

THE BANKS  
LOT 28 GARAGE & PARK

**Bid Package 2 (ITB #006-22)**

**Park & Garage**

**December 17, 2021**

FOR THE BOARD OF COMMISSIONERS  
OF HAMILTON COUNTY, OHIO

**THP Limited:** Architect/Structural Engineer

**Michael McInturf Architects:** Design Architect

**The Kleingers Group:** Landscape Architect

**DNK Architects:** Architect/Code Consultant

**Heapy Engineering:** MEP/FP Engineer

**Burgess & Niple:** Civil Engineer

**McGill Smith Punshon:** Surveyor

**Terracon Consultants:** Geotechnical Engineer

**Messer/MBJ Consultants:** Construction Manager

SECTION 000110  
PROJECT MANUAL INDEX

**Introductory Pages**

Section	000110	Project Manual Index
	000115	Drawing Index
	000125	Project Directory

**Bidding Requirements, Contract Forms, and Conditions of the Contract**

Section	001000	Bidding Documents
	001000.1	Advertisement for Bids (Legal Notice)
	001000.2	Instructions to Bidders – AIA A701
	001000.3	Additional Bid Conditions
	001000.4	Bid Form
	001000.5	Bid Guaranty and Contract Bond
	001000.6	Certificate of Compliance, Ohio Department of Insurance – Hamilton County
	001000.7	Non-Collusion Affidavit of Contractor
	001000.8	Bidder’s Certification Concerning Equal Employment Opportunity Requirements
	001000.9	Personal Property Tax Statement
	001000.10	Subcontractor and Material Supplier List
	001000.11	The Banks Project SBE Program Summary
	001000.12	Subcontractor Utilization Plan – (Form 2003)
	001000.13	Statement of Good Faith Efforts – (Form 2007)
	001000.14	Outreach/Good Faith Summary Sheet – (Form 2007-a)
	001000.15	Warranty Against an Unresolved Finding For Recovery
	001000.16	Not Used
	001000.17	Responsible Bidder Certification
	001000.18	Tax Statement Sheet
	001000.19	Not Used
	001000.20	Not Used
	001000.21	Certified Check Form
	001000.22	Registration Form
	001000.23	Prevailing Wages and Prevailing Wage Rate Tables (See Appendix A)
	003200	Geotechnical Data
	005000	Agreement Form
	006100	Contract Bond
	006150	Escrow Agreement
	007200	General Conditions
	008100	Project Safety Program
	008260	Joint Policy for Small Business Enterprise, Economic Inclusion and Workforce Development

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

008270 Responsible Bidder Requirements  
009000 Contract Forms

**Division 01 - General Requirements**

Section 011100 Summary of Work  
012100 Allowances  
012513 Product Substitution Procedures  
013100 Project Coordination  
013119 Project Meetings  
013216 Construction Progress Schedule  
013226 Construction Progress Reporting  
013300 Submittals  
013323 Shop Drawings, Product Data, and Samples  
013543 Environmental Procedures  
014000 Quality Requirements  
014216 Definitions, Standards, and Regulatory Requirements  
015000 Construction Facilities and Temporary Controls  
017329 Cutting and Patching  
017700 Closeout Procedures and Submittals

**Technical Specifications:**

**Division 02 – Existing Conditions**

Section 024100 Demolition

**Division 03 – Concrete**

Section 030100 Concrete Repair  
033000 Cast-in-Place Concrete

**Division 04 – Masonry**

Section 042000 Unit Masonry  
044213 Dimensional Stone Cladding  
044302 Solid Granite

**Division 05 – Metals**

Section 055000 Metal Fabrications  
057000 Ornamental Metals

**Division 07 – Thermal and Moisture Protection**

Section 071400 Fluid Applied Waterproofing  
079200 Sealants

**Division 08 – Openings**

Section 081100 Steel Doors and Frames  
087100 Door Hardware

**Division 09 – Finishes**

Section 099100 Painting

**Division 10 – Specialties**

Section 104400 Fire Protection Specialties

**Division 21 – Fire Suppression**

Section 210501 Basic Fire Suppression Requirements  
210502 Agreement and Waiver for Use of Electronic Files  
210502A Electronic Files - Heapy Release Form to Contractors  
210504 Basic Fire Suppression Materials and Methods  
210505 Firestopping  
210507 Piping Materials and Methods for Fire Suppression  
210517 Expansion Loops for Fire Suppression Systems  
210519 Gauges for Fire Suppression Piping  
210523 General Duty Valves for Fire Suppression Piping  
210529 Hangers and Supports for Fire Suppression Piping  
210533 Heat Tracing for Fire Suppression Piping  
210553 Identification of Fire Suppression Piping & Equipment  
  
211312 Fire Suppression Piping  
211313 Fire Suppression Sprinkler & Standpipe System

**Division 22 – Plumbing**

Section 220501 Basic Plumbing Requirements  
220502 Agreement and Waiver for Use of Electronic Files  
220502A Electronic Files - Heapy Release Form to Contractors  
220504 Basic Plumbing Materials and Methods  
220505 Firestopping  
220507 Piping Materials and Methods  
220517 Expansion Loops for Plumbing Systems  
220523 General Duty Valves for Plumbing Piping  
220529 Hangers and Supports for Plumbing Piping  
220553 Identification of Plumbing Piping  
  
221116 Interior Domestic Water Piping  
221119 Interior Domestic Water Piping Specialties  
  
221316 Interior Drainage and Vent Systems  
221319 Drainage Systems Specialties

**Division 23 – HVAC**

Section 230501 Basic HVAC Requirements  
230502 Agreement and Waiver for Use of Electronic Files  
230502A Electronic Files - Heapy Release Form to Contractors  
230504 Basic HVAC Materials and Methods  
230505 Firestopping  
230553 Identification of HVAC Piping & Equipment  
  
230923 Direct Digital Control System for HVAC  
230925 Instrumentation & Control Devices for HVAC  
230947 Control Power & Wiring for HVAC

**Division 26 – Electrical**

Section	260501	Basic Electrical Requirements
	260502	Agreement and Waiver for Use of Electronic Files
	260502A	Electronic Files – Heavy Release Form to Contractors
	260504	Basic Electrical Materials and Methods
	260505	Firestopping
	260519	Low-Voltage Electrical Power Conductors - Copper
	260526	Grounding and Bonding for Electrical Systems
	260533	Raceways and Boxes for Electrical Systems
	260553	Identification for Electrical Systems
	260565	Specific Wiring Applications
	260923	Lighting Control Devices
	262213	Distribution Transformers
	262416	Panelboards
	262716	Electrical Cabinets and Enclosures
	262726	Wiring Devices and Coverplates
	262813	Fuses
	262816	Disconnect Switches
	262913	Motor Controllers
	265113	Interior Luminaires, Lamps and Ballasts
	265114	Lighting Control Panels
	265115	Lighting Control System
	265200	Exit and Emergency Lighting
	265600	Exterior Lighting

**Division 28 – Electronic Safety and Security**

Section	283100	Fire Detection and Alarm (Addressable)
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**Division 31 – Earthwork**

