts, their part numbers, current cost, and name and address of nearest vendor of parts.
 5. Copy of all guarantees and warranties issued.

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- 6. Copy of the approved shop drawings with all data concerning changes made during construction.
- B. Where contents of manuals include Manufacturer's catalog pages, clearly indicate the precise items included in this installation and delete or otherwise clearly indicate all Manufacturer's data with which this installation is not concerned.
- C. Number of Copies Required: Three (3) of each manual.

2.03 INTEGRATED DRAWINGS

- A. The HVAC subcontractor shall prepare a Drawing or Drawing showing duct work, heating and sprinkler piping. This Drawings shall include location of grilles, registers, etc., and access doors in hung ceilings. Locations shall be fixed by elevations and dimensions from column center lines and/or walls.
- B. The HVAC subcontractor shall prepare and distribute to the Plumbing and Electrical subcontractors, the General Contractor.
- C. The HVAC subcontractor shall lay out on his sepia the reflected ceiling plan, beam soffit elevations, ceiling heights, roof openings, etc.
- D. The Plumbing subcontractor shall lay out on his sepia the piping, valves, clean-outs, etc., indicating locations and elevations and shall indicate the necessary access doors.
- E. The Electrical subcontractor shall indicate on his sepia the fixtures, large conduit runs, clearances, pull boxes, junction boxes, sound system speakers, etc.
- F. The General Contractor shall indicate on his sepia any structural framing, ceiling hangers, etc.
- G. The General Contractor shall call as many meetings with the subcontractors as are necessary to resolve any conflicts that become apparent. He will call on the services of the Consultant Engineer or Architect where necessary. The Construction Manager is responsible for the coordination of the Drawing or Drawings.
- H. On resolution of the conflicts, each subcontractor shall enter his own work on the HVAC Subcontractor's sepia, which shall become the master or integrated Drawings. The master sepia shall be signed by each contributing subcontractor to indicate his acceptance of the arrangement of the work.
- I. A reproducible copy of the master integrated Drawings will be prepared by the HVAC subcontractor. The General Contractor will make distribution.
- J. Each subcontractor shall prepare his Shop Drawings in accordance with the integrated Drawings. No work will be permitted without approved Shop Drawings. It is therefore essential that this procedure be instituted as quickly as possible.

PART 3.00 - EXECUTION

3.01 COORDINATION OF SUBMITTALS

- A. Prior to submittal for Architect's review, use all means necessary to fully coordinate all

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material, including the following procedures:

1. Determine and verify all field dimensions and conditions, materials, catalog numbers and similar data.
 2. Coordinate as required with all trades and with public agencies involved.
 3. Secure all necessary approvals from public agencies and others and signify by stamp, or other means, that they have been secured.
 4. Clearly indicate all deviations from the Contract Documents.
- B. Unless otherwise specifically permitted by the Architect, make all submittals in groups containing all associated items; the Architect may reject partial submittals as not complying with the provisions of the Contract Documents.

END OF SECTION

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SECTION 01310

PROGRESS SCHEDULE

PART 1.00 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with requirements of the Contract Documents.

1.02 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the progress schedule as specified herein, including, but not limited to, the following:
 - 1. Format.
 - 2. Content.
 - 3. Revisions to schedules.
 - 4. Submittals.

1.03 RELATED WORK

- A. Summary of work - Section 01010.
- B. Submittals - Section 01300.

1.04 FORMAT

- A. Prepare Schedules as horizontal bar chart with separate bar for each major portion of Work or operation, identifying first work day of each week.
- B. Sequence of Listings: The chronological order of the start of each item of Work.
- C. Scale and Spacing: To provide space for notations and revisions.

1.05 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by Specification section number.
- C. Identify work of separate stages and other logically grouped activities.
- D. Provide sub-schedules to define critical portions of the entire Schedule.
- E. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- F. Provide separate schedule of submittal dates for shop drawings, product data, and samples, including Owner furnished products and Products identified under Allowances,

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and dates reviewed submittals will be required from Architect. Indicate decision data for selection of finishes.

- G. Indicate delivery dates for Owner furnished products and Products identified under Allowances.

1.06 REVISIONS TO SCHEDULES

- A. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
- B. Identify activities modified since previous submittal, major changes in scope, and other identifiable charges.
- C. Provide narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect including the effect of changes on schedules of separate contractors.

1.07 SUBMITTALS

- A. Submit initial Schedules within 5 days after date of Owner-Contractor Agreement. After review, resubmit required revised data within ten days.
- B. Submit revised Progress Schedule with each Application for Payment.
- C. Submit one opaque reproduction and one reproducible transparency.

1.08 DISTRIBUTION

- A. Distribute copies of reviewed Schedules to project site file, Subcontractors, suppliers, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in Schedules.

PART 2.00 - PRODUCTS

(Not Used)

PART 3.00 - EXECUTION

(Not Used)

END OF SECTION

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SECTION 01400

TESTING AND INSPECTION

PART 1.00 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.02 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the testing and inspection requirements as specified herein.

1.03 RELATED WORK

- A. Requirements for Testing and inspection shall be described in various Sections of these Specifications. Where no testing and inspection requirements are described but the Owner decides that it is required, the Owner may require additional testing and inspection to be performed at his own expense.
- B. Work Not Included
 - 1. Unless otherwise noted in this Section or other Section of work, the Owner will select a pre-qualified independent testing laboratory and inspection professional.
 - 2. Unless otherwise noted in this Section or other Sections of work, the Owner will pay for all initial services of the testing laboratory and inspection professionals as further described in Article 2.01 of this Section of these Specifications.

1.04 QUALITY ASSURANCE

- A. The testing laboratory will be qualified to the Owner's approval in accordance with ASTM E-329- 70 "Recommended Practice for Inspection and Testing Agencies for Concrete and Steel Used in Construction.
- B. Testing, when required, will be in accordance with all pertinent codes and regulations and with selected standards of the American Society for Testing and Materials.

1.05 PRODUCT HANDLING

- A. Promptly process and distribute all required copies of test reports and related instructions to ensure all necessary retesting and/or replacement of materials with the least possible delay in progress of the work.

PART 2.00 - PRODUCTS

2.01 PAYMENTS FOR TESTING AND INSPECTION SERVICES

- A. Initial Services: The Owner will pay for all initial and inspection services.
- B. Retesting: When initial tests and inspections indicate non-compliance with local Codes and the Contract Documents, all subsequent retesting occasioned by the non-

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compliance shall be performed by the same testing laboratory and inspectors and the costs thereof will be deducted by the Owner from the Contract Sum.

2.02 CODE COMPLIANCE TESTING AND INSPECTION

- A. Inspections and tests required by all applicable Codes or Ordinances shall be paid by for by the Owner unless otherwise noted in this Section or other Sections of work. Retesting or inspection as required shall conform to the requirements of Article 2.01B of this Section.

2.03 CONTRACTOR'S TESTING

- A. Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.
- B. Where operating tests are specified, the Contractor shall test his work as it progresses, on his own account, and shall make satisfactory preliminary tests in all cases before applying for official tests.
- C. Tests shall be made in the manner specified, for the different branches of the work. Each test shall be made on the entire system for which such test is required, wherever practical. In case it is necessary to test portions of the work independently, the Contractor shall do so without extra compensation. The Contractor shall furnish all labor, material and apparatus, make connections and conduct the official test. The test will be conducted in the presence of a representative of the Architect.
- D. All parts of the mechanical and electrical work and associated equipment shall be tested and adjusted to work properly and be left in perfect operating condition. All defects disclosed by these tests shall be corrected to the satisfaction of the Architect and Engineer without any additional cost to the Owner. Tests shall be repeated on this repaired or replaced work if deemed necessary by the Architect. The Architect shall be notified at least forty-eight (48) hours in advance of all tests, and shall be represented at tests that he deems necessary. The Contractor shall furnish all necessary instruments, other equipment, and personnel required for such tests.
- E. Required certificates of inspection, testing or approval shall be secured by the contractor and promptly delivered by him to the Architect.
- F. If the Architect or Engineer is to observe the inspections, test or approvals required by the Contract Documents, he will endeavor to do so promptly and, where practicable, at the source of supply.

PART 3.00 - EXECUTION

3.01 COOPERATION WITH TESTING LABORATORY AND INSPECTORS

- A. Representatives of the testing laboratory and inspections shall have access to the work at all times. Provide facilities for such access in order that they may properly perform their functions.

3.02 SCHEDULES

- A. Establishing Schedule

Testing and Inspection

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1. By advance discussions with the inspection service and testing laboratory selected by the Owner, determine the time required to perform inspections and tests and to issue each of its findings.
 2. Provide all required time within the construction schedule.
- B. Revision Schedule**
1. When changes of construction schedule are necessary during construction, coordinate all such changes of schedule with the inspectors and testing laboratory as required.

C. Adherence to Schedule

When the testing laboratory is ready to test according to the determined schedule but is prevented from testing or taking specimens due to incompleteness of the work, all extra costs for testing attributable to the delay will be back-charged to the Contractor.

3.03 TAKING SPECIMENS

- A.** All specimens and samples for testing, unless otherwise provided in these Contract Documents, will be taken by the testing laboratory; all sampling equipment and personnel will be provided by the testing laboratory; and all deliveries of specimens and samples to the testing laboratory will be performed by the testing laboratory.

END OF SECTION

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SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1.00 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.02 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the construction facilities and temporary controls as shown on the drawings and specified herein, including but not limited to, the following:
 - 1. Hoists, stairs, and ladders.
 - 2. Rodent control.
 - 3. Field office.
 - 4. Fire protection.
 - 5. Temporary utilities.
 - 6. Temporary toilets.
 - 7. Temporary site access.
 - 8. Security.
 - 9. Snow control
 - 10. Environmental controls.
 - 11. Elevator.

1.03 RELATED WORK

- A. Cleaning - Section 01505.
- B. Materials and equipment - Section 01600.

PART 2.00 - PRODUCTS

2.01 GENERAL

- A. Arrange for and provide temporary facilities and controls as specified herein and as required for the proper and expeditious prosecution of the work. Pay all costs, except as

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otherwise specified, until final acceptance of the work unless the Owner makes arrangements for the use of completed portions of the work after substantial completion.

- B. Pay all costs for temporary electrical power, temporary water, and temporary heating; provide metering as necessary.

2.02 PROJECT IDENTIFICATION

- A. No signs or advertisements will be allowed to be displayed on the premises without the approval of the Architect.
- B. One construction sign on the site shall be provided by the Contractor and shall be subject to the review of the Architect and the approval of the Owner. Text and lettering shall be provided for at a later date.
- C. Erect the construction sign on the site where directed by the Architect approximately 4 ft. x 8 ft. in size, of 3/4 in. plywood with suitable frame, moldings, and supports. Use Douglas Fir Overlay Plywood, Grade B-B high density, exterior, good two sides, complying with PS-1. The sign shall be primed and given two coats of approved white paint. Lettering shall be black of an approved type, size, and lay-out as directed by the Architect. Sign shall contain the name of the building, Owner, Architect, Contractor, and such other reasonable information as the Architect or Owner may require.

2.03 MATERIAL HOIST

- A. Provide a material hoist as required for use by all trades. Provide all necessary guards, signals, safety devices, and so on, required for safe operations, and suitable runways from the hoists to each floor level and roof. The construction and operation of the material hoist shall comply with all applicable requirements of ANSI A10.5, the ACG Manual of Accident Prevention in Construction and to all applicable state and municipal codes. Prohibit the use of the material hoist for transporting personnel.

2.04 TEMPORARY CONSTRUCTION OPENINGS

- A. Provide openings in slabs, walls, and partitions where required for moving in large pieces of equipment of all types. Close and/or restore all openings and finish them after the equipment is in place. Structural modification, if required, shall be subject to review by the Architect.

2.05 TEMPORARY ELEVATOR

- A. Provide a temporary elevator or use existing elevators for necessary service during construction operations.
- B. The temporary elevator shall include temporary wood cars with suitable gates, including temporary hoistway doors, all designed in accordance with the local and state safety requirements.
- C. The temporary services shall include qualified operating and maintenance personnel to perform the work in connection with the temporary operations.
- D. Upon completion of temporary use, all work or damaged permanent parts are to be replaced and all equipment placed in first-class condition equal to new.

2.06 TEMPORARY FIELD OFFICES

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- A. Provide and maintain a field office with a telephone and fax machine at a space within the existing facility. The office shall be complete with light, heat, air conditioning, plan racks, four-drawer metal file with lock, shelves for samples, tables, chairs, and janitor service. When it becomes possible to establish an office in the building, office accommodation of approximately the same size as those in the field offices, including the services above, shall be provided and maintained until the issuance of a certificate of substantial completion. Field and temporary offices shall be removed when no longer required. Provide a telephone and pay all charges for calls, including long distance calls.

2.07 FIRE PROTECTION

- A. Provide and maintain adequate fire protection, ready for instant use, distributed around the project.
- B. Make arrangements for periodical inspection by City of Chicago fire protection authorities and insurance underwriters inspections. Cooperate with said authorities and promptly carry out their recommendations.
- C. Open fire will not be permitted within the building enclosure or on the project site.

2.08 TEMPORARY HEAT AND VENTILATION

- A. Provide temporary heat as required during construction to protect the work from freezing or frost damage, and as necessary to ensure suitable working conditions for the construction operations of all trades. In areas of the building where work is being conducted, the temperature shall be maintained as specified in the various sections of the Specifications, but not less than 45 degrees Fahrenheit. Unless no circumstances shall the temperature be allowed to reach a level that will cause damage to any portion of the work which may be subject to damage by low temperatures.
- B. Until the building, or any major portion thereof, is enclosed, temporary heating shall be by smokeless portable unit heaters of type listed by Underwriter's Laboratories, Factory Mutual, and the Fire Marshall. Pay for fuel, maintenance, and attendants required in connection with the portable unit heaters. Interior or exterior surfaces damaged by the use of these space heaters shall be replaced by new materials or be refinished.
- C. The building shall be considered enclosed when it has reached the stage when exterior walls have been erected, the roof substantially completed, exterior openings closed up either by the permanently glazed windows and doors, or by adequate temporary closing, and the building is ready for interior masonry and plastering operations.
- D. After the building, or any major portion thereof, has been enclosed, the permanent heating system as specified below may be used for temporary heat.
- E. When the permanent heating system, or a suitable portion thereof, is in operating condition, the system may be used for temporary heating, provided that the Contractor
 - (1) Obtains approval of the Architect, (2) assumes full responsibility for the entire heating system, and (3) pays all costs for fuel, operation, maintenance, and restoration of the system.
- F. Provide adequate ventilation as required to keep the temperature of the building within 10 degrees Fahrenheit of the ambient outdoor temperature when such ambient temperature exceeds 70 degrees Fahrenheit, and to prevent accumulation of excess moisture or to prevent excess thermal movement in the building.

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- G. When the permanent air circulation system, or a suitable portion thereof, is in operating condition, it may be used without refrigeration or chilling, provided that the Contractor (1) obtains approval from the Architect, (2) assumes full responsibility for the system which he is using, and (3) pays costs for power, operation, maintenance, and restoration of the system. Provide temporary filters to adequately filter air being distributed through the duct work to the supply outlets; disposable filters shall be placed in front of all exhaust registers to keep construction dirt out of exhaust duct work. The Contractor shall thoroughly clean the interior of the air handling units and duct work prior to acceptance of the work.
- H. Upon conclusion of the temporary heating period, remove all temporary piping, temporary heating units, or other equipment and pay all costs in connection with repairing any damage caused by the installation or removal of temporary heating equipment. Thoroughly clean and recondition those parts of permanent heating and air circulation systems used for temporary service.

2.09 TEMPORARY LIGHT AND POWER

- A. Contractor may use existing electrical service; provide power distribution as required throughout structure. The terminations of power distribution shall be at convenient locations in the building. Terminations shall be provided for each voltage supply complete with circuit breakers, disconnect switches, and other electrical devices as required to protect the power supply system.
 - 1. Contractor shall meter electric service and pay for all charges of power consumed.
- B. A temporary lighting system shall be furnished, installed, and maintained as required to satisfy minimum requirements of safety and security. The temporary lighting system shall afford general illumination in all building areas and shall supply not less than 1 watt per sq. ft. of floor area for illumination in the areas of the building where work is being performed.
- D. All temporary equipment and wiring for power and lighting shall be in accordance with the applicable provisions of the governing codes. All temporary wiring shall be maintained in a safe manner and used so as not to constitute a hazard to persons or property.
- E. When the permanent electrical power and lighting systems are in operating condition, they may be used for temporary power and lighting for construction purposed, provided that the Contractor (1) obtains the approval of the Architect, (2) assumes full responsibility for the entire power and lighting system, and (3) pays costs for power, operations, maintenance, and restoration of the system.

2.10 TEMPORARY ACCESS TO SITE

- A. Construct and maintain in good usable condition all required temporary access to site, and, when no longer required, remove all temporary construction and restore the site.
- B. Where streets now in use are within or adjacent to the work, keep the passageways of such streets open to vehicular and pedestrian traffic to building fronting thereon. Maintain constant access for police, fire, and ambulance service.
- C. Access to the site for delivery of construction material or equipment shall be made only from locations designated by the Owner. Materials shall be brought into the building through sidewalk lift to basement.

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2.11 TEMPORARY STAIRS, LADDERS, RAMPS, AND RUNWAYS

- A. Provide and maintain all equipment such as temporary stairs, ladders, ramps, runways, and chutes as required for the proper execution of the work.
- B. All such apparatus, equipment, and construction shall meet all requirements of the Labor Law and other state or local laws applicable thereto.
- C. As soon as permanent stairs are erected, provide temporary protective treads, handrails, and shaft protection.

2.12 TEMPORARY TOILETS

- A. Provide and maintain in a sanitary condition enclosed weathertight toilets for the use of all construction personnel at a location within the contract limits, complete with fixtures, water, and sewer connections and all appurtenances. Contractor at his option may leave one existing toilet functional for use of workmen. Upon completion of the work, toilets and their appurtenances shall be removed. Installation shall be in accordance with all applicable codes and regulations of authorities having jurisdiction. Chemical toilets will be permitted. The number of toilet rooms required shall be in accordance with the ANSI Standard Safety Code for Building Construction or other local authorities.

2.13 TEMPORARY WATER SERVICE

- A. Contractor may use existing water service; meter water lines and pay for all water consumed.

2.14 SECURITY

- A. Provide sufficient watchman service to prevent illegal entry or damage during nights, holidays, or other periods when work is not being executed, and such other control watchmen as required during working hours.
- B. Provide all temporary enclosures required for protecting the project from the exterior, for providing passageways, for the protection of openings both exterior and interior, and any other location where temporary enclosures and protection may be required.
- C. Take adequate precautions against fire; keep flammable material at an absolute minimum; and ensure that such material is properly handled and stored. Except as otherwise provided herein, do not permit fires to be built or open salamanders to be used in any part of the work.

2.15 SNOW CONTROL

- A. Remove snow and ice as necessary for the protection and prosecution of the work, and protect the work against weather damage.

2.16 ENVIRONMENTAL CONTROLS

- A. The Contractor shall comply with all applicable Federal, State and local laws, regulations, ordinances, codes and standards concerning environment control. Particular attention shall be given, without limitations, to:
 - 1. Minimization of dust, containment of chemical vapors, control of exhaust gases, and control of smoke from temporary heaters.

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2. Reduction of water pollution by control of sanitary facilities, proper storage of fuels and other potential contaminants, and prevention of situation from land erosion.
3. Minimization of noise levels.
4. Proper and legal disposal, off site otherwise provided, of waste and spoil resulting from construction activities.

PART 3.00 - EXECUTION

3.01 REMOVAL

- A. Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the work. Remove all such temporary facilities and controls as rapidly as progress of the work will permit or as directed by the Architect.

END OF SECTION

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SECTION 01505

CLEANING

PART 1.00 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.02 WORK INCLUDED

- A. Throughout the construction period, the contractor shall maintain the building and site in a standard of cleanliness as described in this Section

1.03 QUALITY ASSURANCE

- A. Inspection: Conduct daily inspections, and more often if necessary, to verify that requirements of cleanliness are being met.

PART 2.00 - PRODUCTS

2.01 CLEANING MATERIALS AND EQUIPMENT

- A. Provide all required personnel, equipment, and materials need to maintain the specified standard of cleanliness.

2.02 COMPATIBILITY

- A. Use only the cleaning material and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

PART 3.00 - EXECUTION

3.01 PROGRESS CLEANING

A. General

1. Retain all stored items in an orderly arrangement allowing maximum access, not impeding drainage or traffic, and providing the required protection of materials.
2. Do not allow the accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
3. At least twice each week, and more often if directed by Owner, completely remove all scrap, debris, and waste material from the job site.
4. Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection of the ecology.

B. Site

1. Daily inspect the site and pick up all scrap, debris and waste material. Remove all such items to the place designated for their storage.

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2. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site: restack, tidy, or otherwise service all arrangements to meet the requirements noted herein.
3. Maintain the site in a neat and orderly condition at all times to the approval of the Owner.

C. Structures

1. Twice a week, and more often if directed by the Owner, inspect the structures and pick up all scrap, debris and waste material. Remove all such items to the place designated for their storage.
2. Twice a week, and more often if directed by Owner, sweep all interior spaces clean. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other materials capable of being removed by reasonable diligence using a hand-held broom.
3. As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using all equipment and materials required to achieve the required cleanliness.
4. Following the installation of finish floor materials, clean the finish floor daily at all times while work is being performed in the space in which finish materials have been installed. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from all foreign material which may be injurious to the finish floor material.

3.02 FINAL CLEANING

- A. Definition: Except as otherwise specifically provided, "clean" (for the purpose of this Article) shall be interpreted as meaning the level of cleanliness generally provided by commercial building maintenance subcontractors using commercial quality building maintenance equipment and materials.
- B. General: Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described in Article 3.01 above.
- C. Site: Unless otherwise specifically directed by the Owner, hose down all paved areas on the site and all public sidewalks directly adjacent to the site. Completely remove all resultant debris.
- D. Structures
 1. Exterior: Visually inspect all exterior surfaces and remove all traces of soil, waste material, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. If necessary to achieve a uniform degree of exterior cleanliness, hose down the exterior of the structure. In the event of stubborn stains not removable with water, use other methods as recommended by the material manufacturer.
 2. Interior: Visually inspect all interior surfaces and remove all traces of soil, waste material, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. Remove all paint droppings, spots, stains, and

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dirt from finished surfaces. Use only the specified cleaning materials and equipment.

- E. Timing: Schedule final cleaning to enable the Owner to accept a completely clean project.

3.03 CLEANING DURING OWNER'S OCCUPANCY

- A. Should the Owner occupy the Work of any portion thereof prior to its completion by the contractor and acceptance by the Owner, responsibilities for interim and final cleaning of the occupied spaces shall be as determined by the Architect in accordance with the General Conditions of the Contract.

END OF SECTION

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SECTION 01570

TRAFFIC REGULATION

PART 1.00 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.02 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the traffic regulation to be provided by the Construction Manager as specified herein, as follows:
 - 1. Flagmen.
 - 2. Flares and Lights.
 - 3. Haul Routes.
 - 4. Traffic Signs and Signals.
 - 5. Removal.

1.03 RELATED WORK

- A. Construction facilities and temporary controls - Section 01500.

1.04 SIGNS, SIGNALS, AND DEVICES

- A. Post Mounted and Wall Mounted Traffic Control and Information Signs.
- B. Traffic Control Signals: As approved by local jurisdictions.
- C. Traffic Cones and Drums, Flares and Lights: As approved by local jurisdictions.
- D. Flagmen Equipment: As approved by local jurisdictions.

1.05 FLAGMEN

- A. Provide trained and equipped flagmen to regulate traffic when construction operations or traffic encroach on public traffic lanes.

1.06 FLARES AND LIGHTS

- A. Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

1.07 HAUL ROUTES

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- A. Consult with authority having jurisdiction in establishing public thoroughfares to be used for haul routes and site access.
- B. Confine construction traffic to designated haul routes.
- C. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference, with public traffic.

1.08 TRAFFIC SIGNS AND SIGNALS

- A. At approaches to site and on site, install signage at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.
- B. Install and operate traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor's control, and areas affected by Contractor's operations.
- C. Relocate as Work progresses, to maintain effective traffic control.

1.09 REMOVAL

- A. Remove equipment and devices when no longer required.
- B. Repair damage caused by installation.

PART 2.00 - PRODUCTS

(Not Used)

PART 3.00 - EXECUTION

(Not Used)

END OF SECTION

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SECTION 01600

MATERIALS AND EQUIPMENT

PART 1.00 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.02 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete materials, and equipment requirements as specified herein, including but not limited to, the following:
 - 1. Transportation and handling.
 - 2. Storage and protection.
 - 3. Installation requirements
 - 4. Identifying markings.
 - 5. Substitution requirements.
 - 6. Temporary use of equipment.
 - 7. General standards.

1.03 RELATED WORK

- A. General Conditions.

1.04 TRANSPORTATION AND HANDLING

- A. Materials, products, and equipment shall be properly containerized, packaged, boxed, and protected to prevent damage during transportation and handling.
- B. More detailed requirements for transportation and handling are specified under the technical Sections.

1.05 STORAGE AND PROTECTION

- A. Provide suitable temporary weather-tight storage facilities as may be required for materials that will be damaged by storage in the open.
- B. Available storage space at the job site is limited to the area permitted by the Architect. Allocate such space for storage purposes. Any additional off-site space required is the responsibility of the Contractor.
- C. Allocate the available storage areas and coordinate their use by the trades on the job. Maintain a current layout of all storage facilities.
- D. Store and protect materials delivered at the site from damage. Do not use damaged material on the work.

1.06 INSTALLATION REQUIREMENTS

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- A. Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned as directed by the respective manufacturers, unless otherwise specified.**

1.07 IDENTIFYING MARKINGS

- A. Name plates and other identifying markings shall not be affixed on exposed surfaces of manufactured items installed in finished spaces.**

1.08 SUBSTITUTION AFTER AWARD OF CONTRACT

- A. The Architect will consider a formal request for the substitution of products in place of those specified, under the following conditions:**
 - 1. The request is accompanied by complete data on the proposed substitution substantiating compliance with the Contract Documents including product identification and description, performance and test data, references and samples where applicable, and an itemized comparison of the proposed with the products specified or named by Addenda, with data relating to Contract time schedule, design and artistic effect where applicable, and its relationship to separate contracts.**
 - 2. The request is accompanied by accurate cost data on the proposed substitution in comparison with the product specified, whether or not modification of the Contract Sum is to be a consideration.**
- B. Requests for substitution based on Paragraph (1) above, when forwarded by the Contractor to the Architect for review are understood to mean that the Contractor:**
 - 1. Represents that he has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified:**
 - 2. Will provide the same guarantee for the substitution that he would for that specified.**
 - 3. Certifies that the cost data presented is complete and includes all related costs under this Contract, but excludes costs under separate contracts and the Architect's redesign costs, and that he waives all claims for additional costs related to the substitution which subsequently become apparent; and**
 - 4. Will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects, at no additional cost to the Owner and at no extension of the contract completion date.**
- C. Substitutions will not be considered if:**
 - 1. They are indicated or implied on shop drawings submissions without the formal request required in Paragraph (1) above; or**
 - 2. For their implementation they require a substantial revision of the Contract Documents in order to accommodate their use.**
 - 3. The Architect will examine, with reasonable promptness, such substitution submittals, and return of submittals to the Contractor shall not relieve the Contractor from responsibility for deviations and alternatives from the contract plans and specifications, nor shall it relieve him from responsibility for errors in**

the submittals. A failure by the Contractor to identify in his letter of transmittal material deviations from the plans and specifications shall void the submittals and any action taken thereon by the Architect. When specifically requested by the Architect, the Contractor shall resubmit such shop drawings, descriptive data and samples as may be required to evaluate substitutions.

- D. If any mechanical, electrical, structural, or other changes are required for the proper installation and fit of alternative materials, articles, or equipment, or because of deviations from the contract plans and specifications, such changes shall not be made without the consent of the Architect and shall be made without additional cost to the Owner.

1.09 TEMPORARY USE OF EQUIPMENT

- A. No equipment intended for permanent installation shall be operated for temporary purposes without the written permission of the Architect.
- B. The temporary or trial usage by the Owner of any mechanical device, machinery, apparatus, equipment or any work or materials supplied under this Contract before final completion and written acceptance by the Architect, shall not be construed as evidence of the acceptance of same by the Owner. The Owner shall have the privilege of such temporary and trial usage, for such reasonable length of time as and when the Architect shall deem to be proper for making a complete and thorough test of same and no claim for damage shall be made by the Contractor for the injury to or breaking of parts of such work which may be caused by weakness of inaccuracy of structural parts or by defective material or workmanship. If the Contractor so elects, he may at his own expense, place a competent person or persons to make such trial usage; such trial usage shall be under the supervision of the Contractor.

1.10 GENERAL REQUIREMENTS

- A. In the event that it is necessary for the Contractor to store any materials offsite, he shall first obtain the approval of the Architect. The Contractor shall be responsible for insurance and warehousing charges of any materials stored offsite. The Contractor shall also be responsible for the cost of delivery to the job site of any material that has been stored offsite.
- B. Materials delivered to the job site shall be carefully stored and protected from damage. Damaged material shall not be used in the work. The Contractor shall provide, where directed, temporary storage facilities as may be required for the storage of all materials which might be damaged by weather.
- C. Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the representative manufacturers, unless otherwise specified.
- D. Equipment, plant, and appliances, such as hoists, centering, concrete lifts, construction elevators, cranes, rigging, towers, derricks, walks, ramps, chutes, scaffolding, implements, transportation, cartage, and other things necessary and required for the adequate execution of the work and as required by law and applicable Union rules shall be provided and shall be maintained in good and safe mechanical working order, be responsible for their safe use, and remove them when no longer required. Applicable requirements of OSHA shall become and form a part of this document.
- E. During handling and installation of work at project site, clean and protect work in progress and adjoining work on a basis of perpetual maintenance. Apply suitable protective

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covering on newly installed work where reasonably required to ensure freedom from damage or deterioration at time of substantial completion; otherwise, clean and perform maintenance on newly installed work as frequently as necessary through remainder of construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

- F. To extent possible through reasonable control and protection methods, supervise performance of work in a manner and by means which will ensure that none of the work whether completed or in progress, will be subjected to harmful, dangerous, damaging, or otherwise deleterious exposures during construction period. Such exposures include (where applicable, but not by way of limitation) static loading, dynamic loading, internal pressures, external pressures, high or low temperatures, thermal shock, high low humidity, air contamination or pollution, water, ice, solvents, chemicals, light, radiation, puncture, abrasion, heavy traffic, soiling, bacteria, insect infestation, combustion, electrical current, high speed operation, improper lubrication, unusual wear, misuse, incompatible interface, destructive testing, misalignment, excessive weathering, unprotected storage, improper shipping/handling, theft and vandalism.
- G. Require installer of each major unit of work to inspect substrate to receive the work, and conditions under which the work will be performed, and to report (in writing to Contractor) unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.
- H. Where installations include manufactured products, comply with Manufacturer's applicable instructions and recommendations for installation to whatever extent these are more explicit or more stringent than applicable requirements indicated in the Contract Documents.
- I. Inspect each item of materials or equipment immediately prior to installation and reject damaged and defective items.
- J. Provide attachment and connection devices and methods for securing work properly as it is installed; true to line and level, and within recognized industry tolerance if not otherwise indicated. Allow for expansions and building movements. Provide uniform joint widths in exposed work, organized for best possible visual effect. Refer questionable visual-effect choices to Architect for final decision.
- K. Recheck measurements and dimensions of the work as an integral step of starting each installation.
- L. Install work during conditions of temperature, humidity, exposure, forecasted weather, and status of project completion which will ensure best possible results for each unit of work in coordination with entire work. Isolate each unit of work from non-compatible work, as required to prevent deterioration.
- M. Coordinate enclosures (closing-in) of work with required inspections and tests, so as to avoid necessity of uncovering work for that purpose.
- N. Mounting Heights: Except as otherwise indicated, mount individual units of work at industry-recognized standard mounting heights, for application indicated. In CMU walls mount units at height closest to Manufacturer's recommendation so as to minimize cutting of block coursings. Refer questionable mounting height choices to Architect for final decision.

END OF SECTION

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SECTION 01700

CONTRACT CLOSE-OUT

PART 1.00 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.02 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the contract close-out, including but not limited to, the following:

1. Punch list.
2. Keys and maintenance kits.
3. Warranties and guarantees.
4. Operating and maintenance instructions.
5. Project record documents.
6. Certificate of Occupancy.
7. Equipment system demonstration.

1.03 RELATED WORK

- A. Submittals - Section 01300.
- B. General Conditions.