Section	310000	Earthwork
	312000	Earth Moving

**Division 32 – Exterior Improvements**

Section	321440	Granite Unit Paving
	328400	Underground Irrigation System
	329113	Planting Soils
	329113.23	Structural Soil
	329300	Plants

**Division 33 – Site Utilities**

Section	334100	Storm Drainage
	334600	Subdrainage

**Appendix A – Prevailing Wage Rates**

END OF SECTION

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

SECTION 000115  
DRAWING INDEX

DRAWING    TITLE

TITLE SHEET

SURVEY: (MSP)  
TOPOGRAPHIC SURVEY

GENERAL: (THP)  
G001      BUILDING CODE NOTES

CIVIL: (THP)  
C101      SITE PLAN

CIVIL: (KLEINGERS)  
C102      UTILITY PLAN  
C102.1    STORM PROFILES  
C102.2    STORM DETAILS

C103      GRADING PLAN

EROSION CONTROL: (KLEINGERS)  
C104      EROSION CONTROL NOTES AND DETAILS  
C104.1    EROSION CONTROL NOTES AND DETAILS

ARCHITECTURAL: (THP/MMA)  
A001      GEOMETRIC LAYOUT

A100      SITE PLAN  
A101      LOWER LEVEL FLOOR PLAN  
A102-S    SUBSTRUCTURE LEVEL PLAN  
A102      PARK LEVEL FLOOR PLAN, LAYOUT, GRADING, AND COMPONENTS

A200      OVERALL ELEVATIONS  
A201      LOT 27 ELEVATIONS AND SECTIONS  
A202      ELM ST. STAIR ELEVATIONS AND SECTIONS  
A203      ELM ST. ELEVATIONS  
A204      ELM ST. WALL SECTIONS  
A205      MEHRING WAY ELEVATIONS  
A206      MEHRING WAY WALL SECTIONS

A210      BUILDING SECTIONS  
A211      BUILDING SECTIONS  
A212      BUILDING SECTIONS  
A213      BUILDING SECTIONS

A220      ARCHITECTURAL DETAILS

A230      ARCHITECTURAL DETAILS

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

A240 RAILING DETAILS

A300 LOT 27/28 PLANTER PLAN & SECTIONS  
A301 LOT 27/28 PLANTER DETAILS  
A302 LOT 27/28 PLANTER DETAILS

A310 ENTRY MARKER - RACE STREET

A320 ENTRY MARKER - ELM STREET STAIR

A510.1 LOWER LANDING BLEACHER SEATING  
A510.2 LOWER LANDING BLEACHER SEATING  
A512.1 STEPPED BENCH & PLANTER @ MIDDLE WALK  
A513 STEPPED BENCH @ LOWER WALK

A801 GUARDRAIL DETAILS

LANDSCAPE: (TKG)

L100 HARDSCAPE PLAN

L200 LANDSCAPE SOILS PLAN

L300 OVERALL LANDSCAPE PLAN  
L301 LANDSCAPE ENLARGEMENT PLAN  
L302 LANDSCAPE ENLARGEMENT PLAN  
L303 PLANTING DETAILS

L400 DETAILS

IRRIGATION: (TKG)

L500 IRRIGATION ZONE PLAN

STRUCTURAL: (THP)

S001 GENERAL NOTES AND TYPICAL DETAILS  
S002 TYPICAL DETAILS  
S101 FOUNDATION PLAN  
S102 UPPER LEVEL (503) FRAMING PLAN

S201 FOUNDATION DETAILS

S301 PILE CAP AND COLUMN DETAILS

S401 FRAMING DETAILS  
S402 FRAMING DETAILS

S501 TYPICAL BEAM DETAILS AND BEAM DIAGRAMS  
S502 BEAM DIAGRAMS  
S503 BEAM DIAGRAMS

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

FIRE PROTECTION: (HEAPY)

F101 LOWER LEVEL FS PLAN

PLUMBING: (HEAPY)

P001 LEGEND SCHEDULES & NOTES

P101 LOWER LEVEL PLUMBING PLAN

P101A LOWER LEVEL PLUMBING PLAN (LOT 27)

P102 UPPER TERRACE LEVEL PLUMBING PLAN

HVAC: (HEAPY)

H001 HVAC SYMBOLS, NOTES, LEGENDS

H101 LOWER LEVEL HVAC PLAN (LOT 28)

H301 CONTROL SCHEMATIC

H302 CONTROL SCHEMATIC

ELECTRICAL: (HEAPY)

E001 LEGEND AND INDEX

E002 SCHEDULES

E003 PANELBOARDS

E004 SINGLE-LINE

E005 DETAILS

E201 LIGHTING PLANS LOT 28

E301 POWER PLANS LOT 28

WATERPROOFING: (THP)

SW101 PARK LEVEL SUBSURFACE WATERPROOFING PLAN

SW301 WATERPROOFING DETAILS

SW302 WATERPROOFING DETAILS

END OF SECTION



The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

SECTION 000125

PROJECT DIRECTORY

**Owner – Garage/Park**

Board of County Commissioners of  
Hamilton County, Ohio  
County Administration Building, Room 603  
138 East Court Street  
Cincinnati, Ohio 45202

**Construction Manager**

Messer Construction /MBJ Consultants Inc.  
643 West Court Street  
Cincinnati, Ohio 45203  
Phone: 513-242-1541

**Landscape Architect**

The Kleingers Group  
6219 Centre Park Drive  
West Chester, Ohio 45069  
Phone: 513-779-7851

**Surveyor**

McGill Smith Punshon, Inc.  
3700 Park 42 Drive, Suite 190B  
Cincinnati, Ohio 45241  
Phone: 513-759-0004

**Geotechnical Engineer**

Terracon Consultants, Inc.  
611 Lunken Park Drive  
Cincinnati, Ohio 45226  
Phone 513-321-5816

**Architect/Structural Engineer**

THP Limited, Inc.  
100 East Eighth Street  
Cincinnati, Ohio 45202  
Phone: 513-241-3222

**Design Architect**

Michael McInturf Architects  
1116 Race Street  
Cincinnati, Oh 45202  
Phone: 513-639-2351

**Architect/Code Consultant**

DNK Architects  
2616 Central Parkway  
Cincinnati, OH 45214  
Phone: 513-948-4146

**MEP & FP Engineer**

Heapy Engineering LLC  
1400 West Dorothy Lane  
Dayton, Ohio 45409  
Phone 937-224-0861

**Civil Engineer**

Burgess & Niple  
525 Vine Street  
Cincinnati, Ohio 45202  
Phone 513-579-0042

END OF SECTION

The Banks, Lot 28, Phase 3C BP#2  
Park & Garage  
December 27, 2021

**Document 001000.1 ADVERTISEMENT FOR BIDS (LEGAL NOTICE)**

Sealed bids will be received by the Board of County Commissioners of Hamilton County, Ohio in Room 507 of the Todd B. Portune Center for County Government (formerly known as County Administration Building), 138 East Court Street, Cincinnati, Ohio until **11:00 A.M., Local Time, January 19, 2022**, for furnishing labor, materials, tools, equipment, and services necessary for:

**ITB 006-22 - THE BANKS, Lot #28, Bid Package #2  
Park & Garage  
TC-03 Concrete Structure and Site Concrete  
TC-04 Park Finishes**

**A PRE-BID CONFERENCE WILL BE HELD ON JANUARY 5, 2022 at 10:00AM,  
138 EAST COURT STREET (ROOM 605) CINCINNATI, OH 45202**

**Questions:** January 11, 2022, *by 12:00 PM*

**Answers:** January 13, 2022, *by end of business day*

This is a prevailing wage project, and the estimated budget is **\$5,402,183 General Construction**. Proposal Forms, specifications, etc. may be obtained upon application at ARC, 7157 E. Kemper Road, Cincinnati, Ohio 45241, or they may be electronically retrieved by accessing the following website – <http://www.hamilton-co.org/purchasing/>.