1.04 PUNCH LIST

- A. Contractor
 1. Submit written declaration to Architect that project is substantially complete.
 2. Submit list of items to be completed and corrected (punch list).
- B. Owner, Architect and Contractor will make preliminary inspection after receipt of Contractor's declaration and punch list.
- C. Should Owner and Architect consider that work is substantially complete:
 1. Architect will add to the punch list items to be completed or corrected, in addition to those items listed by the Contractor, as determined by the inspection.

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2. Architect will prepare and issue a Certificate of Substantial Completion, containing:
 - a. Date of substantial completion.
 - b. Punch list of items to be completed or corrected.
 - c. The time within which Contractor shall complete or correct work of listed items.
 - d. Date or time Owner will assume possession of work or designated portion thereof.
- D. Contractor: Complete work listed for completion or correction, within designated time.

1.05 FINAL INSPECTION

- A. Contractor shall submit written declaration to Owner and Architect that:
 1. All aspects of Contract Documents have been complied with.
 2. All items on substantial completion punch list have been completed.
 3. All tools, construction equipment, and surplus materials have been removed from site.
- B. The Owner, Architect and Contractor will make final inspection to ensure completion of all contract requirements.
- C. When the Architect considers that work is finally complete in accordance with Contract Document requirements, the Architect will process close-out documents prior to issuance of final Certificate of Payment.

1.06 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. Three (3) bound sets of operating and maintenance instructions covering completely the operation and maintenance of all equipment furnished under the Contract shall be delivered to the Owner. These shall include operating sequence and flow diagrams of all systems. Three (3) sets of lubricating charts and manuals for each item of equipment shall be furnished.
- B. Upon completion of the work and at a time designated, a competent engineer shall be provided for a sufficient period to instruct representatives of the Owner in the operation and maintenance of each piece of equipment and of equipment and of each system as a whole.
- C. In addition, furnish to the Owner in three (3) sets of 8-which shall include, for each piece of operating equipment (electric or otherwise powered), the name, address, and telephone number of the firm or organization who are authorized by the manufacturer of the installed equipment, to service and maintain the equipment as the need may arise within twenty-four (24) hours when summoned by the Owner.

1.07 PROJECT RECORD DOCUMENTS

Contract Close-Out

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- A. As the work progresses, keep a complete and accurate record of changes or deviations from the Contract Documents and the shop drawings, indicating the work as actually installed.
 - 1. Changes shall be neatly and correctly shown on the respective portions of the affected document, using black line prints of the drawings affected, or the specifications, with appropriate supplementary notes.
 - 2. The records above shall be arranged in order, in accordance with the various sections of the Specifications, and properly indexed.
 - 3. This record set of drawings, shop drawings for inspection by the Architect and Owner.
- B. At the completion of the work, certify that each of the revised prints of the drawings and Specifications is complete and accurate.
- C. Prior to application for final payment, and as a condition to its approval by the Architect and Owner, deliver the record drawings and specifications, arranged in proper order, indexed, and certified as herein before specified. Provide suitable transfer cases and deliver the records therein, indexed and marked for each division of the Work.
- D. No review or receipt of such records by the Architect or Owner shall be a waiver of any deviation from the Contract Documents or the shop drawings, or in any way relieve the Contractor from his responsibility to perform the work in accordance with the Contract Documents and the shop drawings to the extent that they are in accordance with the Contract Documents.

1.08 GUARANTEES AND WARRANTIES

- A. In addition to the Contractor's guarantees, warranties, service or maintenance and similar contracts, where required by the Contract Documents, with direct obligations running from the manufacturer to the Owner. Such guarantees or warranties, as applicable, shall be subject to the approval of the Owner.
- B. Guarantees, service policies and warranties for individual pieces of equipment or portions of the work shall also date from final acceptance by the Architect, except that where the Owner requests and obtains temporary use of such facilities prior to final acceptance, the earlier date shall apply.
- C. Certain guarantees longer than one year's duration are required under various sections of these specifications. At the completion of the work all such guarantees covering material, workmanship, maintenance, etc., as specified, shall be produced by the Contractor, who shall forward them in duplicate to the Architect together with a letter addressed to the Owner giving a summary of guarantees attached, stating:
 - 1. Character of Work.
 - 2. Name of Contractor.
 - 3. Period of Guaranty.
 - 4. Condition of Guarantee.

Contract Close-Out

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- D. The guarantees shall cover any and all work done under this contract, either by the Contract Subcontractors. All guarantees shall bear the endorsement of Contractor in writing.
- E. The correction of such work shall include without additional charge, all additional expenses, and damages in connection with such removal, replacement of any, or part, of the work which may be damaged or distributed thereby.
- F. Form of Guarantee: The Contractor shall use the form found at the end of this Section for presentation of their guarantees.

1.09 KEYS AND MAINTENANCE KITS

- A. All keys, maintenance kits or stock, replacement parts of materials, spare construction material, and equipment required under the contract shall be stored in the completed building in specific areas as designated by the Owner.

1.10 PROJECT CLOSE-OUT DOCUMENTATION

- A. Prior to final payment, the Contractor shall submit to the Architect the following documents in an original and one copy unless otherwise noted:
 - 1. A complete listing of all trade Subcontractors, business addresses and items supplied by such trade Subcontractor.
 - 2. A listing of manufacturers of major materials, equipment and systems installed in the work.
 - 3. Payment of Debts and Claims and Consent of Surety: Adequate evidence that he has paid all obligations arising out of the Construction Contract. He shall submit AIA Document No. G-706, contractor's Affidavit of Payment of Debts and Claims, together with AIA Document G-707, Consent of Surety, indicating written consent of the surety to final payment.
 - 4. Release of Liens: Each Contractor shall also submit AIA Document G-706-A, contractor's Affidavit of Release Liens, indicating that the release for waivers submitted are exceptions that they be so stated specifically in this form. Contractor and all Subcontractors and suppliers shall in addition submit any other release documentation required by the Owner.
 - 5. Test Data: A copy of all test data taken.
 - 6. All warranties, guarantees, maintenance agreements and similar provisions of the contract documents.
 - 7. Final progress photographs.
 - 8. A complete punch list signed off by General Contractor as being completed.
 - 9. Operating and maintenance instructions, keys, and maintenance kits.
 - 10. Project record documents as described herein.

1.11 CERTIFICATE OF OCCUPANCY

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- A. The Contractor shall obtain and pay for a Certificate of Occupancy and deliver it to the Owner.

1.12 EQUIPMENT SYSTEMS DEMONSTRATION

- A. Upon completion of the work and tests, instruct the Owner's adjustment and maintenance of systems and equipment furnished.
- B. The Owner will determine date of starting the instruction. The respective Subcontractor shall provide instructions for each system installed.

1.13 BUILDING DEPARTMENT APPROVED DRAWINGS AND CERTIFICATES

- A. All Building Department Approved Plans and Certificates which were maintained at the job site shall be delivered to the Owner after Building Department approval of the project and prior to final inspection.

END OF SECTION

(See Form on following page)

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Date

To: (Owner's Name)

ATTENTION OF:

RE: (Work Covered in Guarantee) _____

NAME OF CONTRACTOR: _____

ADDRESS OF CONTRACTOR: _____

Gentlemen:

The undersigned guarantees to the Owner that he will be responsible for faulty or defective materials, equipment and workmanship, in the above referenced work and that he will remedy any defects due thereto and pay for all damages to the work resulting there from which shall appear within a period of ____ year(s) from the date of which substantial completion of the entire work is certified by the Architect.

(Add additional conditions of guarantee as noted in various technical sections of the specifications.)

During this period upon written notice from Owner to do so, the undersigned shall proceed with due diligence at the undersigned's expense to replace properly any defective materials, equipment or perform any labor necessary to correct any defect in the work. In case that undersigned fails, upon reasonable notice to remedy such defects, then the Owner may furnish such materials or labor as are necessary to bring the work up to the standard called for, and the undersigned agrees to reimburse the Owner fully and promptly.

Witness: Signed: * _____

Date: Signed: * _____

*Signatures must be notarized.

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SECTION 01732 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Demolition and removal of selected portions of a building or structure.
 - 2. Repair procedures for selective demolition operations.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- C. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

1.5 SUBMITTALS

- A. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- 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. Demolition work must be coordinated with other construction trades, including but not limited to abatement and façade restoration work.

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2. Interruption of utility services.
 3. Coordination for shutoff, capping, and continuation of utility services.
 4. Use of elevator and stairs.
 5. Locations of temporary partitions and means of egress.
- C. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.6 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- B. Professional Engineer Qualifications: Comply with Division 1 Section "Quality Requirements."
- C. Regulatory Requirements: Comply with governing EPA/DEP notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- D. Standards: Comply with ANSI A10.6 and NFPA 241.
- E. Predemolition Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to selective demolition including, but not limited to, the following:
 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 requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.

1.7 PROJECT CONDITIONS

- A. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
 1. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.
- B. Owner assumes no responsibility for condition of areas to be selectively demolished.
 1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Hazardous Materials: Hazardous materials are present in building to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present. Quantity schedule is included in the JLC abatement specification. Contact JLC for access to full report.

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1. Hazardous material remediation is specified elsewhere in the Contract Documents. See JLC Drawings and specifications for extent of abatement work.
 2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
- D. Storage or sale of removed items or materials on-site will not be permitted.
- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
- a. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 - PRODUCTS

2.1 REPAIR MATERIALS

- A. Use repair materials identical to existing materials.
1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 2. Use materials whose installed performance equals or surpasses that of existing materials.
- B. Comply with material and installation requirements specified in individual Specification Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- D. Engage a professional engineer to survey 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 demolition operations.
- E. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES

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- A. **Existing Utilities:** Maintain services indicated to remain and protect them against damage during selective demolition operations. Retain one of two "Utility Requirements" paragraphs below, if applicable. Delete both if Owner arranges and performs work.
- B. **Utility Requirements:** Locate, identify, disconnect, and seal or cap off indicated utilities serving areas to be selectively demolished.
 - 1. Arrange to shut off indicated utilities with utility companies.
 - 2. If utility services are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary utilities that bypass area of selective demolition and that maintain continuity of service to other parts of building.
 - 3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

3.3 PREPARATION

- A. **Dangerous Materials:** Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.
- B. **Pest Control:** Employ a certified, licensed exterminator to treat building and to control rodents and vermin before and during selective demolition operations.
- C. **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.
 - 1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
 - 2. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
- D. **Temporary Facilities:** 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, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
- E. **Temporary Enclosures:** Provide temporary enclosures for protection of existing building and construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
- F. **Temporary Shoring:** Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction to

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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.

3.4 POLLUTION CONTROLS

- A. Dust Control: Use water mist, temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.
 1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- B. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- C. Cleaning: 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.

3.5 SELECTIVE DEMOLITION

- A. General: Demolish and remove existing construction only to the extent required as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 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, to minimize disturbance of adjacent surfaces. 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. Use of explosives will not be allowed.
 5. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
 6. Maintain adequate ventilation when using cutting torches.
 7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.

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9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 10. Dispose of demolished items and materials promptly.
 11. Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.
- B. Existing Facilities: Comply with Construction Manager's requirements for using and protecting elevators, stairs, walkways, loading docks, building entries, and other building facilities during selective demolition operations.
- C. Removed and Salvaged Items: Comply with the following:
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.
- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition.
- E. Concrete: Demolish in small sections. Cut concrete to a depth of at least 3/4 inch (19 mm) at junctures with construction to remain, using power-driven saw. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete indicated for selective demolition. Neatly trim openings to dimensions indicated.
- F. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
- G. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

3.6 PATCHING AND REPAIRS

- A. General: Promptly repair damage to adjacent construction caused by selective demolition operations.
- B. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
1. Completely fill holes and depressions in existing masonry walls that are to remain with an approved masonry patching material applied according to manufacturer's written recommendations.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
- B. Burning: Do not burn demolished materials.

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- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.8 SELECTIVE DEMOLITION SCHEDULE

A. Existing Items or Construction to Be Removed:

1. Interior non-bearing partitions as indicated on the Contract Drawings including, but not limited to, elevator shaft enclosures, stairway #1 enclosure, restroom walls.
2. Stairway #1, cast-in-place concrete stairs and landings.
3. Elevator equipment, rails, cars and motors.
4. Rooftop water storage tanks and related dunnage.
5. Plumbing fixtures.
6. Electrical Switchgear and panels
7. Steam pipes and perimeter radiators.
8. Exterior brick parapets and face bricks from concrete parapets.
9. Aluminum windows and frames on the North and South facades (See JCL abatement documents for removal of Steel casement and existing steel).
10. Exterior masonry spandrel panels and non-bearing masonry brick mullions.
11. Exterior concrete façade panels on ground, 2nd & 3rd floors.
12. Rooftop bulkheads enclosures and concrete structure except for stairway #2.
13. North-end of main roof slab and concrete parapet backup as indicated on Contract Drawings.
14. Concrete columns and masonry walls directly beneath concrete roof slab to be removed, down to 12th floor slab.

B. Existing Items to Be Removed and Salvaged:

1. Undamaged face brick, suitable for reuse in façade restoration.

C. Existing Items to Remain:

1. Firestair #2 – cast-in-place concrete stair enclosure, stair, landings and railings to remain in place and free of debris.
2. Exterior masonry veneer at concrete pilasters as indicated on the Contract Drawings.
3. Structural concrete floor slabs and columns unless specifically noted to be demolished or judged to be unstable by Structural Engineer.
4. Existing structural shoring until damaged area is either removed or repaired.

D. Existing Items Assumed to Contain Hazardous Materials:

1. Provide Add/Alternate pricing for all items listed in abatement scope which are assumed to contain hazardous materials, but have not yet been tested because of inaccessibility. Including, but not limited to:
 - a. Boilers and related fuel storage tanks in Basement.
 - b. Electrical Wiring.
 - c. See JLC abatement drawings and specification for full list of Assumed materials.

E. Existing Items to be Removed Confirmed Hazardous Materials:

1. See JCL abatement drawings and specification for extent of abatement work.

END OF SECTION 01732

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SECTION 04200

UNIT MASONRY

PART 1.00 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.02 WORK INCLUDED

- A. The work of this Section includes all labor, materials, equipment and services necessary to complete the unit masonry work as shown on the drawings and specified herein, including but is not necessarily limited to the following:
 - ~~1. Enlargement of existing masonry openings for new windows or louvers~~
 2. **Construction of concrete masonry unit walls in Basement**
 3. Metal joint reinforcing, anchors, ties, weeps, and related accessories for masonry.
 4. Chases, recesses, pockets and openings in masonry/terra cotta as required for installation of work by others.
 5. Building in of items furnished by others into masonry, including access doors, door frames, anchors, sleeves and inserts, and other similar items to be embedded in masonry.
 6. Grouting in of metal items built into masonry work.

1.03 RELATED WORK

- A. Furnishing loose lintels - Section 05500.
- B. Sealant - Section 07900.
- C. **Masonry Restoration - Section 04901**

1.04 SUBMITTALS

- A. Samples (Submit the following):
 1. Each type of face brick in sufficient number and color to show full range of color and shade. Submit certification that brick meets ASTM standards specified.
 - a. Submit samples of all special shapes required showing color range and sizes.
 2. Joint reinforcing, each type, width and proposed locations (labeled).
 3. Anchors, wedges and ties, each type; width and proposed locations (labeled).
 4. Joint filler, each type.
 5. Flashing, including splice sample, 12" x 12".
- B. Manufacturer's literature: Submit technical and installation information for:

1. Mortar materials, each material and mortar types.
2. Certification of mortar mix.
3. Flashing material, descriptive literature.

1.05 PRODUCT HANDLING

- A. General: Deliver, store, handle and protect all materials from damage, moisture, dirt and intrusion of foreign matter. Store all masonry units and mortar materials on raised platforms and under ventilated and waterproof cover. Store packaged materials in Manufacturer's unopened containers, marked with manufacturer's name and product brand name. Immediately reseal containers after partial use. Remove and replace damaged materials.
- B. Masonry Units: Pack, deliver and store to prevent breakage, cracking, chipping, spalling or other damage. Store, protect and ventilate units at project site.
- C. Aggregate: Store with provisions for good drainage.
- D. Reinforcement and Anchors: Store and protect so that when placed, joint reinforcement and anchors will be free of soil, dirt, ice loose rust, scale, or other coatings which would destroy or reduce bond with mortar and will not be disfigured or bent out of shape.

1.06 JOB CONDITIONS

- A. In cold weather, when the outside temperature is below forty (40) degrees F., the temperature of the masonry, when laid, shall be above forty (40) degrees F., and maintained on both sides of the masonry wall for at least seventy-two (72) hours. All water, sand and masonry units must be heated so that temperature of masonry when laid will be over forty (40) degrees F.. No anti-freeze admixtures will be allowed. Conform to the requirements of Cold Weather Masonry Construction and Protection Recommendations: publication by Brick Institute of America (BIA).

PART 2.00 - PRODUCTS

2.01 MATERIALS

- A. Brick
 1. Size: Unless otherwise indicated, provide bricks of size, color and texture to match existing.
 2. Facing Brick: ASTM C216, Grade SW, Type FBX.
 3. Where brick is fully concealed provide common brick conforming to ASTM C26, Grade SW.
 4. Provide special molded shapes including lip bricks, where indicated and for application requiring brick of form, size and finish on exposed surfaces which coat be produced from standard modular brick sizes by sawing.
 5. For sills, and similar applications resulting in exposure of brick surfaces which otherwise would be concealed from view, provide uncured units with all exposed surfaces finished.

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B. Anchors and Ties

1. Wire Mesh: Galvanized sixteen (16) gauge steel wire, 1/4" square mesh, width 1/2" less than wall thickness, by length to suit condition.
2. For anchoring masonry to structural steel provide anchors equal to No. 355 and 357 hot-dip galvanized steel anchors made by Hohmann & Barnard or approved equal. Galvanizing shall conform to ASTM A-153, with zinc coating of 1.5 oz. of zinc per sq. ft.
3. Approved Manufacturers: Heckmann Building Products, Hohmann & Barnard, Inc., National Wire Products Industries, Inc., Dur-O-Wall or approved equal.

C. Control Joint Filler

1. Vertical Installation Within Concrete Masonry Wall: Extruded high grade neoprene rubber, cross shape, for use with concrete masonry sash units, which shall provide a force fit in the grooves of the sash block, and shall have 1/2" diameter tubular ends (compressed 25% when installed in 3/8" wide joint).
 - a. Provide the following sizes
 - 1) 2-5/8" wide control joint fillers 4" block walls.
 - 2) 4-5/8" wide for 6" block walls.
 - 3) 6-5/8" wide for 8", 10" and block walls.
 - b. Provide backer rod and sealant joint over joint filler as per drawings and Section 07900 of these specifications.
2. Isolation Joint Filler at Abutting Construction and at Intersecting CMU Walls: Compressible and resilient closed cell neoprene gasket with pressure sensitive adhesive backing, thickness 30% greater than thickness of joint. Acceptable joint filler shall be "Everlastic, Type NN-1" by Williams Products, Inc., or approved equal. Recess joint filler and install backer rod and sealant as per drawings and Section 07900 of these specifications.

D. Through Wall Flashing

1. Provide sixty(60) mils thick uncured neoprene flashing material as manufactured by Emseal. "Perm-A-Barrier" forty (40) mils thick self -adhering through wall flashing made by W.R. Grace shall be an acceptable equal.
2. Provide Manufacturer's recommended cleaner, primer and adhesive to be used in conjunction with flashing material.

2.02 MORTAR MATERIALS

- A. Portland Cement: ASTM C150 Type 1, standard color, one source.
- B. Hydrated Lime: ASTM C207, Type S, as manufactured by Corsons, or approved equal.
- C. Sand: Clean, washed, buff colored sand, graded per ASTM C144.
- D. Water: Clean, fresh and suitable for drinking.

2.03 MORTAR MIX

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- A. Mortar for Cement Cants: One (1) part Portland cement and four (4) parts sand, by volume.
- B. Grout for Unit Masonry: Comply with ASTM C-476 for grout for use in construction of unit masonry. Use grout of consistency (fine or coarse) at time of placement which will completely fill all spaced intended to receive grout.
- C. Mixing
 - 1. General: Add cement just before mixing and mix dry. Use sufficient amount of water as necessary to produce workable mix. Mix in small batches to make plastic mass.
 - 2. Mixing: Machine mix all mortars in approved type mixer with device to accurately and uniformly control water. Add hydrated lime dry. Mix dry materials not less than two (2) minutes. Add water, then mix not less than three (3) minutes. Mix only amount of mortar that can be used before initial set. Do not use mortar which has reached its initial set or two (2) hours after initial mixing, whichever comes earlier. Mortar may be re-tempered only to replace water lost by evaporation which shall be done within one (1) hour after initial mixing. Clean mixer for each batch, whenever mortar type is changed, and at end of each day's work.
 - 3. **Acceleration or other admixtures not permitted.**
 - 4. Mortar shall have a flow after suction of not less than seventy-five (75) percent of that immediately after mixing as determined by ASTM C91.
- F. Admixtures
 - 1. No air-entraining admixtures or cementitious materials containing air-entraining admixtures shall be used in the mortar.
 - 2. No antifreeze compounds or other substances shall be used in the mortar to lower the freezing point.
 - 3. Calcium chloride or admixtures containing calcium chloride shall be not used in mortar.

2.04 WEEP HOLES

- A. Remove mortar completely from head joints above all shelf angles. If wall construction includes a mortar collar joint, place drainage material behind weep holes to keep loose mortar debris from clogging weeps.

PART 3.00 - EXECUTION

3.01 SURFACE CONDITIONS

- A. Inspection
 - 1. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

Unit Masonry

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2. Verify that masonry may be completed in accordance with all pertinent codes, and regulations, the reference standards, and the original design.
3. Do not start any work until mock-ups are approved by the Architect.

B. Discrepancies

1. In the event of discrepancy, immediately notify the Architect.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.02 COORDINATION

- A.** Carefully coordinate with all other trades to ensure proper and adequate interface of the work of other trades with the work of this section.

3.03 PREPARATION

A. Brick

1. Wet brick having ASTM C67 absorption rates greater than 0.025 oz. per square inch per minute.
2. Determine absorption by placing twenty (20) drops of water inside a circle the size of a quarter on typical units. If water is absorbed within 1-1/2 minutes, wet brick before laying.
3. Use setting methods which ensure that each masonry unit is nearly saturated but surface dry when laid. During freezing weather, comply with the recommendations of BIA.
4. Except for absorbent units specified to be wetted, lay masonry units dry.

3.04 BRICK REMOVAL AND REPLACEMENT

- A.** Carefully remove by hand, at locations indicated, bricks that are damaged, spalled, or deteriorated. Cut out full units from joint to joint and in a manner to permit replacement with full-size units without damaging surrounding masonry.
- B.** Support and protect remaining masonry that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.
- C.** Salvage as many whole, undamaged bricks as possible.
- D.** Remove mortar, loose particles, and soil from salvaged brick by cleaning with brushes and water. Store brick for reuse.
- E.** Clean remaining brick at edges of removal areas by removing mortar, dust, and loose particles in preparation for replacement.
- F.** Install new or salvaged brick to replace removed brick. Fit replacement units into bonding and coursing pattern of existing brick. If cutting is required, use a motor-driven saw designed to cut masonry with clean, sharp, unchipped edges.

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- G. Lay replacement brick with completely filled bed, head, and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet clay bricks that have ASTM C 67 initial rates of absorption (suction) of more than 30 g per 30 sq. in. per min. (30 g per 194 sq. cm per min.). Use wetting methods that ensure units are nearly saturated but surface dry when laid. Maintain joint width for replacement units to match existing units.
1. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork.
 2. Rake out mortar used for laying brick before mortar sets and point new mortar joints in repaired area to comply with requirements for repointing existing masonry.

3.05 INSTALLATION

A. General

1. Build walls to the full thickness shown. Build single wythe walls to the actual thickness of the masonry units, using units of nominal thickness shown.
2. Build chases and recesses as shown or required for the work of other trades.
3. Leave openings for equipment to be installed before completion of masonry work. After installation of equipment, complete masonry work to match work immediately adjacent to the opening.

B. Mortar Bedding and Jointing

1. All joints between bricks shall be completely filled with mortar. Bed joints shall be formed of a thick layer of smooth or slightly furrowed mortar applied to the units previously laid, with the brick then shoved in place; or bed joints may be formed as specified for cross joints. Cross joints shall be formed by applying a full coat of mortar to the entire end or the entire side, as the case requires, and then shoving the mortar covered end and/or side of the brick tightly against the bricks previously laid; the practice of buttering the corners of brick and then throwing mortar scraping into the empty joints will not be permitted. All brick shall be laid without disturbing the brick previously laid. Dry or butt joints will not be permitted. Grouting shall be done only as necessary. Do not slush head joints.
2. Lay concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on exterior walls and in all courses of piers, columns and pilasters, and where adjacent to cells or cavities to be reinforced or filled with concrete or grout.
 - a. To ensure alignment of brick and block coursing, adjust block back-up by cutting block to insure alignment of coursing or use adjustable anchorage.
3. Lay masonry walls with 3/8" joints unless otherwise required to match existing of face brick construction.
4. Tool exposed joints slightly concave. Concealed joints shall be struck flush.
5. Remove masonry units disturbed after laying; clean and reset mortar. Do not pound corners at jambs to fit stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.

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C. Stopping and Resuming Work: Rake back 1/2 brick length in each course; do not tooth. Clean exposed surfaces of set masonry wet units lightly (if required) and remove loose masonry units and mortar prior to laying fresh masonry.

D. Built-In-Work

1. As the work progresses, build in items specified under this and other Sections of these specifications. Fill in solidly with masonry around built-in items.
2. Grout in door frames, access doors, louvers and other metal items embedded or built into masonry work solidly with grout.
3. Grout under lintels bearing plates, and steel bearing on masonry with solid bed of mortar.
4. Grout around sleeves, pipes, ducts and all other items which pass through masonry walls solidly with mortar, so as to be air tight and prevent air leakage. Refer to Section 07271 for packing of voids in rated masonry walls.
5. Fill vertical cells of masonry units solid with mortar or grout which have anchoring, reinforcing rods, supporting of hanging devices embedded in the cell including all required anchors.
6. Fill vertical cells of masonry units solid with mortar on each side of door frames to sixteen (16) inches beyond.
7. Unless otherwise noted, fill vertical cells of masonry units solid with mortar which are below steel bearing plates, steel beams, and ends of lintels, to eight (8) inches beyond bearing and from floor to bearing.
8. Place wire mesh in horizontal joint below masonry unit cells to be filled with mortar, to prevent mortar from dropping into unfilled cells.
9. Any masonry indicated as being reinforced shall have all voids filled solid with grout. Grout shall be consolidated in place by vibration or other methods which insure complete filling of cells. When the least clear dimension of the grouted cell is less than two (2) inches, the maximum height of grout pour shall not exceed twelve (12) inches. When the least clear dimension is two (2) inches or more, maximum height of grout pour shall not exceed forty-eight (48) inches. When grouting is stopped for one (1) hour or longer, the grout pour shall be stopped 1-1/2" below the top of a masonry unit. Vertical bar reinforcing shall be accurately placed and held in position while being grouted, and shall be in place before grouting starts. All such reinforcing shall have a minimum clear cover of 5/8". Lap all bars a minimum of forty (40) bar diameters and provide steel spacer ties (not to exceed 192 bar diameter) to secure and position all vertical steel and prevent displacement during grouting. Provide continuous horizontal reinforcement embedded in mortar joints every second course.

E. Cutting and Patching

1. All exposed masonry which requires cutting or fitting shall be cut accurately to size with motorized carborundum or diamond saw, producing cut edges.
2. Do not saw cut any masonry openings in face brick construction without Architect's approval and after a procedure has been reviewed and approved.

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3. All masonry which required patching in exposed work, if approved by Architect, shall be patched neatly with mortar to match appearance of masonry as closely as possible and to the Architect's satisfaction. Rake back joints and use pointing mortar to match as required.

F. Ties and Anchors for Masonry Construction

1. Provide ties and anchors as shown or specified, but not less than one metal tie, spaced not to exceed sixteen (16) inches o.c. horizontally and vertically. Stagger ties in alternate courses. Provide additional ties within 1'-0" of all openings and spaced not more than 24" apart around perimeter of openings.
4. Anchor masonry to structure complying with the following:
 - a. Provide an open space not less than 1/2 in width between masonry and structural member, unless otherwise shown. Keep open space free of mortar or other rigid materials

G. Control and Expansion Joints

1. Provide vertical expansion, control and isolation joints in masonry as shown. Build in related items as the masonry work progresses.
2. Control Joint Spacing: If location of control joints is not shown, place vertical joints spaced not to exceed 30'-0" o.c., In addition, locate joints at points of natural weakness in the masonry work, including the following:
 - a. At structural column or joint between bay.
 - b. Above control joints in the supporting structure.
 - c. Above major openings at ends of lintels upward and below at ends of sills downward. Place at one side of jamb for openings not less than 3'-0" wide and both sides for openings over 6'-0" wide.
 - d. At reduction of wall thickness
 - e. Where masonry abuts supporting structure.
 - f. If additional joints are required, indicate same on approved shop drawings.

H. Lintels

1. Install loose steel lintels furnished by Section 05500 allowing adequate bearing at ends as scheduled on Structural Specifications.
2. For concrete block walls where indicated, use specially formed U-shaped concrete block lintels units with reinforcing bars in accordance with the Structural Specifications.

I. Flashing

1. Provide concealed flashing in masonry work as shown. Prepare masonry surfaces smooth and free from projections. Seal flashing penetrations with adhesive before covering with mortar. Terminate flashing beyond the face of the wall and cut back flush to the face.

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2. Flashing shall be placed, generally, at bottoms of cavity wall construction, over all wall openings, window jambs, at sills of window, and in other locations where indicated on the drawings. At bottoms of cavity walls, the flashing shall be built extending from the exterior face of the brick, up and over onto the back-up as detailed on drawings. Flashing shall be loosely draped. Extreme care shall be exercised in placing the masonry materials not to damage the flashing. Flashing damaged during the masonry erection shall be repaired or replaced by the Contractor at no additional cost to the Owner. All flashing shall be continuous around building unless otherwise noted on the drawings. Provide flashing of sufficient width to allow flashing to protrude 1-1/2" beyond building face. Trim excess only at time of final brick clean-down.
3. Where flashing is penetrated by anchors patch flashings at penetration using adhesive and mastic recommended by the manufacturer to insure watertight seal.
4. Install flashing in accordance with Manufacturer's instructions, using adhesive, primer, thinner, cleaner and mastic as recommended by flashing manufacturer.
5. Provide weep holes of type specified in the head joints of the first course of masonry immediately on concealed flashing Space twenty-four (16) inches o.c..

3.06 CLEANING, PROTECTION, ADJUSTMENT

A. Clean-up

1. Upon completion, masonry shall be thoroughly cleaned. If stiff brushes and water do not suffice, the surface shall be thoroughly wetted with clean water and then scrubbed with a solution of an approved detergent masonry cleaner, equal to Sure Klean 600" made by ProSoCo Inc. or approved equal, mixed as per Manufacturer's directions, followed immediately by a thorough rinsing with clean water. All lintels and other corrodible parts shall be thoroughly protected during cleaning.
2. The Contractor shall take adequate precautions for the protection of all surfaces against mortar spatter, and shall immediately remove any such spatter should it inadvertently occur, leaving no stain or discoloration.
3. Trim exposed flashing.

B. Protection

1. Excess mortar shall be wiped off the masonry surfaces, as the work progresses.
2. Wood coverings shall be placed over all such masonry surfaces as are likely to be damaged during the progress of the entire project.
3. Protective measures shall be performed in a manner satisfactory to the Architect.
4. Damaged masonry units shall be replaced to satisfaction of the Architect.
5. Exterior masonry walls shall be draped with waterproof covering until copings are in place, to prevent water penetration in cavity.

C. Pointing: Point any defective joint with mortar identical with that specified for that joint.

3.07 REPOINTING EXISTING MASONRY

Unit Masonry

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A. Joint Raking

1. Rake out mortar from joints to depths equal to 2-1/2 times their widths but not less than 1/2" nor less than that required to expose sound, unweathered mortar.
2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum or flush joints to remove dirt and loose debris.
3. Do not spall edges of masonry units or widen joints. Replace any masonry units which become damaged.
 - a. Cut and old mortar by hand with chisel and mallet.
 - b. Power operated rotary hand saws and grinders will be permitted but only on specific written approval of Architect based on submission by Contractor of a satisfactory quality control program and demonstrated ability of operators to use tools without damage to masonry. Quality control program shall include provisions for supervising performance and preventing damage due to worker fatigue.