Owner – Parking Garage & Park  
Hamilton County  
Todd B. Portune Center for Cty Government  
138 East Court Street, Room 603  
Cincinnati, Ohio 45202  
Phone: 513-946-4400

Architect/Engineer for the Project:  
THP Limited, Inc.  
100 East Eighth Street  
Cincinnati, Ohio 45202  
Phone: 513-241-3222

Surveyor:  
McGill Smith Punshon  
3700 Park 42 Drive, Suite 190B  
Cincinnati, Ohio 45241  
513-759-0004

Civil Engineer for the Project:  
Burgess and Niple, Inc.  
312 Plum Street, 12<sup>th</sup> Floor  
Cincinnati, Ohio 45202  
513- 579-0042

Construction Manager for the Project:  
Messer Construction Co. / MJB Consultants Inc.  
643 West Court Street  
Cincinnati, Ohio 45203  
513-242-1541

Bidding Documents may be examined at:  
Allied Construction Industries  
3 Kovac Drive  
Cincinnati, Ohio 45215  
513-221-8020

Hamilton Co. Purchasing  
[www.Hamilton-Co.org](http://www.Hamilton-Co.org)  
See Auctions/Bid/Vendors  
Select Bids/RFPs/RFQs or [www.bidsync.com](http://www.bidsync.com)

Cincinnati Minority Contractors  
3 Kovac Drive  
Cincinnati, Ohio 45215  
513-631-7666

McGraw Hill Construction Dodge  
7265 Kenwood Rd., Suite 200  
Cincinnati, Ohio 45236  
513-345-8200

The Banks, Lot 28, Phase 3C BP#2  
Park & Garage  
December 27, 2021

South Central Ohio Minority  
Business Council  
441 Vine Street Suite 300  
Cincinnati, Ohio 45202  
513-579-3104

Greater Cincinnati Northern Kentucky  
African American Chamber of Commerce  
2945 Gilbert Avenue  
Cincinnati, Ohio 45206  
513-751-9900

Reed Construction Data  
[www.reedconstructiondata.com](http://www.reedconstructiondata.com)

Bidding Documents will also be available on SCAN, a subscription microfilm service of Dodge/McGraw-Hill Information Systems.

Starting **December 27, 2021**, prime bidders, and bidders other than prime bidders may purchase Plans, Specifications, and Proposal Forms by electronically retrieved by accessing the following web site – <http://www.hamilton-co.org/purchasing/>.

All Prime Bidders MUST register with Hamilton County Purchasing for this project through BidSync in order to receive addenda or other communications to bidders. When purchasing Bidding Documents, prime bidders shall identify themselves as legitimate prime bidders by means of company stationary or business cards. Documents will not be issued on a deposit basis and will not be available for purchase from the Engineer or Hamilton County.

Prime bidders are cautioned that addenda will be sent to all bidders who have registered. The Engineer, the Construction Manager, Development Manager and Hamilton County will not be responsible for sending addenda to prime bidders who have not registered.

As bid security, Bidders shall submit with their bid a Bid Guaranty in the form of either (1) a combined Guaranty and Contract Bond, or (2) a certified check, cashier's check drawn on a solvent bank, or an irrevocable letter of credit. If a Bid Guaranty and Contract Bond is submitted with the Bid, it shall be for the full amount of Bidder's bid, including alternates. If a certified check, cashier's check, or irrevocable letter of credit shall be in the amount of 10% of the bid amount including Base Bid and Alternates. If a certified check, cashier's check drawn on a solvent bank, or an irrevocable letter of credit is submitted, it shall be payable to the Board of County Commissioners of Hamilton County, Ohio, and Messer Construction Co. The Bid Guaranty, in either form, must be in strict compliance with Section 153.54 of the Ohio Revised Code, and also Sections 153.57 or 153.571, as applicable. **The Board of County Commissioners of Hamilton County, Ohio and Messer Construction Co. shall be named as obligees on the Bid Guaranty and Contract Bond.**

A successful bidder submitting a certified check, cashier's check, or irrevocable letter of credit as bid security shall be required to furnish and pay for a Contract Bond in accordance with Ohio Revised Code Section 153.57 and the Instructions to Bidders. The Contract Bond must be the amount of 100% of the successful bidder's Contract amount. The Board of County Commissioners of Hamilton County, Ohio and Messer Construction Co. shall be named as Obligees on the Contract Bond.

In accordance with Article 153.12 of the Ohio Revised Code the following is the estimate of cost of the Work as provided by the Construction Manager.

The Banks, Lot #28, BP#2 – Park & Garage

The Banks, Lot 28, Phase 3C BP#2  
Park & Garage  
December 27, 2021

**Total Construction Budget \$5,402,183**

**Small Business Goal for this Bid Package is 30%**

**Bidders shall comply with the prevailing wages.**

Bidders shall comply with Ohio Revised Code Section 153.59 to ensure that in the hiring of employees for the performance of work under the contract or any subcontract, no contractor, subcontractor, or any person acting on a contractor's or subcontractor's behalf, by reason of race, creed, sex, disability, or military status as defined in section 4112.01 of the Revised Code, or color, shall discriminate against any and all employees and applicants for employment. In addition, Bidders shall comply with equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630 and 41 CFR 60) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The Equal Opportunity Construction Contract Specifications set forth under 41 CFR 60-4.3 and the provisions of the American Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract.

The Board of County Commissioners of Hamilton County, Ohio reserves the right to reject any or all bids, to waive any irregularities or informalities in bidding, and to withhold final awarding of the contract for sixty (60) days after the opening of bids.

**THE BOARD OF COUNTY COMMISSIONERS**

Stephanie Summerow Dumas, President  
Alicia Reece, Vice President  
Denise Driehaus

Jeffrey Aluotto, County Administrator  
Holly Christmann, Assistant County Administrator

The Banks, Lot 28, Phase 3C BP#2  
Park & Garage  
December 27, 2021



# Instructions to Bidders

AIA Document A701 – 1997  
1997 Edition – Electronic Format

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This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification. AUTHENTICATION OF THIS ELECTRONICALLY DRAFTED AIA DOCUMENT MAY BE MADE BY USING AIA DOCUMENT D401.