B. Joint Pointing

1. Rinse masonry joint surfaces with water to remove any dust and mortar particles. Time application of rinsing so that, at time of pointing, excess water has evaporated or run off, and joint surfaces are damp but free of standing water.
2. Apply first layer of pointing mortar to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8" until a uniform is formed. Compact each layer thoroughly and allow to become thumbprint-hard before applying next layer.
3. After joints have been filled to a uniform depth, place remaining pointing mortar in three (3) layers with each of first and second layers filling approximately 2/5 of joint depth and third layer the remaining 1/5. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing bricks have rounded edges recess final layer slightly from face. Take care not to spread mortar over edges onto exposed masonry surfaces, or to featheredge mortar.
4. When mortar is thumbprint hard, tool joints to match original appearance of joints, unless otherwise indicated. Remove excess mortar from edge of joint by brushing.
5. Cure mortar by maintaining in a damp condition for not less than seventy-two (72) hours.
6. Where repointing work precedes cleaning of existing masonry allow mortar to harden not less than thirty (30) days before beginning cleaning work.

END OF SECTION

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SECTION 04901 - CLAY MASONRY RESTORATION AND CLEANING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes restoration and cleaning of brick as follows:
 - 1. Reanchoring brick veneers at concrete pilasters to remain as indicated on Contract Drawings.
 - 2. Replacing/restoring damaged shelf angles and installing flashing and weepholes at shelf angles.
 - 3. Repairing clay masonry, including replacing damaged units.
 - 4. Repointing mortar joints.
 - 5. Removing plant growth.
 - 6. Cleaning exposed clay masonry surfaces.
- B. Related Sections include the following:
 - 1. Division 4, Section "Unit Masonry" for masonry accessories not specified herein
 - 2. Division 5, Section "Misc. Metals" for metal anchors and coatings
 - 3. Division 7 Section "Joint Sealants" for sealing joints in restored clay masonry.
- C. Quantities and Allowances:
 - 1. Architect provided quantity take-offs are for reference only; Restoration Contractor is responsible for verifying all quantities prior to Bid.
 - a. Re-anchoring all brick veneer at pilasters to remain
 - b. Installing flashing and weeps at all shelf angles at pilasters to remain
 - c. Cleaning all exposed brick at pilasters to remain.
 - 2. Allowances for bid purposes:
 - a. 5% replacement of damaged bricks (at pilasters to remain)
 - b. 20% repointing of mortar joints (at pilasters to remain)
- D. Unit Prices: Provide unit prices for the following:
 - 1. Unit prices apply to authorized work covered by quantity allowances.
 - 2. Unit prices apply to additions to and deletions from Work as authorized by Change Orders.
 - a. Price per linear foot for replacing galvanized shelf angles (anchorage and steel angle only)

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- b. Price per linear foot for restoring existing shelf angles (removing rust and painting with rust-inhibiting coating)
- c. Price per square foot for replacing damaged brick.
- d. Price per square foot for patching damaged brick.
- e. Price per square foot for repointing bricks.

1.3 DEFINITIONS

- A. Low-Pressure Spray: 100 to 400 psi (690 to 2750 kPa); 4 to 6 gpm (0.25 to 0.4 L/s).
- B. Medium-Pressure Spray: 400 to 800 psi (2750 to 5500 kPa); 4 to 6 gpm (0.25 to 0.4 L/s).
- C. High-Pressure Spray: 800 to 1200 psi (5500 to 8250 kPa); 4 to 6 gpm (0.25 to 0.4 L/s).

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.
- B. Samples for Verification: Before erecting mockup, submit samples of the following:
 - 1. Each type of exposed masonry unit to be used for replacing existing units.
 - a. For each brick type, provide straps or panels containing at least four bricks.
 - 2. Each type of pointing mortar in the form of sample mortar strips, 6 inches (150 mm) long by 1/2 inch (13 mm) wide, set in aluminum or plastic channels.
 - a. Include with each sample a list of ingredients with proportions of each. Identify sources, both supplier and quarry, of each type of sand and brand names of cementitious materials and pigments if any.
- C. Restoration Program: For each phase of restoration process, provide detailed description of materials, methods, equipment, and sequence of operations to be used for each phase of restoration work including protection of surrounding materials on building and Project site.
 - 1. Include methods for keeping pointing mortar damp during curing period.
 - 2. If materials and methods other than those indicated are proposed for any phase of restoration work, provide a written description, including evidence of successful use on comparable projects, and a testing program to demonstrate their effectiveness for this Project.
- D. Cleaning Program: Describe cleaning process in detail, including materials, methods, and equipment to be used and protection of surrounding materials on building and Project site, and control of runoff during operations.

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1. If materials and methods other than those indicated are proposed for cleaning work, provide a written description, including evidence of successful use on comparable projects, and a testing program to demonstrate their effectiveness for this Project.

1.5 QUALITY ASSURANCE

- A. **Restoration Specialist Qualifications:** Engage an experienced masonry restoration and cleaning firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance.
 1. At Contractor's option, work may be divided between two specialist firms: one for cleaning work and one for repair work.
 2. **Field Supervision:** Restoration specialist firms shall maintain experienced full-time supervisors on Project site during times that clay masonry restoration and cleaning are in progress. Supervisors shall not be changed during Project except for causes beyond the control of restoration specialist firm.
 3. **Restoration Worker Qualifications:** Persons who are experienced and specialize in restoration work of types they will be performing. When masonry units are being patched, assign at least one worker among those performing patching work who is trained and certified by manufacturer of patching compound to apply its products.
- B. **Chemical Manufacturer Qualifications:** A firm regularly engaged in producing masonry cleaners that have been used for similar applications with successful results, and with factory-trained representatives who are available for consultation and Project-site inspection and assistance at no additional cost.
- C. **Source Limitations:** Obtain each type of material for masonry restoration (face brick, cement, sand, etc.) from one source with resources to provide materials of consistent quality in appearance and physical properties.
- D. **Preconstruction Testing Service:** Engage a qualified independent testing agency to test the following. Provide test specimens and assemblies as indicated.
 1. **Replacement Brick:** For each proposed type of replacement brick, according to sampling and testing methods in ASTM C 67 for compressive strength, 24-hour cold-water absorption, 5-hour boil absorption, saturation coefficient, and initial rate of absorption (suction).
 2. **Existing Brick:** For each type of existing brick indicated for replacement, according to testing methods in ASTM C 67 for compressive strength, 24-hour cold-water absorption, 5-hour boil absorption, saturation coefficient, and initial rate of absorption (suction). Carefully remove existing bricks from locations designated by Architect.
- E. **Mockups:** Prepare mockups of restoration and cleaning as follows to demonstrate aesthetic effects and qualities of materials and execution. Prepare mockups on existing walls under same weather conditions to be expected during remainder of the Work.

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1. Repair an area [approximately 36 inches (900 mm) high by 48 inches (1200 mm) wide] [as indicated] for each type of masonry material indicated to be rebuilt or replaced.
2. Patch three small areas [at least 1 inch (25 mm) in diameter] [as directed] for each type of masonry material indicated to be patched.
3. Clean an area [approximately 25 sq. ft. (2.3 sq. m) in area] [as indicated] for each type of clay masonry and surface condition.
 - a. Test cleaners and methods on samples of adjacent materials for possible adverse reactions unless cleaners and methods are known to have deleterious effect.
 - b. Allow a waiting period of not less than seven days after completion of sample cleaning to permit a study of sample panels for negative reactions.
4. Rake out joints in two separate areas [approximately 36 inches (900 mm) high by 72 inches (1800 mm) wide] [as indicated] for each type of repointing required and repoint one of the two areas.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver masonry units to Project site strapped together in suitable packs or pallets or in heavy-duty cartons.
- B. Deliver other materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.
- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- D. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.
- E. Store lime putty covered with water in sealed containers.
- F. Store sand where grading and other required characteristics can be maintained and contamination avoided.

1.7 PROJECT CONDITIONS

- A. Repoint mortar joints and repair masonry only when air temperature is between and 40 and 90 deg F (4 and 32 deg C) and is predicted to remain so for at least 7 days after completion of work.
- B. Hot-Weather Requirements: Protect masonry repair and mortar-joint pointing when temperature and humidity conditions produce excessive evaporation of water from mortar and repair materials. Provide artificial shade and wind breaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 90 deg F (32 deg C) and above.

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- C. Patch masonry only when air and surface temperatures are between and 55 and 100 deg F (13 and 38 deg C) and are predicted to remain above 55 deg F (13 deg C) for at least 7 days after completion of work. On days when air temperature is predicted to go above 90 deg F (32 deg C), schedule patching work to coincide with time that surface being patched will be in shade or during cooler morning hours.
- D. Clean masonry surfaces only when air temperature is 40 deg F (4 deg C) and above and is predicted to remain so for at least 7 days after completion of cleaning.

1.8 SEQUENCING AND SCHEDULING

- A. Order replacement materials at earliest possible date, to avoid delaying completion of the Work.
- B. Order sand for repointing mortar immediately after approval of [Samples] [mockups]. Take delivery of and store at Project site a sufficient quantity of sand to complete Project.
- C. Perform masonry restoration work in the following sequence:
 - 1. Re-anchor existing brick veneer to remain.
 - 2. Replace/restore existing shelf angles and install flashing and weepholes at shelf angle locations.
 - 3. Repair existing masonry, including replacing existing masonry with new masonry materials.
 - 4. Clean masonry surfaces.
 - 5. Rake out joints that are to be repointed.
 - 6. Point mortar joints.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Products: Subject to compliance with requirements and approval by the Architect, products that may be incorporated into the Work include, but are not limited to, the products specified.

2.2 MASONRY MATERIALS

- A. See specification in Section 04200 Unit Masonry

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2.3 MORTAR MATERIALS

- A. See specification in Section 04200 Unit Masonry

2.4 CLEANING MATERIALS

- A. Water for Cleaning: Potable.
- B. Hot Water: Heat water to a temperature of 140 to 160 deg F (60 to 71 deg C).
- C. Job-Mixed Detergent Solution: Solution prepared by mixing 2 cups (0.5 L) of tetrasodium polyphosphate (TSPP), 1/2 cup (125 mL) of laundry detergent, and 20 quarts (20 L) of hot water for every 5 gal. (20 L) of solution required.
- D. Job-Mixed Mold, Mildew, and Algae Remover: Solution prepared by mixing 2 cups (0.5 L) of tetrasodium polyphosphate (TSPP), 5 quarts (5 L) of 5 percent sodium hypochlorite (bleach), and 15 quarts (15 L) of hot water for every 5 gal. (20 L) of solution required.
- E. Nonacidic Gel Cleaner: Manufacturer's standard gel formulation, with pH between 6 and 9, that contains detergents and chelating agents and is specifically formulated for cleaning masonry surfaces.
 - 1. [Available]Products:
 - a. Price Research, Ltd.; Price Marble Cleaner-Gel.
 - b. ProSoCo; Sure Klean 942 Masonry Cleaner.
 - c. <Insert manufacturer's name; product name or designation.>
- F. Nonacidic Liquid Cleaner: Manufacturer's standard mildly alkaline liquid cleaner formulated for removing mold, mildew, and other organic soiling from ordinary building materials, including polished stone, brick, aluminum, plastics, and wood.
 - 1. Products:
 - a. ProSoCo; Enviro Klean Restoration Cleaner.
- G. Mild Acidic Cleaner: Manufacturer's standard mildly acidic cleaner containing no hydrochloric, hydrofluoric, or sulfuric acid; or chlorine bleaches.
 - 1. Products:
 - a. ProSoCo; Sure Klean Light-Duty Restoration Cleaner.
- H. Acidic Cleaner: Manufacturer's standard acidic masonry restoration cleaner composed of hydrofluoric acid blended with other acids, detergents, wetting agents, and inhibitors.
 - 1. Products:

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- a. ProSoCo; [Sure Klean Heavy-Duty Restoration Cleaner] [Sure Klean 1028 Restoration Cleaner] [or] [Sure Klean Restoration Cleaner].
- I. Two-Part Chemical Cleaner: Manufacturer's standard system consisting of potassium or sodium hydroxide based, alkaline prewash cleaner and acidic afterwash cleaner that does not contain hydrofluoric acid.
 1. Products:
 - a. ProSoCo; Sure Klean 766 Limestone & Masonry Prewash and Afterwash.

2.5 MISCELLANEOUS MATERIALS

- A. Masonry Patching Compound: Factory-mixed cementitious product that is custom manufactured for patching masonry, is vapor- and water permeable, exhibits low shrinkage, and develops high bond strength to all types of masonry.
 1. Formulate patching compound used for patching brick in colors and textures to match brick being patched. Provide [number of colors needed] [not less than three colors] to enable matching each brick.
 2. Formulate patching compound used for patching unglazed terra cotta in colors and textures to match terra cotta being patched.
 3. [Available]Products:
 - a. Cathedral Stone Products, Inc.; Jahn Restoration Mortar.
 - b. Edison Coatings, Inc.; Custom System 45.
 - c. <Insert manufacturer's name; product name or designation.>
- B. Masonry Repair Anchors, Expansion Type: Mechanical fasteners designed for masonry veneer stabilization consisting of 1/4-inch- (6-mm-) diameter, Type 304 stainless-steel rod with brass expanding shells at each end and water-shedding washer in the middle. Expanding shells shall be designed to provide positive mechanical anchorage to veneer on one end and backup masonry on the other.
 1. [Available]Products:
 - a. Dur-O-Wal, a Dayton Superior Company; Mechanical Repair Anchors.
 - b. Hohmann & Barnard, Inc.; #521RA Repair/Restoration Anchor.
 - c. <Insert manufacturer's name; product name or designation.>
- C. Masonry Repair Anchors, Spiral Type: Type 304 stainless-steel spiral rods designed to anchor to backing and veneer. Anchors are flexible in plane of veneer but rigid perpendicular to it.
 1. Provide adhesive-installed anchors complete with manufacturer's standard epoxy adhesive and injection tubes, screens, sleeves, or other devices required for installation.
 2. Provide driven-in anchors designed to be installed in drilled holes and relying on screw effect rather than adhesive to secure them to backup and veneer.

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3. [Available]Products:

- a. Dur-O-Wal, a Dayton Superior Company; Dur-O-Flex.
- b. Heckmann Building Products, Inc.; #391 Spiro Remedial Tie.
- c. Helifix Ltd.; [Helifix HRT60] [or] [Helifix HRT80].
- d. <Insert manufacturer's name; product name or designation.>

4. MORTAR MIXES

- a. See Section 04200 Unit Masonry

2.6 CHEMICAL CLEANING SOLUTIONS

- A. Dilute chemical cleaners with water to produce solutions not exceeding concentration recommended by chemical cleaner manufacturer.
- B. Acidic Cleaner Solution for Brick: Dilute with water to produce hydrofluoric acid content of 3 percent or less, but not greater than that recommended by chemical cleaner manufacturer.

PART 3 - EXECUTION

3.1 PROTECTION

- A. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from masonry restoration work.
 - 1. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of restoration and cleaning work.
- B. Comply with chemical cleaner manufacturer's written instructions for protecting building and other surfaces against damage from exposure to its products. Prevent chemical cleaning solutions from coming into contact with pedestrians, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.
 - 1. Cover adjacent surfaces with materials that are proven to resist chemical cleaners used unless chemical cleaners being used will not damage adjacent surfaces. Use 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.
 - 2. Keep wall wet below area being cleaned to prevent streaking from runoff.
 - 3. Do not clean masonry during winds of sufficient force to spread cleaning solutions to unprotected surfaces.
 - 4. Neutralize and collect alkaline and acid wastes for disposal off Owner's property.
 - 5. Dispose of runoff from cleaning 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.

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C. Prevent mortar from staining face of surrounding masonry and other surfaces.

1. Cover sills, ledges, and projections to protect from mortar droppings.
2. Keep wall area wet below rebuilding and pointing work to discourage mortar from adhering.
3. Immediately remove mortar in contact with exposed masonry and other surfaces.
4. Clean mortar splatters from scaffolding at end of each day.

3.2 UNUSED ANCHOR REMOVAL

A. Remove masonry anchors, brackets, wood nailers, and other extraneous items no longer in use unless identified as historically significant or indicated to remain.

1. Remove items carefully to avoid spalling or cracking masonry.
2. If item cannot be removed without damaging surrounding masonry, cut off item flush with surface and core drill surrounding masonry and item as close around item as practical.
3. Patch holes where items were removed unless directed to remove and replace units.

3.3 BRICK REMOVAL AND REPLACEMENT

A. See Section 04200 Unit Masonry

3.4 REANCHORING VENEERS

- A. Install masonry repair anchors in horizontal mortar joints and according to manufacturer's written instructions. Install at not more than 16 inches (400 mm) o.c. vertically and 32 inches (800 mm) o.c. horizontally, unless otherwise indicated. Install at locations to avoid penetrating flashing.
- B. Recess anchors at least 5/8 inch (16 mm) from surface of mortar joint and fill recess with pointing mortar.

3.5 REPLACING OR RESTORING SHELF ANGLES

- A. Remove existing face brick and back up at shelf angle location. Salvage undamaged face brick for reinstallation.
- B. Remove all loose materials and backup from the void to expose the steel shelf angle for the full length of the opening.
- C. Clean all exposed surfaces of the the steel shelf angle. Remove all corrosion by-products using power wire burshing techniques.
- D. Clean the steel and the opening of all loose dust and debris with oil-free compressed air.

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- E. Notify the Structural Engineer to inspect exposed steel to determine if shelf angle can be repaired or must be reinforced or replaced.
- F. If the Structural engineer determines that the shelf angle must be replaced due to the severity of corrosion damage, install new steel members to match the existing in original size and physical dimension, unless otherwise directed by the Structural Engineer. Replacement steel is to conform to Section 05500.
- G. If no steel is to be replaced, apply ²~~two~~ coats of protective coating for exposed steel surfaces:
 - 1. Carbomastic 15, Low Odor, by Carboline.
- H. Install new flashing and stainless steel termination bar. Flashing to extend at least 8" up the wall and be reinforced as recommended at protruding anchor bolts.
- I. Install new compressible filler beneath shelf angle.
- J. Reinstall face brick with drainage material behind weepholes to keep loose mortar from clogging weep holes.
- K. Install backer-rod and sealant as per Section 07900.

3.6 MASONRY UNIT PATCHING

- A. Patch the following masonry units:
 - 1. Units indicated to be patched.
 - 2. Units with holes.
 - 3. Units with chipped edges or corners.
 - 4. Units with small areas of deep deterioration.
- B. Remove and replace existing patches, unless otherwise indicated or approved by Architect.
- C. Patching Bricks:
 - 1. Remove loose material from brick surface. Remove additional material so patch will not have feathered edges and will be at least 1/4 inch (6 mm) thick, but not less than recommended by patching compound manufacturer.
 - 2. Mask or remove surrounding mortar joints if patch will extend to edge of brick.
 - 3. Mix patching compound in individual batches to match each unit being patched. Combine one or more colors of patching compound, as needed, to produce exact match.
 - 4. Rinse surface to be patched and leave damp, but without standing water.
 - 5. Brush-coat surfaces with slurry coat of patching compound according to manufacturer's written instructions.
 - 6. Place patching compound in layers as recommended by patching compound manufacturer, but not less than 1/4 inch (6 mm) or more than 2 inches (50 mm) thick. Roughen surface of each layer to provide a key for next layer.

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7. Trowel, scrape, or carve surface of patch to match texture and surface plane of surrounding brick. Shape and finish surface before or after curing, as determined by testing, to best match existing brick.
8. Keep each layer damp for 72 hours or until patching compound has set.

3.7 CLEANING MASONRY, GENERAL

- A. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other.
- B. Use only those cleaning methods indicated for each masonry material and location.
 1. Do not use wire brushes or brushes that are not resistant to chemical cleaner being used. Do not use plastic-bristle brushes if natural-fiber brushes will resist chemical cleaner being used.
 2. Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip. Adjust pressure and volume to ensure that cleaning methods do not damage masonry.
 - a. Equip units with pressure gages.
 3. For chemical cleaner spray application, use low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with cone-shaped spray tip.
 4. For water spray application, use fan-shaped spray tip that disperses water at an angle of 25 to 50 degrees.
 5. For high-pressure water spray application, use fan-shaped spray tip that disperses water at an angle of at least 40 degrees.
 6. For heated water spray application, use equipment capable of maintaining temperature between 140 and 160 deg F (60 and 71 deg C) at flow rates indicated.
 7. For steam application, use steam generator capable of delivering live steam at nozzle.
- C. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging masonry surfaces.
- D. Removing Plant Growth: Completely remove plant, moss, and shrub growth from masonry surfaces. Carefully remove plants, creepers, and vegetation by cutting at roots and allowing to dry as long as possible before removal. Remove loose soil and debris from open masonry joints to whatever depth they occur.
- E. Preliminary Cleaning: Before beginning general cleaning, remove extraneous substances that are resistant to cleaning methods being used. Extraneous substances include paint, calking, asphalt, and tar.
 1. Carefully remove heavy accumulations of material from surface of masonry with a sharp chisel. Do not scratch or chip masonry surface.
 2. Remove paint and calking with alkaline paint remover.

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- a. Comply with requirements for paint removal.
 - b. Repeat application up to two times if needed.
 3. Remove asphalt and tar with solvent-type paint remover.
 - a. Apply only to asphalt and tar by brush without prewetting.
 - b. Allow paint remover to remain on surface for 10 to 30 minutes.
 - c. Rinse off with [cold] [hot] water using low-pressure spray.
 - d. Repeat application if needed.
 - F. Water Spray Applications: Unless otherwise indicated, hold spray nozzle at least 6 inches (150 mm) from surface of masonry and apply water in horizontal back and forth sweeping motion, overlapping previous strokes to produce uniform coverage.
 - G. Steam Wash: Apply steam to masonry surfaces at pressures not exceeding 80 psi (550 kPa). Hold nozzle at least 6 inches (150 mm) from surface of masonry and apply steam in horizontal back and forth sweeping motion, overlapping previous strokes to produce uniform coverage.
 - H. Chemical Cleaner Application Methods: Apply chemical cleaners to masonry surfaces to comply with chemical cleaner manufacturer's written instructions; use brush or spray application methods, at Contractor's option. Do not spray apply at pressures exceeding 50 psi (345 kPa). Do not allow chemicals to remain on surface for periods longer than those indicated or recommended by manufacturer.
 - I. Rinse off chemical residue and soil by working upward from bottom to top of each treated area at each stage or scaffold setting. Periodically during each rinse, test pH of rinse water running off of cleaned area to determine that chemical cleaner is completely removed.
 1. Apply neutralizing agent and repeat rinse, if necessary, to produce tested pH of between 6.7 and 7.5.
 - J. After cleaning is complete, remove protection no longer required. Remove tape and adhesive marks.
- 3.8 CLEANING BRICKWORK**
- A. Cold-Water Wash: Use cold water applied by [low] [medium] [high]-pressure spray.
 - B. Cold Water Soak:
 1. Apply cold water by intermittent soaking.
 2. Use perforated hoses or other means that will apply a fine water mist to entire surface being cleaned.
 3. Apply water in cycles with at least 30 minutes between cycles.
 4. Continue water application until surface encrustation has softened sufficiently to permit its removal by water wash, as indicated by cleaning tests.
 5. Remove soil and softened surface encrustation from masonry with cold water applied by low-pressure spray.

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- C. Hot-Water Wash: Use hot water applied by [low] [medium] [high]-pressure spray.
- D. Steam Cleaning: Apply steam at pressures not exceeding 80 psi (550 kPa).
- E. Detergent Cleaning:
 - 1. Wet masonry with [cold] [hot] water applied by low-pressure spray.
 - 2. Scrub masonry with detergent solution using medium-soft brushes until soil is thoroughly dislodged and can be removed by rinsing. Use small brushes to remove soil from mortar joints and crevices. Dip brush in solution often to ensure that adequate fresh detergent is used and that masonry surface remains wet.
 - 3. Rinse with [cold] [hot] water applied by [low] [medium] [high]-pressure spray to remove detergent solution and soil.
 - 4. Repeat cleaning procedure above where required to produce cleaning effect established by mockup.
- F. Mold, Mildew, and Algae Removal:
 - 1. Wet masonry with [cold] [hot] water applied by low-pressure spray.
 - 2. Apply mold, mildew, and algae remover by brush[or low-pressure spray].
 - 3. Scrub masonry with medium-soft brushes until mold, mildew, and algae are thoroughly dislodged and can be removed by rinsing. Use small brushes for mortar joints and crevices. Dip brush in mold, mildew, and algae remover often to ensure that adequate fresh cleaner is used and that masonry surface remains wet.
 - 4. Rinse with [cold] [hot] water applied by [low] [medium] [high]-pressure spray to remove mold, mildew, and algae remover and soil.
 - 5. Repeat cleaning procedure above where required to produce cleaning effect established by mockup.
- G. Nonacidic Gel Chemical Cleaning:
 - 1. Wet masonry with [cold] [hot] water applied by low-pressure spray.
 - 2. Apply nonacidic gel cleaner in 1/8-inch (3-mm) thickness by brush, working into joints and crevices. Apply quickly and do not brush out excessively so area will be uniformly covered with fresh cleaner and dwell time will be uniform throughout area being cleaned.
 - 3. Let cleaner remain on surface for period indicated below:
 - a. As recommended by chemical cleaner manufacturer.
 - b. As established by mockup.
 - 4. Remove bulk of nonacidic gel cleaner by squeegeeing into containers for disposal.
 - 5. Rinse with [cold] [hot] water applied by [low] [medium] [high]-pressure spray to remove chemicals and soil.
 - 6. Repeat cleaning procedure above where required to produce cleaning effect established by mockup. Do not repeat more than once. If additional cleaning is required, use steam wash.
- H. Nonacidic Liquid Chemical Cleaning:

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1. Wet masonry with [cold] [hot] water applied by low-pressure spray.
 2. Apply cleaner to masonry[in two applications] by brush[or low-pressure spray]. Let cleaner remain on surface for period indicated below:
 - a. As recommended by chemical cleaner manufacturer.
 - b. As established by mockup.
 - c. Two to three minutes.
 3. Rinse with [cold] [hot] water applied by [low] [medium] [high]-pressure spray to remove chemicals and soil.
 4. Repeat cleaning procedure above where required to produce cleaning effect established by mockup. Do not repeat more than once. If additional cleaning is required, use steam wash.
- I. [Mild Acidic] [Acidic] Chemical Cleaning:
1. Wet masonry with cold water applied by low-pressure spray.
 2. Apply cleaner to masonry[in two applications] by brush[or low-pressure spray]. Let cleaner remain on surface for period indicated below:
 - a. As recommended by chemical cleaner manufacturer.
 - b. As established by mockup.
 - c. Two to three minutes.
 3. Rinse with cold water applied by [low] [medium] [high]-pressure spray to remove chemicals and soil.
 4. Repeat cleaning procedure above where required to produce cleaning effect established by mockup. Do not repeat more than once. If additional cleaning is required, use steam wash.

3.9 REPOINTING MASONRY

- A. Rake out and repoint mortar joints to the following extent:
 1. Joints where mortar is missing or where they contain holes.
 2. Cracked joints where cracks can be penetrated at least 1/4 inch (6 mm) by a knife blade 0.027 inch (0.7 mm) thick.
 3. Cracked joints where cracks are 1/8 inch (3 mm) or more in width and of any depth.
 4. Joints where they sound hollow when tapped by metal object.
 5. Joints where they are deteriorated to point that mortar can be easily removed by hand.
 6. Joints, other than those indicated as sealant-filled joints, where they have been filled with substances other than mortar.
- B. Do not rake out and repoint joints where not required.
- C. See Section 04200 Unit Masonry for Execution of raking and repoint joints.

3.10 FINAL CLEANING

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- A. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, spray applied at low pressure.**
 - 1. Do not use metal scrapers or brushes.**
 - 2. Do not use acidic or alkaline cleaners.**
- B. Wash adjacent woodwork and other non-masonry surfaces. Use detergent and soft brushes or cloths.**
- C. Clean masonry debris from roof; remove debris from gutters and downspouts. Rinse off roof and flush gutters and downspouts.**
- D. Sweep and rake adjacent pavement and grounds to remove masonry debris. Where necessary, pressure wash surfaces to remove mortar, dust, dirt, and stains.**

3.11 FIELD QUALITY CONTROL

- A. Inspectors: Owner will engage qualified independent inspectors to perform inspections and prepare test reports. Allow inspectors use of lift devices and scaffolding, as needed, to perform inspections.**
- B. Architect's Project Representatives: Architect will assign Project representatives to help carry out Architect's responsibilities at the site, including observing progress and quality of portion of the Work completed. Allow Architect's Project representatives use of scaffolding, as needed, to observe progress and quality of portion of the Work completed.**
- C. Notify Structural Engineer in advance of times when lift devices and scaffolding will be relocated. Do not relocate lift devices and scaffolding until inspectors and Architect's Project representatives] have had reasonable opportunity to make inspections and observations of work areas at lift device or scaffold location.**

END OF SECTION 04901

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SECTION 05500

MISCELLANEOUS METALS

PART 1.00 - GENERAL

1.01 GENERAL REQUIREMENTS

- A Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents

1.02 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the miscellaneous metal work as indicated on the drawings and specified herein, including but not limited to, the following.
 - 1. Rough hardware.
 - 2. Loose steel lintels.
 - 3. Light steel framing and supports, not included as part of work of other trades.
 - 4. Steel grating and frames.
 - 5. Steel dunnage beams.
 - 6. Sleeves in concrete walls and slabs.
 - 7. Steel framing, bracing, supports, anchors, bolts, shims, fastenings, and all other supplementary parts indicated on drawings or as required to complete each item of work of this Section.
 - 8. Prime painting, touch-up painting, galvanizing and separation of dissimilar metals for work of this Section.
 - 9. Cutting, fitting, drilling and tapping work of this Section to accommodate work of other Sections and of concrete, masonry or other materials as required for attaching and installing work of this Section.

1.03 RELATED WORK

- A. Unit Masonry - Section 04200.

1.04 QUALITY ASSURANCE

- A. **Field Measurements:** Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress ; allow for trimming and fitting where taking field measurement before fabrication might delay work.
- B. **Shop Assembly:** Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly an coordinated installation.
- C. **Reference Standards:** The work is subject to requirements of applicable portions of the following standards:

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1. "Manual of Steel Construction", American Institute of Steel Construction.
2. AWS D1-1 "Structural Welding Code", American Welding Society.
3. SSPC SP-3 "Surface Preparation Specification No. 3, Power Tool Cleaning", Steel Structures Painting Council.
4. SSPC PA-1 "Painting Application Specification", Steel Structures Painting Council.
5. "Handbook on Bolt, Nut and Rivet Standards", Industrial Fasteners Institute.

1.05 SUBMITTALS

- A. Manufacturers Literature: Submit Manufacturer's specification, loads tables, dimensions diagrams, anchor details and installation instruction for products to be used in the fabrication of miscellaneous metal work, including paint products.
- B. Shop Drawings: Shop drawings for the fabrication and erection of all assemblies of miscellaneous iron work which are not completely shown by Manufacturer's data sheets. Include plans and elevations at not less than 1" to 1'-0" scale, and include details of sections and connections at not less than 3' to 1'-0" scale. Show anchorage and accessory items.
- C. Welding shall be indicated on shop drawings using AWS symbols and showing length, size and spacing (if not continuous). Auxiliary views shall be shown to clarify all welding. Notes such as 1/4" weld, weld and tack are not acceptable.

PART 2.00 – PRODUCTS

2.01 MATERIALS

- A. Metals
 1. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
 2. Steel Plates, Shapes and Bars: ASTM A36
 3. Steel Bar Grating: ASTM A569 or ASTM A36.
 4. Steel Tubing: Cold formed, ASTM A500; or hot rolled, ASTM A501.
 5. Structural Steel Sheet: Hot rolled, ASTM A570; or cold rolled, ASTM A611, Class 1; of grade required for design loading.
 6. Galvanized Structural Steel Sheet: ASTM A446, of grade required for design loading. Coating designation as indicated, or if not indicated, G90.

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7. **Steel Pipe:** ASTM A53, type and grade as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (Schedule 40), unless otherwise indicated.
 8. **Gray Iron Castings:** ASTM A48, Class 30.
 9. **Malleable Iron Castings:** ASTM A47, grade as selected by fabricator.
 10. **Brackets, Flanges and Anchors:** Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
 11. **Concrete Inserts:** Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A47, or cast steel, ASTM A27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A153.
- B. **Grout:** Non-shrink, non-metallic grout conforming to the requirements of Section 03300.
- C. **Fasteners**
1. **General:** Provide zinc-coated fasteners of exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.
 2. **Bolts and Nuts:** Regular hexagon head type, ASTM A307, Grade A.
 3. **Log Bolts:** Square head type, FS FF-B-561.
 4. **Machine Screws:** Cadmium plated steel, FS FF-S-92.
 5. **Plain Washers:** Round, carbon steel, FS, FF-W-92.
 6. **Masonry Anchorage Devices:** Expansion shields, FS FF-S-325.
 7. **Toggle Bolts:** Tumble-wing type, FS-FF-B-588, Type, class and style as required.
 8. **Lock Washers:** Helical spring type carbon steel, FS FF-W-84.
- D. **Shop Paint:** Shop prime all non-galvanized miscellaneous metal items using Series 88 Azaron Primer made by Tnemec or No. 230R55 "Rust Barrier" made by Con-Lux.
- E. **Bituminous Paint:** Fed. Spec. TT-C-494.
- F. **Galvanize Repair Coating:** For touching up galvanized surfaces after erection, provide Z.R.C. Cold Galvanizing Compound made by Z.R.C. Chemical Products Co.