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## TABLE OF ARTICLES

1. DEFINITIONS
2. BIDDER'S REPRESENTATIONS
3. BIDDING DOCUMENTS
4. BIDDING PROCEDURES
5. CONSIDERATION OF BIDS
6. POST-BID INFORMATION
7. PERFORMANCE BOND AND PAYMENT BOND
8. FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR
9. ADDITIONAL REQUIREMENTS

## AMENDED AND MODIFIED FORM OF INSTRUCTIONS TO BIDDERS

**Revised Form Indicates  
Changes From Standard  
AIA Document A701 – 1997  
(As Amended and Modified)**

## INSTRUCTIONS TO BIDDERS

### ARTICLE I DEFINITIONS

- 1.1 Bidding Documents include the Bidding Requirements and the Contract Documents. The Bidding Requirements consist of the Advertisement or Invitation to Bid, Instructions to Bidder, the bid form and other sample bidding and contract forms. The Contract Documents consist of the form of agreement between the Owner and Contractor specified in Paragraph 8.1 hereof, the General Conditions, the Drawings and Specifications, and all amendments, modifications and addenda to any of the foregoing.
- 1.2 Definitions set forth in the General Conditions and in other Contract Documents are applicable to the Bidding Documents.
- 1.3 As used herein, "Addendum" or "Addenda" are written or graphic instruments issued by the Architect or Construction Manager prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.
- 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents. The word "proposal" is used interchangeably with the word "bid".
- 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids.
- 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.
- 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.
- 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.
- 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment or labor for a portion of the Work.
- 1.10 The term "Median Bid" shall be interpreted as the Bid where an equal number of all other Bids are higher and lower than said Bid. In the event of an even number of Bids, the "Median Bid" shall be the average of the two Bids where an equal number of all other Bids are higher and lower than the two said Bids.

### ARTICLE 2 BIDDER'S REPRESENTATIONS

- 2.1 The Bidder, by making a Bid, represents that:
- 2.1.1 The Bidder has read and understands the Bidding Documents and the Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and for other portions of the Project, if any, being bid concurrently or presently under construction.
- 2.1.2 The Bid is made in compliance with the Bidding Documents.

2.1.3 The Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents.

2.1.3.1 A pre-bid meeting will be held as noted in the Advertisement for Bids. All Bidders are strongly urged to attend the pre-bid meeting, but attendance is not a mandatory prerequisite to bidding. However all Bidders are required to visit the Site prior to Bid date to thoroughly familiarize themselves with existing conditions affecting the Work.

2.1.4 The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

## **2.2 BID PREPARATION COST**

2.2.1 Any and all cost associated with the preparation and submittal of the bid shall be the sole responsibility of the Bidder. The Bidder must certify that the bid and pricing will remain in effect for the duration specified. All materials submitted in response to the ITB will become the property of Owner and may be returned only at Owner's option and at the Bidder's expense.

## **ARTICLE 3 BIDDING DOCUMENTS**

### **3.1 COPIES**

3.1.1 Refer to the Advertisement for Bids for procedure for procurement of Bidding Documents.

3.1.2 Bidding Documents will be issued to anyone registering their interest in the process. Sub-bidders may register with the Owner.

3.1.3 Bidder shall use complete sets of Bidding Documents in preparing Bids; neither the Construction Manager, the Owner, the Development Manager nor the Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

3.1.4 The Construction Manager, Owner, Development Manager and/or Architect may distribute copies of the Bidding Documents on the terms set forth in this Section 3.1 for the purpose of obtaining Bids on the Work. No license or right of use is conferred by such issuance of copies of the Bidding Documents.

### **3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS**

3.2.1 The Bidder shall carefully study and compare the various Bidding Documents, shall compare the Bidding Documents with other work being bid concurrently or presently under construction, to the extent it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall immediately report to the Construction Manager all errors, inconsistencies or ambiguities discovered.

3.2.2 Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall submit a written request to the Construction Manager and Owner at least 10 days prior to the date for receipt of Bids.

3.2.3 Interpretations corrections and changes of the Bidding Documents will be made by Addendum. Interpretations, corrections and changes of to Bidding Documents made in any other manner will not be binding, and Bidder shall not be entitled to rely upon them.

### **3.3 SUBSTITUTIONS**

3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.



3.3.2 Awards will be based on the lowest and best bids.

3.3.3 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

#### **3.4 ADDENDA**

3.4.1 Addenda will be transmitted to all parties known by the issuing office to have received a complete set of Bidding Documents.

3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are maintained for inspection purposes.

3.4.3 The bid for which the award is to be made will be opened at the time and place named in the Advertisement for Bids, unless extended by the Owner or its representative or unless, within seventy two hours prior to the published time for the opening of Bids, excluding Saturdays, Sundays, and legal holidays, any modification of the Bidding documents for the Work for which Bids are solicited is issued and mailed or otherwise furnished to persons who have obtained Bidding Documents for the Work, for which the time for opening of Bids shall be extended one week, with no further advertising of Bids required. (Note: Proof of receipt of addendum by bidders shall be "fax" date/time indication if addendum is "faxed", or return receipt if addendum is sent by any other means.)

3.4.4 Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge such receipt in the Bid.

3.4.5 Changes by addenda:

- .1 Addenda will be issued for corrections, revisions and clarifications of Contract Documents prior to bidding.
- .2 Requests for corrections, revisions and clarifications of Contract Documents may be considered by Architect and Construction Manager prior to bid date, and if acceptable to Architect and Construction Manager, may be included in addenda. Bidders are required to submit requests for corrections, revisions and clarifications of Contract Documents to Construction Manager and Owner in writing so as to be received by Construction Manager not less than 10 days prior to bid date to permit Construction Manager and Architect adequate time for consideration of request.

### **ARTICLE 4 BIDDING PROCEDURES**

#### **4.1 PREPARATION OF BIDS**

4.1.1 Bids shall be submitted on the forms included with the Bidding Documents.

4.1.2 All applicable blanks on all bid forms shall be legibly executed in a non-erasable print medium.

4.1.3 Sums shall be expressed in both words and figures. In case of discrepancy, the amount written in words shall govern.

4.1.4 Interlineations, alterations and erasures must be initialed by the signer of the Bid.

4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change." Failure to bid an Alternate shall be cause for rejection of entire Bid only if said Alternate is accepted by Owner.

4.1.6 Bidders may bid on more than one Bid item. Bidders submitting Bids on several Bid items are requested to submit each separate Bid item in a separate envelope in order to expedite the Bid opening and recording process.

AIA DOCUMENT A701 – INSTRUCTIONS TO BIDDERS - AIA COPYRIGHT 1997 – THE AMERICAN INSTITUTE OF ARCHITECTS, 1735 NEW YORK AVENUE N.W., WASHINGTON D.C., 20006-5292. WARNING: Unlicensed photocopying violates U.S. copyright laws and will subject the violator to legal prosecution. This document was electronically produced by AIA software under Order No. 1000343138\_1 which expires on 2/12/2009, and is not for resale.