2.02 PRIME PAINTING

- A. **Scope:** All ferrous metal (except galvanized steel) shall be cleaned and shop painted with one coat of specified ferrous metal primer. No shop prime paint required on galvanized steel or aluminum work.
- B. **Cleaning:** Conform to Steel Structures Painting Council Surface Preparation Specification SP-3 (latest edition) Power Tool Cleaning: for cleaning of ferrous metals which are to receive shop prime coat.
- C. **Application**

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1. Apply shop prime coat immediately after cleaning metal. Apply paint in dry weather or under cover. Metal surfaces shall be free from frost or moisture when painted. Paint all metal surfaces including edges, joints, holes, corners, etc.
 2. Paint surfaces which will be concealed after shop assembly prior to such assembly. Apply paint in accordance with approved paint Manufacturer's printed instructions, and the use of any thinners, adulterants or admixtures shall be only as stated in said instructions.
 3. Paint shall uniformly and completely cover the metal surfaces, 2.0 mils minimum dry film thickness. No work shall be shipped until the shop prime coat thereon has dried.
- D. Touch-Up: In the shop, after assembly and in the field, after installation of work of this Section, touch-up damaged or abraded portions of shop prime paint with specified ferrous metal primer.
- E. Apply one shop coat to fabricated metal items, except apply two (2) coats of paint to surfaces inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.

2.03 GALVANIZING

- A. Scope: All ferrous metal exposed to the weather, and all ferrous metals indicated on drawings or in specifications to be galvanized, shall be cleaned and then hot-dipped galvanized after fabrication.
- B. Cleaning: Thoroughly clean metal surfaces of all mill scale, rust dirt, grease, oil, moisture and other contaminants prior to galvanizing.
- C. Application: Hot-dip galvanizing shall be applied in accordance with:
1. ASTM A123: Standard specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 2. ASTM A153: Galvanized Coating on Iron and Steel Hardware - Table 1.
 3. ASTM A446: Galvanized Coating on Steel Sheets.
 4. Minimum weight of galvanized coating shall be two (2) oz. per square foot of surface.
- D. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.
- E. All galvanized materials must be inspected for compliance with these specifications and marked with a stamp indicating the name of the galvanizer, the weight of the coating, and the appropriate ASTM number.
- F. To minimize surface imperfection (e.g.: flux inclusions), material to be galvanized shall be dipped into a solution of Zinc Ammonium Chloride (pre-flux) immediately prior to galvanizing. The type of galvanizing process utilizing a flux blanket overlaying the molten zinc will not be permitted.

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- G. After galvanizing, all materials not exposed to view must be chromated by dipping material in a 0.2% chromic acid solution.
- H. Galvanizing surfaces, where exposed to view, must have a smooth level surface finish. Where this does not occur, piece shall be rejected and replaced to the acceptance of the Architect.

2.04 PROTECTIVE COATINGS

- A. Whenever dissimilar metals will be in contact, separate contact surfaces by coating each contact surface prior to assembly or installation with one coat of specified bituminous paint, which shall be in addition to the specified shop prime paint. Mask off those surfaces not required to receive protective coating.

2.05 WORKMANSHIP

A. General

- 1. Miscellaneous metal work shall be fabricated by an experienced fabricator or manufacturer and installed by an experienced tradesman.
- 2. Materials, methods of fabrication, fitting, assembly, bracing, supporting, fastening, operating devices, and erection work shall be in accordance with drawings and specifications, approved shop drawings, and best practices of the industry, using new and clean materials as specified having structural properties sufficient to safely sustain or withstand stresses and strains to which materials and assembled work will be subjected.

- 3. All work shall be accurately and neatly fabricated, assembled and erected.

- B. Shop Assembly: Insofar as practicable, fitting and assembly work shall be done in shop. Shop assemble work in largest practicable sizes to minimize field work. It is the responsibility of the miscellaneous metal subcontractor to assure himself that the shop-fabricated miscellaneous metal items will properly fit the field condition. In the event that shop-fabricated miscellaneous metal items do not fit the field condition, the item shall be returned to shop for correction.

- C. Cutting: Cut metal by sawing, shearing, or blanking. Flame cutting will be permitted only if cut edges are ground back to smooth, clean edges. Make cuts accurate, clean, shop and free of burrs, without deforming adjacent surfaces or metals.

- D. Holes: Drill or cleanly punch holes; do not burn.

- E. Connections: Make connections with tight joints, capable of developing full strength of member, flush unless otherwise indicated, formed to exclude water where exposed to weather. Locate joints where less conspicuous. Unless indicated otherwise, weld or bolt shop connections; bolt or screw field connections. Provide expansion and contractor joints to allow for thermal movement of metal at locations and by methods approved by Architect.

1. Welding:

- a. Shall be in accordance with "Standard Code for Welding in Building Construction" of the American Welding Society, and shall be done with

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electrodes and/or methods recommended by the manufacturer of the metals being welded.

- b. Welds shall be continuous, except where spot welding is specifically permitted. Welds exposed to view shall be ground flush and dressed smooth with and to match finish of adjoining surfaces; undercut metal edges where welding oxides from all welded surfaces.
- c. All welds on or behind surfaces which will be exposed to view shall be done so as to prevent distortion on finished surface. Remove weld splatter and welding oxides from all welded surfaces.

2. Bolts and Screws: Make threaded connections tight with threads loosely concealed. Use lock nuts. Bolts and screw heads exposed to view shall be flat and countersunk. Cut off projecting ends of exposed bolts and screws flush with nuts or adjacent material.

- F. Operating Mechanism: Operating devices (i.e. pivots, hinges, etc.) mechanism and hardware used in connection with this work shall be fabricated, assembled, installed and adjusted after installation so that they operate smoothly, freely, noiselessly and without excessive friction.
- G. Built-In Work: Furnish anchor bolts, inserts, plates and any other anchorage devices, and all other items specified under this Section of the Specifications to be built into concrete, masonry or work of other trades, with necessary templates and instructions, and in ample time to facilitate proper placing and installation.
- H. Supplementary Parts: Provide as necessary to complete each item of work, even though such supplementary parts are not shown or specified.
- I. Coordination: Accurately cut, fill, drill and tap work of this Section to accommodate and fit work of other trades. Furnish or obtain, as applicable, templates or drawings to or from applicable trades for proper coordination of this work.
- J. Exposed Work:
 - 1. In addition to requirements specified herein and shown on drawings, all surfaces exposed to view shall be clean and free from dirt, stains, grease, scratches, distortions, waves, dents, buckles, tool marks, butts, and other defects which mar the appearance of finished work.
 - 2. Metal work exposed to view shall be straight and true to line or curve, smooth arises and angles sharp as practicable, miters formed in true alignment, profiles accurately intersecting, and with joints carefully matched to produce continuity of line and design.

2.06 MISCELLANEOUS METAL ITEMS

A. Loose Lintels:

Provide loose lintels over all openings in interior masonry walls as listed below except where otherwise stated on the drawings.

Masonry Openings

Lintel

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- | | | |
|--------------------|---------------------|--|
| 4' - 11" or less | 4" X 3-1/2" X 5/16" | a. 3-1/2" legs are horizontal. |
| 5' - 0" to 7' - 0" | 5" X 3-1/2" X 5/16" | b. Provide one angle for each 3-3/4" of wall thickness or less. Provide 5" X 5" x 5/16" angle for 5-5/8" or 6" thick walls and partitions. |
| | | c. Length of lintels - Masonry openings + 12". |

B. Rough Hardware:

1. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring and securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 Sections.
- 2.. Fabricate items to sizes, shapes and dimensions required. Furnish malleable iron washers for heads and nuts which bear on wood connections; elsewhere, furnish steel washers.

C. Loose Steel Lintels

1. Provide loose structural steel lintels for openings and recesses in masonry walls and partitions as shown. Weld adjoining members together to form a single unit where indicated. Provide proper size and quantity of loose lintels with adequate bearing length.
2. At columns or vertical surfaces where lintels cannot bear on masonry, provide clip angles for structural capacity of lintel.

D. Miscellaneous Light Steel Framing.

1. Light steel framing, bracing, supports, framing, clip angles, shelf angles, plates, etc., shall be of such shape and sizes as indicated on the drawings and details or as required to suit the condition and shall be provided with all necessary supports and reinforcements such as hangers, braces, struts, clip angles, anchors, bolts, nuts, welds, etc., as required to properly support and rigidly fasten and anchor same in place and to steel, concrete, masonry and all other connecting and adjoining work.
2. All light steel frame shall be furnished and erected in accordance with the applicable requirements of the "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings" by the American Institute for Steel Construction and as specified herein.

E. Sleeves in Concrete Walls and Slabs

1. Sleeves through concrete walls shall be of Schedule 40 steel pipe with i.d. two (2) inches larger than o.d. of pipe or conduit (including insulation, if any) to be accommodated. Sleeves shall project one-half (1/2) inch on each side of finished wall. Provide rectangular one quarter (1/4) inch steel plate collar at center, continuously welded to the perimeter of the sleeve, and six (6) inches wider than the o.d.

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2. Slots in slab shall be 12 gauge steel sheet, galvanized, of dimensions indicated, with strap anchors welded in place not more than twelve (12) inches on center.

PART 3.00 - EXECUTION

3.01 INSPECTION

- A. Examine the areas and conditions where miscellaneous metal is to be installed and notify the Architect of conditions detrimental to the proper and timely completion of work. Do not proceed with the work until satisfactory conditions are corrected to permit proper installation of the work.

3.02 ERECTION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary to secure miscellaneous metal fabrications to in-place construction; including threaded fastener for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connections as required.
- B. Cutting, Fitting and Replacement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in Location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built in concrete, masonry, or similar construction.
- C. Fitting Connections: Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot dip galvanized after fabrication, and are intended for bolted or screwed field connections.
- D. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance, and quality of welds made, and methods used in correcting welding work.
- E. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- F. Field Touch-Up of Galvanized Surfaces: Touch-up shop applied galvanized coatings damaged during handling and installation. Use galvanizing repair coating specified herein for galvanized surfaces.

END OF SECTION

Miscellaneous Metals
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Carpentry

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SECTION 06200

CARPENTRY

PART 1.00 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.02 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the carpentry work as shown on the drawings and specified herein, including but not limited to, the following:
 - 1. Installation only of finish hardware.
 - 2. Installation only of doors and frames.
 - 3. Blocking and miscellaneous wood, including plywood wall lining for telephone and electrical closets.
 - 4. Rough Hardware.
 - 5. Temporary Controls furnished by Carpentry trades.

~~1.03 RELATED WORK~~

- ~~A. Section 08100 STEEL DOORS AND FRAMES.~~
- ~~B. Section 08700 DOOR HARDWARE.~~
- ~~C. Section 06400 ARCHITECTURAL WOODWORK.~~
- ~~D. Section 07500 ROOFING.~~
- ~~E. Section 08200 WOOD DOORS.~~

1.04 QUALITY ASSURANCE

- A. Lumber Standard: Comply with PS 20.
- B. Plywood Standard: Comply with PS1 and American Plywood Association (APA).
- C. Shop fabricate carpentry work to the extent feasible and where shop fabrication will result in better workmanship than feasible for on site fabrication.
- D. Grade Marks: Identify lumber and plywood by official grade mark.
 - 1. Lumber: Grade stamp to contain symbol grading agency certified Board of Review, American Lumber Standards Committee, mill number or name, grade of lumber, species grouping or combination designation, rules under which graded if applicable, and condition of seasoning at time of manufacture.

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- a. S-Dry: Maximum nineteen (19) percent moisture content as per ASTM D2016.

1.05 SUBMITTALS

- A. Pressure Treatment: Include certification by treating plant stating chemicals and process used, net amount of salt retained and conformance with applicable standards.
- B. Fire Retardant Treatment: Include certification by treating plant that treatment material complies with government ordinances and that treatment will not bleed through finished surfaces.

1.06 PRODUCT HANDLING

- A. All items specified in Section 08700 of this specification entitled "Finish Hardware" shall be received, accounted for, stored and applied under this Section.
- B. Hardware shall be sorted and stored in space assigned by Contractor and shall be kept at all times under lock and key. The safety and preservation of all items delivered will be the responsibility of the Contractor.
- C. Deliver carpentry materials to the site ready to use with each piece of lumber clearly marked as to grade, type and mill, and place in area protected from the elements.
- D. Deliver rough hardware in sealed kegs and/or other containers which shall bear labels as to which what type and kind.
- E. Pile lumber for rough usage, when delivered to the site in stacks to insure drainage and with a minimum clearance of six (6) inches above grade. Cover stacks with tarpaulins or other watertight coverings. Store grounds and similar small sized lumber inside the building as soon as possible after delivery.
- F. Do not store seasoned lumber in wet or damp portions of the building.
- G. Protect fire retardant treated materials against high humidity and moisture during storage and erection.
- H. Remove delivered materials which do not confirm to specified grading rule or are otherwise not suitable for installation from the job site and replace with acceptable materials.

1.07 JOB CONDITIONS

- A. Installer must examine the substrates and supporting structure and the conditions under which the carpentry work is to be installed, and notify the Contractor in writing of conditions detrimental to the work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the Installer and the Architect.
- B. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow proper attachment of other work.

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PART 2.00 - PRODUCTS

2.01 WOOD MATERIAL

A. General:

1. All woods shall be sound flat, straight, well seasoned, thoroughly dry and free from all defects. Warped or twisted wood shall not be used.
2. For miscellaneous wood blocking, grounds, furring as required, use Utility Grade Coastal Douglas Fir or Southern Pine, free from knots, shakes, rot or other defects, straight, square edges and straight grain, air seasoned with maximum moisture content of nineteen (19) percent. Wood shall be S4S, S-Dry, complying with PS-20.
3. Plywood for rough carpentry work shall conform to PS-74 and APA standards best grade for intended use.
4. Plywood for telephone and electric closets, provide 3/4" thick C-D EXT-APA plywood, fire retardant treatment as specified herein.

B. Wood Treatment

1. All interior wood material shall be fire retardant treated to comply with the AWP standards (C20 for lumber, C27 for plywood) for pressure impregnation with fire retardant chemical to achieve a flame spread rating of not more than 25 (UL Class "FR-S" when tested in accordance with UL Test 723 or ASTM E84.
 - a. After treatment, kiln dry to a moisture content of fifteen (15) percent; if wood is to be painted or finished, kiln dry to moisture content of twelve (12) percent. Treatment shall be equal to "Flameproof LHC" made by Osmose or "Dricon" made by Koppers. Provide UL approve identification on treated materials.
2. For exterior blocking, roofing and sheet metal, pressure treat wood with water-borne, "CCA-Oxide": preservative complying with AWPB LP-2 (.23lbs./cubic foot in chemical wood).
 - a. After treatment, kiln dry to a maximum moisture content of fifteen (15) percent. Treatment shall be equal to "Wolmanized" made by Koppers, or K33 mad by Osmose, or approved equal.
3. Treated wood which is cut or otherwise damaged shall be further treated in accordance with the APA Standard M-4.

2.02 HARDWARE

- A. Rough Hardware for Exterior Use: Hot-dipped galvanized, aluminum or an approved non-ferrous metal.
- B. Nails: Common steel wire, untreated for interior work as per Fed. Spec. FF-N-105.

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- C. Bolts: Standard mild steel, square head machine bolts with square nuts and malleable iron or steel plate washers or carriage bolts with square nuts and cut washers conforming to the following:
 - 1. Bolts: FS-FF-B-575 and 584.
 - 2. Nuts: FF-N-836D.
 - 3. Expansion Shields: FS-FF-B-561.
 - 4. Toggle Bolts: FS-FF-B-561.
 - 5. Lag Screws and Bolts: FS-FF-B-561.
- D. Wood Screws: Per Fed. Spec. FF-S-111D.
- E. Concrete and Masonry Anchors: Standard expansion shield self-drilling type concrete anchors where so shown or noted on the drawings, or where approved by Architect.

PART 3.00 - EXECUTION

3.01 INSPECTION

- A. Examine the areas and conditions where carpentry is to be installed and notify the Architect of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.02 INSTALLATION OF FINISH HARDWARE

- A. All finishing hardware specified in Section 08700 of this specification entitled "Door Hardware" shall be received, accounted for, stored and applied under this Section.
- B. Hardware shall be sorted and stored in space assigned by Contractor and shall be kept at all times under lock and key. The safety and preservation of all items delivered will be the responsibility of the Contractor.
- C. Hardware shall be carefully fitted and securely attached, in accordance with these specification and the instructions of the various manufacturers.
- D. Unless otherwise noted, mount hardware units at heights established in Section 08100.
- E. Install each hardware item in compliance with Manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes, re-install each item. Do not install surface-mounted items until finishes have been completed on the substrate.
- F. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- G. Drill and countersink units which are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

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- H. Cut and fit threshold and floor covers to profile of door frames, with mitered corners and hair-line joints. Join units with concealed welds or concealed mechanical joints. Cut smooth openings for spindles, bolts and similar items, if any.
- I. All keys used shall be construction keys which are to be tagged with fiber discs as approved, clearly labeled with identifying inscriptions and then neatly arranged in a temporary cabinet. All construction keys shall be returned to the Owner.
- J. Adjusting and Cleaning
 - 1. Adjust and check each operating item of hardware and each door, to ensure proper operation of function of every unit. Lubricate moving parts with type lubrication recommended by manufacturer (graphite type if no other recommended). Replace units, which cannot be adjusted and lubricated to operate freely and smoothly as intended for the application made.
 - 2. Final Adjustment: Whenever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make a final check and adjustment of all hardware items in such space or area. Clean and re-lubricate operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

3.03 INSTALLATION OF DOORS AND FRAMES

A. Steel Doors and Frames

- 1. Install hollow metal units and accessories in accordance with the final shop drawings, Manufacturer's data, and as herein specified.
- 2. Setting Masonry Anchorage Devices
 - a. Provide masonry anchorage devices where required for securing hollow metal frames to in-place concrete masonry construction.
 - b. Set anchorage devices opposite each anchor location, in accordance with details or final shop drawings and anchorage device Manufacturer's instructions. Leave drilled holes rough, not reamed, and free from dust and debris.
 - c. Provide loose lintels if conditions require them.
- 3. Placing Frames: Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
 - a. In masonry construction, building-in of anchors and grouting of frames is included in Section 04200 of the specification.
 - b. At in-place concrete or masonry construction, set frames and secure in place with machine screws and masonry anchorage devices.

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- c. At steel stud partitions, attach wall anchors to studs with tapping screws. Spot grout anchors with USG Durabond Joint Compound just before board is inserted into frame; coordinate with Section 09250.
- d. Place frames at fire-rated openings in accordance with NFPA Standard No. 80.
- e. Make field splices in frames as detailed on final shop drawings, welded and finished to match factory work.
- f. Remove spreader bars only after frames or bucks have been properly set and secured.
- 4. Door Installation: Fit hollow metal doors accurately in their respective frames, with the following clearances:
 - a. Jambs and Heads: 3/32".
 - b. Bottom: 1/4", where no threshold or carpet.
 - c. Place fire-rated doors with clearances as specified in NFPA Standard No. 80.

B. Wood Doors

- 1. Condition doors to average prevailing humidity in installation area prior to hanging.
- 2. Install doors in accordance with Manufacturer's instructions.
- 3. Fit doors to frames and machine for hardware to whatever extent not previously worked at factory as required for proper fit and uniform clearance at each edge.
- 4. Clearances: For non-fire doors provide clearances of: 1/8" at jambs and heads; 1/8" at meeting stills for pairs of doors; and 1/2" from bottom of door to top of decorative floor finish or covering, except where threshold is shown or scheduled provide 1/4" clearance from bottom of door to top of threshold.
- 5. Fire-Rated Doors: Install in corresponding fire-rated frames in accordance with the requirements of NFPA No. 80. Provide clearances compliant with the limitations of the authority having jurisdiction.

- C. Adjustments: Check and readjust operating finish hardware items just prior to final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames which are warped, bowed or otherwise unacceptable.

3.04 BLOCKING AND MISCELLANEOUS WOOD

A. General:

- 1. Erect rough carpentry true to line, levels and dimensions required; squared, aligned, plumbed, and securely fastened in place.

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2. Shim where required to true up furring, blocking and the like. Use wood or metal shims only.
3. Do all cutting, fitting, drilling and tapping of other work as required to secure work in place and to perform the work included herein. Do all the cutting and fitting of carpentry work, for the work of other trades as required.

B. Blocking and Miscellaneous Wood

1. Furnish and install all wood grounds, furring, blocking, curbs, bucks, nailers, etc. that may be necessary and required in connection with the carpentry and with the work described for any other trades and including required carpentry for electrical fixtures. All blocking and nailers shall be continuous where required, whether or not so indicated.
2. Blocking shall be required for the proper installation of the finished work and for items in mechanical sections as required. Blocking, edging, stops, nailing strips, etc., shall be continuous, unless distinctly noted otherwise. Provide blocking as required to install all equipment. Provide blocking and nailers where shown or required to fasten interior sheet metal work.
3. Fastening for wood grounds, furring and blocking shall be of metal and of type and spacing as best suited to conditions. Hardened steel nails, expansion screws, toggle bolts, self-cinching nails, metal plugs, inserts or similar fastenings shall be used, of suitable type and size to draw the members into place and securely hold same.

C. Rough Lumber for Roofing and Sheet Metal

1. Furnish and install all wood nailing strips and wood blocking required in connection with respective types of roofing, fans, flashings, and sheet metal work, using preservative treated wood as herein before specified.
2. Wood blocking shall be of sizes and shapes as indicated on drawings and/or designed for the reception of curb flashings for roof ventilators and similar items.
3. All nailing strips and blocking shall be carried out in accordance with the printed installation instructions, and/or recommendations of the accepted manufacturer of the roofing materials, and in coordination and cooperation with the sheet metal work trades.
4. All blocking and nailing strips shall be firmly secured in place using counter bored bolt and nut fastenings, or secured by any other proposed flush surfaced fastenings.
5. Wood nailing strips and blocking required to be embedded in concrete work shall be furnished in time due for placing, prior to start of concrete operations. Locations and spacing of nailing strips and blocking shall be performed in coordination with the concrete trades, as required for respective installations.

3.05 TELEPHONE AND ELECTRIC EQUIPMENT MOUNTING BOARDS

- A. Furnish and install 3/4" thick plywood panels to the walls of the telephone and electric equipment rooms in accordance with the requirements of the local utility company.

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- B. Secure to wall using proper devices for substrates encountered, spaced twelve (12) inches o.c., maximum around the edges, 1-1/2" from corners, and in three (3) rows of three (3) each in the field. Recess fastening devices flush with the plywood surface. Adjacent panels shall be butted with 1/16" space between without lapping.

3.06 ROUGH HARDWARE

- A. Securely fasten rough carpentry together. Nail, spike, lag screw or bolt as required by conditions encountered in the field and Contract Documents.
- B. Provide rough or framing hardware, such as nails, screws, bolts, anchors, hangers, clips, inserts, miscellaneous fastenings, and similar items of the best quality and of the proper size and kind to adequately secure the work together and in place, in a rigid and substantial manner.
- C. Secure rough carpentry to masonry with countersunk bolts in expansion sleeves or other acceptable manner, with fastenings not more than sixteen (16) inches apart. Secure woodwork to hollow masonry with toggle bolts spaced not more than sixteen (16) inches apart.
- D. Countersink bolts in nailers and other rough woodwork and include washers and nuts. Cut bolts off flush with surface and peen as may be required to receive finished work.
- E. Inserts to secure wood nailers to concrete shall be malleable iron threaded inserts with 3/8" diameter bolts of length to allow for countersinking. Locate at end of each nailer and at intervals not exceeding thirty (30) inches o.c.
- F. Furnish to the mason for building into the work, or attaching the work which is to be built in, anchors, bolts, wall plates bolted to masonry, corrugated wall plugs, nailing blocks, etc., which are required for the proper fastening and installation for the work or other items as called for in this Section.
- G. Detailed instructions with sketches of necessary requirements, shall be given to the masonry trade showing the location and other details of such nailing devices.

3.07 TEMPORARY PROTECTION BY CARPENTER

- A. General: Provide temporary protection as follows:
 - 1. Temporary wood doors at exterior entrances and at interior door openings, as required.
 - 2. Temporary protection and enclosures at elevators, stairs, and other shifts, at openings in floor and roof.
 - 3. Temporary elevator cabin and temporary hatchway doors for each floor of elevators used for temporary service.
 - 4. Temporary sills at door thresholds and other openings.
 - 5. Temporary stair handrails continuously from top to bottom of each stair.

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- B. **Stair Protection:** Provide wood protection for stairs: cover finished threads. Protect platforms, treads and rises with dressed planking full stair width; hold in place with continuous edge strips. Erect required handrails and railings for closing in open wells and open sides of stairs. Protect railing from damage. Protect door sills and saddles.
- C. **Openings in Floors and Roofs:** Protect openings in floor and roof slabs with adequate wood railings, substantially framed, braced and nailed. Cover openings not required to be kept open with not less than two (2) inches thick planking, cleat together, brace; make sufficiently strong and secure. Protect openings in floors and roofs immediately after forms are removed.
- D. **Exterior Openings:** Provide temporary enclosures for exterior openings where required, properly secured and maintained until finished work is in place. Provide a sufficient number of temporary doors to give access to the building, all provided with hardware, locks and keys.
- E. **Maintenance:** Maintain all temporary protection in good repair during the constructive period. Remove when no longer required.
- F. **Temporary Locks:** Provide temporary locks, including keys, for temporary doors. Use of permanent building hardware in connection with temporary doors is prohibited.

3.08 CLEANING-UP

- A. **General:** Keep the premises in a neat, safe and orderly condition at all times during execution of this portion of the work, free from accumulation of sawdust, cut-ends and debris.
- B. **Sweeping**
 - 1. At the end of each working day, or more often if necessary, thoroughly sweep all surfaces where refuse from this portion of the work has settled.
 - 2. Remove the refuse to the area of the job site set aside for its storage.
 - 3. Upon completion of this portion of the work, thoroughly broom clean all surfaces.

END OF SECTION

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SECTION 07900

JOINT SEALERS

PART 1.00 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.02 WORK INCLUDED

- A. The work of this Section includes all labor, materials, equipment and services necessary to complete the joint sealers work as shown on the drawings and specified herein, including but is not limited to the following:

1. Exterior wall joints as required at shelf angle detail.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 04901 – CLAY MASONRY RESTORATION AND CLEANING

1.04 QUALITY ASSURANCE

- A. Qualification of Installers: Use only personnel who are thoroughly familiar, skilled and specially trained in the techniques of sealant work, and who are completely familiar with the published recommendations of the sealant manufacturer.

1.05 SUBMITTALS

- A. Samples: Submit the following:
1. Color samples of sealants.
 2. Sealant bond breaker and joint backing.
- B. Product Data: Submit manufacturer's technical information and installation instructions for:
1. Sealant materials, indicating that material meet standards specified herein.
 2. Backing rods.
 3. Data sheets for manufacturer's recommended solvents.

1.06 ENVIRONMENTAL CONDITIONS

- A. Temperature: Install all work of this Section when air temperature is above forty (40) degrees F. and below eighty (80) degrees F., unless manufacturer submits written instructions permitting sealant use outside of this temperature range.
- B. Moisture: Do not apply work of this Section on surfaces which are wet, damp, or have frost.

1.07 PRODUCT HANDLING

- A. Production: Use all means necessary to protect the materials of this Section, before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements as necessary.
- C. Storage
1. Store sealant materials and equipment under conditions recommended by their manufacturer.

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2. Do not use materials stored for a period of time exceeding the maximum recommended shelf life of the material.

1.08 GUARANTEE

- A. Provide a written guarantee from the manufacturer and the applicator stating that the applied sealants shall remain watertight for a period of five (5) years.

PART 2.00 - PRODUCTS

2.01 SEALANT MATERIALS

- A. Exterior Wall Sealant: Provide two (2) part non-sag polyurethane sealant conforming to tt-s-00227e, Type II, Class A, equal to Sonolastic NP-2 by Sonneborn or approved equal.
- B. Colors: Colors of sealants as selected by the architect.

2.02 MISCELLANEOUS MATERIALS

- A. Back-Up Materials: Provide back-up materials and preformed joint fillers, non-staining, non-absorbent, compatible with sealant and primer, and of a resilient nature, equal to "Sof-Rod" made by Applied Extrusion Technologies Inc. or approved equal, twenty-five (25) percent wider than joint width. Materials impregnated with oil, bitumen or similar materials shall not be used. Provide back-up materials only as recommended by sealant manufacturer in writing.
- B. Provide bond breakers, where required, of polyethylene tape as recommended by manufacturer of sealant.
- C. Provide primers recommended by the sealant manufacturer for each material to receive sealant. Note that each exterior joint must be primed prior to sealing.
- D. Provide solvent, cleaning agents and other accessory materials as recommended by the sealant manufacturer.
- C. Materials shall be delivered to the job in sealed containers with manufacturer's original labels attached. Materials shall be used per manufacturer's printed instruction.

PART 3.00 - EXECUTION

3.01 INSPECTION

- A. Examine the areas and conditions where joint sealers are to be installed and notify the architect of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.02 INSTALLATION

- A. Apply the sealant under pressure with a hand or power actuated gun or other appropriate means. Gun shall have nozzle of proper size and provide sufficient pressure to completely fill joints as detailed. Neatly point or tool joint to provide the contour as indicated on the drawings.
- B. Preparation and Application
 1. Thoroughly clean all joints, removing all foreign matter such as old caulking, dust, oil, grease, water, surface dirt and frost. Sealant must be applied to the base surface. Previously applied film must be entirely removed.
 2. Stone, masonry and concrete surfaces to receive sealant shall be cleaned where necessary by grinding, water blast cleaning, mechanical abrading, or combination of these methods as required to provide a clean, sound base surface for sealant adhesion.
 - a. Do not use any acid or other material which might stain surfaces.

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- b. Remove laitance by grinding or mechanical abrading.
 - c. Remove loose particles present or resulting from grinding, abrading, or blast cleaning by blowing out joints with compressed air, oil and water free, or vacuuming joints prior to application of primer or sealant.
- 3. Clean non-porous surfaces such as metal and glass chemically. Remove protective coatings on metallic surfaces by solvent that leaves no residue and is compatible with sealant. Use solvent with clean, lint free paper towels, and wipe dry with clean, dry lint free paper towels. Do not allow solvent to air dry without wiping. Clean joint areas protected with masking tape or strippable films as above after removal of tape film.
- 4. Joint Size and Sealant Size: Joints to receive sealant shall be at least 1/4" wide. In joints 1/4" to 3/8" wide, sealant shall be 1/4" deep. In joints wider than 3/8" and up to 1" wide, sealant depth shall be one half the joint width. For joints wider than 1" sealant depth shall be as recommended by the sealant manufacturer. Depth of joint is defined as distance from outside face of joint to closest point of the filler.
- 5. Primer: Thoroughly clean joints and apply primer to all surfaces that will receive sealant. Apply primer on clean, dry surfaces, and prior to installation of joint backing. Completely wet both inner faces of the joint with primer. Mask adjacent surfaces of joint with non-staining masking tape prior to priming.
- 6. Joint Backing: In joints where depth of joint exceeds required depth of sealant, install joint backing (after primer is dry) in joints to provide backing and proper joint shape for sealant. Proper shape for sealant is a very slight "hourglass" shape, with back and front face having slight concave curvature. Use special blunt T- shaped tool or roller to install joint backing to the proper and uniform depth required for the sealant. Joint backing shall be installed with approximately twenty-five (25) percent compression. Do not stretch, twist, braid, puncture, or tear joint backing. Butt joint backing at intersections.
- 7. Bond Breaker: Install bond breaker smoothly over joint backing so that sealant adheres only to the sides of the joint and not backing.
- 8. Sealant Application: Apply sealant in accordance with the manufacturer's application manual and manufacturer's instructions, using hand guns or pressure equipment, on clean, dry, properly prepared substrates, completely filling joints to eliminate air pockets and voids. Mask adjacent surfaces of joint with non-staining masking tape. Force sealant into joint in front of the tip of the "caulking gun" (not pulled after it) and force sealant against sides to make uniform contact with sides of joint and to prevent entrapped air or pulling of sealant off of sides. Fill sealant space solid with sealant.
- 9. Tooling: Tool exposed joints to form smooth and uniform beds, with slightly concave surface. Finished joints shall be straight, uniform, smooth and neatly finished. Removed masking tape immediately after tooling of sealant and before sealant face starts to "skin" over. Neatly remove any excess sealant from adjacent surfaces of joint, leaving the work in a neat, clean condition.
- 10. Replace any sealant which is damaged during construction process.
- 11. No prepared joint or crack shall be left unsealed at the completion of each day's work.

END OF SECTION