User Notes:

(2776861191)

4.1.7 Each copy of the Bid shall state the legal name of the Bidder, and, if the Bidder is an entity, the type of entity and state of organization of the Bidder. The Bidder shall provide evidence of legal authority to perform work within the jurisdiction of the Work. Each copy of the Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid submitted by an authorized agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

4.1.8 Bidders shall fill in where indicated on Bid Form names of manufacturers on which Bidder's bid was based. Failure to list manufacturer shall be cause for rejection of Bidder's Bid.

#### **4.2 BID SECURITY**

4.2.1 Each Bid shall be accompanied by a bid security in the form and amount required in Article 9.4 herein. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will furnish bonds guaranteeing the Bidder's faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty.

4.2.2 Form of Bid security shall be as described in Article 9.4.

4.2.3 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until the later of (a) execution of the Contract and furnishing of satisfactory payment and performance bonds by Bidder, (b) the expiration of the time period permitted for withdrawal of Bids and (c) rejection of all Bids by Owner.

#### **4.3 SUBMISSION OF BIDS**

4.3.1 All copies of the Bid, the bid security and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

4.3.2 All Bids are to be delivered to the location designated in the Bidding Documents prior to the time and date specified in the Bidding Documents for receipt of Bids. Bids received late will be returned unopened.

4.3.3 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

4.3.4 Oral, telephonic, telegraphic, facsimile or other electronically transmitted Bids will not be considered.

#### **4.4 MODIFICATION OR WITHDRAWAL OF BID**

4.4.1 Except as provided in Article 5.2.1, a Bid may not be modified, withdrawn or canceled by the Bidder at any time after the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting a Bid.

4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing and signed by the Bidder. Each such notice shall be date- and time-stamped by the receiving party when received to acknowledge receipt thereof. Any modification of the Bid shall be worded so as not to reveal the amount of the original Bid.

4.4.3 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids, provided that they are then fully in conformance with the requirements of the Bid Documents.

4.4.4 Bid security shall be in an amount sufficient for the Bid as resubmitted.

## **ARTICLE 5 CONSIDERATION OF BIDS**

### **5.1 OPENING OF BIDS**

At the discretion of the Owner, if stipulated in the Advertisement or Invitation to Bid, all Bids which comply with the requirements of the Bidding Documents will be publicly opened and will be read aloud. An abstract of the Bids may be made available to Bidders.

### **5.2 REJECTION OF BIDS**

The Owner shall have the right to reject any or all Bids. A Bid not accompanied by the required bid security or by other data required by the Bidding Documents as determined by the Owner shall be rejected. A Bid which is in any way irregular, but which otherwise conforms to the requirements of the Bidding Documents, is subject to rejection as determined by the Owner.

#### **5.2.1 Errors in Bids:**

- .1 In the event that a Bidder's Bid is substantially lower than the other Bids for the same work, and the Bidder wishes to withdraw its Bid, and the Bid was submitted in good faith, and the reason for the Bid amount being substantially lower was a clerical error as opposed to a judgment error, and was actually due to an unintentional and substantial arithmetic error, or an unintentional omission of a substantial quantity of work, labor or material made directly in the compilation of the Bid, the Bidder shall submit to the Construction Manager and Owner in writing, within two business days (48 business-day hours) after the time of Bid opening stated in the Bidding Documents a written request for consideration of withdrawal of its Bid.
- .2 After due consideration of the bidding error, the Owner may, at his discretion, permit withdrawal of the Bid.

### **5.3 ACCEPTANCE OF BID (AWARD)**

5.3.1 Unless Owner rejects all Bids, Contracts will be awarded as soon as practicable after opening of Bids. In determining lowest and best Bidder, the following elements and factors will be considered in addition to Bid amount:

- .1 Bidder's performance on publicly funded projects.
- .2 Bidder has adequate equipment and facilities to perform the Work properly and expeditiously.
- .3 Bidder has suitable financial status to meet obligations incident to the Work.
- .4 Bidder's satisfactory compliance with the requirements set forth in the Joint Policy located in Section 008260 of the Project Manual and the County Small Business Enterprise (SBE) program.
- .5 Bidder's satisfactory compliance with the requirements set forth in the Responsible Bidder Requirements Applicable to Public Contracts.
- .6 Bidder has appropriate technical experience in projects of similar scope and conditions.
- .7 Bidder can complete the Work in timely and expeditious manner.
- .8 Bidder's satisfactory compliance with the requirements set forth in Article 7 herein.
- .9 Bidder's satisfactory completion and submission of the Bid Submission Documents outlined in Article 9.2.

Owner reserves unrestricted privilege to reject any, part of any, or all of Bids received and to waive any informalities in bidding.

5.3.2 The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the lowest and best Bid on the basis of the sum of the base Bid and Alternates accepted.

- .1 Owner reserves unrestricted privilege to reject any, part of any, or all of bids received and to waive any informalities in bidding.

5.3.3 No Contract will be awarded if the low Bidder for that Contract is more than 15% below the Median Bid (as defined in 1.10 herein) unless, the following procedure is followed:

- .1 Construction Manager and Architect will hold interview with the Bidder to determine what, if anything, has been overlooked in the Bid in question, and to analyze the process envisioned by the Bidder to complete the Contract.
- .2 The financial status of the Bidder and its Surety shall be examined, based upon certified financial statements submitted by each to the Construction Manager.
- .3 Written confirmation by the Surety shall be submitted to the Construction Manager that it has reviewed the Bid in question and finds it to be in compliance with Contract Documents.
- .4 Bidders may be required to furnish satisfactory evidence of their experience and ability to execute work of like character, scope and size to that of the Work.
- .5 The record of the Bidder in performing other publicly funded projects in the past will be considered.
- .6 If after review and consideration, the acceptance of the lowest Bid is not in the best interest of the Owner may accept another Bid so opened or reject all Bids and advertise for other Bids.

5.3.4 Owner reserves unrestricted privilege to reject any, part of any, or all of bids received and to waive any informalities in bidding.

5.3.5 No Bid nor any obligation hereunder to be assumed by the Owner, shall be considered as accepted until such time as the Owner, or Owner's representative, may deposit in U.S. Mail, or hand to Bidder personally, written notice addressed to Bidder at address given on Bid of acceptance of Bid."

## **ARTICLE 6 POST-BID INFORMATION**

### **6.1 POST-BID/PRE-AWARD MEETING**

6.1.1 Bidder shall be required to attend a post-bid, pre-award meeting with the Construction Manager, Architect and Development Manager, as described in Section 9.3.

### **6.2 SUBMITTALS**

6.2.1 The Bidder will be required to establish to the satisfaction of the Architect and Construction Manager the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

6.2.2 Persons and entities proposed by the Bidder and to whom neither the Construction Manager nor the Architect have made reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Construction Manager and Architect.

## **ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND**

### **7.1 BOND REQUIREMENTS**

7.1.1 The Bidder shall furnish bonds in compliance with Article 9.4 herein, covering the faithful performance of the Contract and payment of all obligations arising thereunder. Bonds may be secured through the Bidder's usual sources.

7.1.2 The cost of Bidder's Bid Guarantee and Contract Bond shall be included in the Bid.

## **ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR**

8.1 Successful Bidder shall promptly enter into Contract with the Owner. Contract Form shall be "Standard Form of Agreement Between Owner and Construction Manager," AIA Document A132, as modified by Owner, a draft of which is included in the Project Manual. The final Agreement shall be provided at award of Contract by the Board of County Commissioners.

8.2 Owner will issue a Notice to Proceed for each Trade Contract.

## **ARTICLE 9 ADDITIONAL REQUIREMENTS**

9.1 Number of copies of Bid: Each Bidder shall submit an original and four (4) copies of the Bid.

9.2 Required attachments to Bid: The following attachments completed and signed as required shall be submitted with each copy of the Bid (the "Bid Submission Documents"):

- .1 Bid Form.
- .2 Bid Guaranty and Contract Bond or certified check, cashier's check drawn on a solvent bank or irrevocable letter of credit as set forth in Article 9.4 herein.
- .3 For Bid Guaranty and Contract Bond, submit Certificate from the State of Ohio Department of Insurance demonstrating that bonding agent is licensed to do business in the State of Ohio. (Refer to sample form bound into Project Manual.)
- .4 For Bid Guaranty and Contract Bond, submit credentials showing proper power of attorney for the attorney-of-fact of the Surety.
- .5 Non-Collusion Affidavit of Bidder.
- .6 Personal Property Tax Statement.
- .7 Subcontractor and Material Supplier List.
- .8 Warranty Against Unresolved Findings for Recovery.
- .9 Not Used
- .10 Bidder's Certification Concerning Equal Employment Opportunity Requirements.
- .11 SBE Subcontractor Utilization Plan
- .12 Bidder's Responsible Bidder Certification.
- .13 County Registration Form.
- .14 Not Used
- .15 Not Used

9.3 Execution of Contract: Subsequent to and within seven calendar days of pre-award meeting by Construction Manager, the successful Bidders shall return signed Contracts and required submittals to Construction Manager.

### **9.4 Bid Guaranty and Contract Bond**

- .1 Each Bidder shall submit with their bid a Bid Guaranty in the form of either (a) combined Guaranty and Contract Bond, or (2) a certified check, cashier's check drawn on a solvent bank, or an irrevocable letter of credit. If a Bid Guaranty and Contract Bond is submitted with the bid, it shall be for the full amount of the Bidder's base bid, including any alternates. If a certified check, cashier's check or irrevocable letter of credit is submitted, it shall be in the amount of 10% of the bid amount including Base Bid and Alternates. If a certified check, cashier's check or irrevocable letter of credit is submitted, it shall be payable to the Board of County Commissioners of Hamilton County, Ohio. The Bid Guaranty, in either form, must be in strict compliance with section 153.54 of the Ohio Revised Code, and also Sections 153.57 or 153.571, as applicable. The Board of County Commissioners of Hamilton County, Ohio and Messer Construction Company shall be named as Obligees on the Bid Guaranty and Contract Bond. No other form of bond is acceptable for use as a bid guaranty.
- .2 If the Bid Guaranty and Contract Bond is submitted, the requirements of Section 3905.41 of the Ohio Revised Code may be applicable to require the Bid Guaranty and Contract

Bond to be countersigned by an Ohio resident agent. It is the duty of the Bidder to determine the applicability of Section 3905.41. NONCOMPLIANCE WITH SECTION 3905.41 WILL CAUSE THE BIDDER'S BID TO BE REJECTED. The Board of County Commissioners of Hamilton County, Ohio and Messer Construction Company shall be named as Obligees on the Bid Guaranty and Contract Bond.

- .3 Bid Guaranty and Contract Bond shall be supported by credentials showing the power of attorney for the attorney-of-fact of the bonding agent.
- .4 If the Bid Guaranty and Contract Bond penal sum is left blank by the Bidder, the penal sum of Bid Guaranty and Contract Bond will be the full amount of the Bidder's Base Bid (plus accepted Alternates for Bid Packages that include Alternates). If completed, the penal sum amount shall be not less than the full amount of the Bidder's Bid and all accepted Alternates stated in dollars and cents. A percentage amount in the Bid Guaranty and Contract Bond is NOT acceptable and shall be rejected.
- .5 Bid Guaranties will be returned to all unsuccessful Bidders immediately after Contract is executed.
- .6 The certified check, cashier's check drawn on a solvent bank or irrevocable letter of credit will be returned to the successful Bidder upon filing of the bond required in Division (C), Section 153.54 of the Ohio Revised Code.
- .7 For successful Bidders who have submitted the Bid Guaranty and Contract Bond as bid guaranty, the Contract Bond is the Bid Guaranty and Contract Bond; no other form of Contract Bond is required. For successful Bidders who have submitted a certified check, cashier's check drawn on a solvent bank or irrevocable letter of credit as bid guaranty in compliance with this Article 9.4, the Contract Bond shall be the Contract Bond set forth in Section 006100 of this Project Manual in compliance with Ohio Revised Code Sections 153.54(C) and 153.57. The Contract Bond shall be fully executed and supported by credentials showing the power of attorney for the attorney-of-fact of the bonding agent. Costs of bonds shall be included in all bids.

DOCUMENT 001000.3  
ADDITIONAL BID CONDITIONS

PART 1 GENERAL

1.01 SUMMARY

- A. The contracting practices used for this project shall conform to the Joint Policy for Small Business Enterprise, Economic Inclusion and Workforce Development for the Banks Project (the “Joint Policy”).
- B. The following documents contain additional bid conditions and are supplemental to and an integral part of the “Instructions to Bidders”:
  - 1. Special Provision – Joint Policy for Small Business Enterprise, Economic Inclusion and Workforce Development for the Banks Project (Although this is a Hamilton County only Project, the County is still utilizing the Joint Policy terms set forth the Joint Policy for Small Business Enterprise included within the Project Manual and the Bid Documents).
  - 2. Special Provision – Responsible Bidder Requirements Applicable to Public Contracts
  - 3. SBE Forms, 2003, 2007, and 2007-a are to be submitted with bid.
  - 4. The Contractor’s Non-discrimination Policy also must be submitted with bid.
- C. Small Business Enterprise (“SBE”) Participation Goal: Hamilton County (“Public Parties”), in conjunction with the project’s Construction Manager, will establish SBE participation goals for project contracts in accordance with the Joint Policy. The goal related to each contract may differ from the goals of other contracts because of the availability of SBEs or other factors. The Public Parties encourage the participation of SBEs, directly and indirectly, in contracts and procurements related to the Banks Project. Contractors awarded such contracts are encouraged to engage or use SBEs as subcontractors and/or suppliers.

The SBE participation goal for each contract of this bid package is listed below and is expressed in terms of a percentage of the total dollar value of such contract.

SBE Participation Goal - 30%

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END

**Document 001000.4**

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**BID FORM**

---

**ACKNOWLEDGMENT OF BIDDER:**

Submitted by: \_\_\_\_\_  
*(enter company name here)*

TO:           The Board of County Commissioners, Hamilton County, Ohio  
              Hamilton County Purchasing Department  
              Room 507, County Administration Building  
              138 East Court Street  
              Cincinnati, Ohio 45202

We, the undersigned, having visited the site, carefully studied the local conditions affecting the cost of the work, and having thoroughly examined the Bidding Documents, consisting of the Instructions to Bidders, this Proposal Form, Bonding Requirements, Contract Form, General and Supplementary Conditions, Technical Specifications, Drawings, and Addenda for the Project titled:

**The Banks, Phase 3C  
Bid Package #2– Park & Garage  
TC-03 Concrete Structure and Site Concrete  
TC-04 Park Finishes**

Prepared by THP Limited, Inc., 100 East Eight Street, Cincinnati, Ohio 45202, for the Board of County Commissioners, Hamilton County, Ohio, do hereby propose to perform all work required to be performed, and to provide and furnish equipment, transportation services, and temporary installations necessary to perform and complete, in a workmanlike manner, such items of work hereinafter designated by and for the sum of money set forth for said items.

**ACKNOWLEDGMENT OF ADDENDA:**

The undersigned acknowledges receipt of the following Addenda to the Contract documents (indicate Addendum Number and Issue Date):

Addendum No. _____	Date: _____	Page(s): _____
Addendum No. _____	Date: _____	Page(s): _____
Addendum No. _____	Date: _____	Page(s): _____
Addendum No. _____	Date: _____	Page(s): _____
Addendum No. _____	Date: _____	Page(s): _____
Addendum No. _____	Date: _____	Page(s): _____



**A. BIDDER AGREEMENTS:**

The undersigned Bidder Agrees:

1. To accept the provisions of these Instruction to Bidders, General Conditions, Supplementary Conditions and Division 1 of the Specifications.
2. To provide and include a Bid Guaranty and Contract Bond as dictated in the Legal Advertisement.
3. That the amounts stated in this Proposal Form represents the entire cost of the work. The completion time stated represents the entire time for performance of the work. The amount bid includes allowances for all fees for permits, taxes and insurance required or applicable to the work. That no claims will be made for any increases in wage scales or material costs.
4. To certify that this bid is genuine not sham or collusive or made in the interest or in behalf of any person not herein named, and that the undersigned has not directly or indirectly induced or solicited any other bidder to put in a sham bid, or any other person, firm or corporation to refrain from bidding and that the undersigned bidder has not in any manner sought by collusion to secure for himself and advantage over any other bidder.
5. And certifies that (we) (he) (they) (has) (have not) previously performed work subject to the President's Executive Order No. 11246.
6. That this bidder will comply with all City, State, and Federal Statutes relating to Liability Insurance, Working Hours, Minimum Wages, Safety and Sanitary Regulations, which in any way may affect those engaged or employed on the work in the event that the award of the Contract is made on the Proposal herein submitted.
7. That the bidder will comply with any new laws or acts regulating public buying procedures.
8. Refer to additional instructions for bidder registration process (See Article 9 in Supplementary Instructions to Bidders).

**BID FORM STIPULATIONS:**

1. The wording of this proposal shall be used throughout, without damage, alteration, or addition. Any change in wording may cause it to be rejected.
2. Include all required forms.
3. Bid amounts shall be provided in both words and figures. The worded amount shall govern in the case of discrepancies or in cases of error in extending the total amount of the bid, the unit price may govern.
4. In the event that qualified bidders submit equal bids (to the penny) and are deemed the lowest and best bidders for that trade's bid, those bidders agree to let the County award the contract to the bidder selected by the current "tied bid" procedures used by the Hamilton County Purchasing Department.
5. The Board of County Commissioners reserves the right to reject any or all bids and, unless otherwise specified by the bidder, to accept any item in the bid.

**C. ALLOWANCES:**

The County may after the bids are opened add an allowance to the contract at its own discretion. This allowance shall be added to the contract and so denoted in the contract in section 7.6. Any allowances added by the County shall be for incidentals associated with this project. If unused, during the project all allowance monies shall be returned to the County at the end of the project or at the County's request.

A. General:

1. Work related to cash allowances will be performed on a time and material basis. The Contractor shall furnish and certify daily detail records of all labor and materials provided.
2. If the cost to complete the work is less than the cash allowance, a deduct Change Order will be prepared by the County for the cost difference.

B. Cash Allowance Items:

1. Trade Contract TC-03 Cash Allowance No. 1: \$50,000
2. Trade Contract TC-04 Cash Allowance No. 2: \$100,000

**D. AWARDING:**

The selection process includes but is not limited to:

1. The results of the evaluation where Hamilton County selects a bidder(s) who it determines to be the Lowest and Best Bidder(s) meeting all required specifications.
2. The Lowest and Best determination shall be based on the Base Bid first then any accepted Alternates. Accepted Alternates must not exceed the published estimate by 10% or the current Ohio Revised Code stipulation for public bidding.
3. A Base Bid must be submitted prior to bidding any Alternate bids. If a bidder does not bid all of the alternates, unit prices or options the County may still consider the proposal and judge it equally to determine which proposal is Lowest and Best and in the best interest of the County.
4. Substitutions not approved prior to the bid opening cannot be used in the determination of the Lowest and Best bid determination.
5. If Hamilton County and the bidder are unable to successfully come to terms regarding the bid and the subsequent contract, Hamilton County reserves the right to terminate contract discussions with the bidder(s) and select the next apparent low bidder.

Hamilton County reserves the right to:

1. Reject any or all bids.
2. Waive any informality in the bids.
3. Eliminate conditions or terms that are not in the best interest of Hamilton County and its residents.

**E. ADDITIONAL BID REQUIREMENTS:**

The Bidder is instructed to review the “Summary of Work” for information on “Time of Completion”, “Work Hours”, “Permits” and “Prime and Sub-Contractors Assignments”. The “General Conditions” and “Supplementary Conditions” for information on “Asbestos” and the “Legal Advertisement” for information on “Pre-Bid Meetings”.

**F. BID PROPOSALS:**

Bidder's Name: \_\_\_\_\_

Each bidder is required to fill out all entries in the proposal section. Enter "NO BID" where no bid will be entered for this proposal.

<b>BASE BID</b>	
<b>TC-03 CONCRETE STRUCTURE AND SITE CONCRETE</b>	
<b>TOTAL COST</b>	<b>LUMP SUM</b>
Includes Cash Allowance No. 1 \$50,000	<b>\$</b>
<i>(enter amount in words)</i>	<i>(enter amount in numbers)</i>

*For reference only provide a breakdown of the total prices listed in the Base Bid. This breakdown is solely a reference tool to be used by the County and shall not enter into the determination of the winning bidder for this project. The summation of the lines below should equal your total price listed above.*

Base Bid Material:        \$ \_\_\_\_\_ *(in numbers)*

Base Bid Labor:         \$ \_\_\_\_\_ *(in numbers)*

Base Bid Allowance:    \$ \_\_\_\_\_ *(in numbers)*

<b>BASE BID TC-04 PARK FINISHES</b>	
<b>TOTAL COST</b>	<b>LUMP SUM</b>
Includes Cash Allowance No. 2 of \$100,000	\$
<i>(enter amount in words)</i>	<i>(enter amount in numbers)</i>

*For reference only provide a breakdown of the total prices listed in the Base Bid. This breakdown is solely a reference tool to be used by the County and shall not enter into the determination of the winning bidder for this project. The summation of the lines below should equal your total price listed above.*

Base Bid Material:       \$ \_\_\_\_\_ *(in numbers)*  
 Base Bid Labor:         \$ \_\_\_\_\_ *(in numbers)*  
 Base Bid Allowance:     \$ \_\_\_\_\_ *(in numbers)*

<b>COMBINATION BID TC-03 CONCRETE STRUCTURE AND SITE CONCRETE; TC-04 GENERAL TRADES</b>	
<b>TOTAL COST</b>	<b>LUMP SUM</b>
Includes Cash Allowance No.1 of \$50,000 and Cash Allowance No. 2 of \$100,000 (\$Total Cash Allowance -\$150,000)	\$
<i>(enter amount in words)</i>	<i>(enter amount in numbers)</i>

TC-03 Base Bid Material:   \$ \_\_\_\_\_ *(in numbers)*  
 TC-03 Base Bid Labor:     \$ \_\_\_\_\_ *(in numbers)*  
 TC-03 Base Bid Allowance: \$ 50,000 *(in numbers)*  
  
 TC-04 Base Bid Material:   \$ \_\_\_\_\_ *(in numbers)*  
 TC-04 Base Bid Labor:     \$ \_\_\_\_\_ *(in numbers)*  
 TC-04 Base Bid Allowance: \$ 100,000 *(in numbers)*  
  
 TC-03 & TC-04 Total Cost : \$ \_\_\_\_\_ *(in numbers)*

The Banks – Lot 28 BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

Bidder's Name:

All Prime Contractors hereby acknowledge and accept all responsibilities assigned to them by the General Conditions, Supplementary General Conditions, and Division One. All fees for supervision and coordination are included in the bids.

Bids submitted by virtue of this Proposal hereby are acknowledged by the Owner to be made under the conditions that the Bidder will not be prevented, on account of strikes or other disruptions affecting source of supply, from obtaining materials necessary to carry out his contract to complete the construction covered thereby.

It is understood and agreed by the undersigned that the Owner reserves the right to reject any and all bids.

It is agreed that this Proposal shall be irrevocable for a period of Sixty (60) days after receipt of same by the Owner at the Day and Place set forth in the "Legal Advertisement".

[ ] We have read and agree to the terms listed above.  
(check here)

Firm Name:

Corporation  Partnership  Sole Proprietorship (check one)

Authorized Offerror (print name):

Authorized Signature (sign name):

Title:

Official Address:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

E-mail Address:

Telephone Number:

**Bid Submission  
Documents**

DOCUMENT 001000.5  
BID GUARANTY AND CONTRACT BOND

(SECTION 153.571 OHIO REVISED CODE)

KNOWN ALL MEN BY THESE PRESENTS, that the undersigned

---

(Name and Address)

as Principal and \_\_\_\_\_

(Name of Surety)

as Surety, are hereby held and firmly bound unto the Board of County Commissioners of Hamilton County, Ohio, and Messer Construction Company as Obligees, in the penal sum of the dollar amount of the bid submitted by the Principal to the Obligee on

\_\_\_\_\_

to undertake the project known as: \_\_\_\_\_

The penal sum referred to herein shall be the dollar amount of the Principal's bid to the Obligee, incorporating any additive or deductive alternate proposals made by the Principal on the date referred to above to the Obligee, which are accepted by the Obligee. In no case shall the penal sum exceed the amount of

\_\_\_\_\_ dollars (\$\_\_\_\_\_).

(If the above line is left blank, the penal sum will be the full amount of the Principal's Bid, including alternates. Alternatively, if completed, the amount stated must not be less than the full amount of the bid, including alternates, in dollars and cents. A percentage is not acceptable.) For the payment of the penal sum well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that whereas the above named Principal has submitted a bid on the above referred to project;

NOW, THEREFORE, if the Obligee accepts the bid of the Principal and the Principal fails to enter into a proper contract in accordance with the bid, plans, details, specifications, and bills of material; and in the event the Principal pays to the Obligee the difference not to exceed ten percent of the penalty hereof between the amount specified in the bid and such larger amount for which the Obligee may in good faith contract with the next lowest bidder to perform the work covered by the bid; or in the event the Obligee does not award the contract to the next lowest bidder and resubmits the project for bidding, the Principal will pay the Obligee the difference not to exceed ten percent of the penalty hereof between the amount specified in the bid, or the costs, in connection with the resubmission, of printing new contract documents, required advertising and printing and mailing notices to prospective bidders, whichever is less, then this obligation shall be void, otherwise to remain in full force and effect. If the Obligee accepts the bid of the Principal and the Principal within ten days after the awarding of the contract, enters into a proper contract in accordance with the bid, plans, details, specifications, and bills of material, which said contract is made a part of this bond the same as though set forth herein; and

IF THE SAID Principal shall well and faithfully perform each and every condition of such contract; and indemnify the Board of County Commissioners of Hamilton County, Ohio, against all damage suffered by failure to perform such contract according to the provisions thereof and in accordance with the plans, details, specifications, and bills of material therefor; and shall pay all lawful claims of subcontractors, materialmen, and laborers, for labor performed and materials furnished in the carrying forward, performing, or completing of said

contract; we agreeing and assenting that this undertaking shall be for the benefit of any materialman or laborer having a just claim, as well as for the Obligee herein; then this obligation shall be void; otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

THE SAID Surety hereby stipulates and agrees that no modifications, omissions, or additions, in or to the terms of said contract or in or to the plans specifications therefore shall in any wise affect the obligations of said Surety on this bond, and it does hereby waive notice of any such modifications, omissions or additions to the terms of the contract or to the work or to the specifications.

The Surety shall not be liable to the Primary Obligee, the Additional Obligees, or any of them, unless the Primary Obligee, the Additional Obligees, or any of them shall make payments to the Principal (or in the case the Surety arranges for completion of the Contract to the Surety) strictly in accordance with the terms of said Contract as to payments and shall perform all other obligations to be performed under said Contract at the time and in the manner therein set forth; and

PROVIDED, FURTHER that the aggregate liability of the Surety under said Bond to any or all of the Obligees, as their interests may appear, is limited to the penal sum of said Bond, and that the Additional Obligees' rights hereunder are subject to the same defenses Principal and/or Surety have against the Primary Obligee, and that the total liability of the Surety shall in no event exceed the amount recoverable from the Principal by the Primary Obligee under said Contract.

SIGNED AND SEALED This \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

PRINCIPAL:

\_\_\_\_\_

BY: \_\_\_\_\_

TITLE: \_\_\_\_\_

SURETY: \_\_\_\_\_

BY: \_\_\_\_\_

*Attorney-in-Fact*

Approved \_\_\_\_\_, 20\_\_\_\_

BOARD OF COUNTY COMMISSIONERS  
HAMILTON COUNTY, OHIO

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

SURETY COMPANY ADDRESS:

\_\_\_\_\_ Street

\_\_\_\_\_ City State Zip

\_\_\_\_\_ Telephone

SURETY AGENTS ADDRESS:

\_\_\_\_\_ Agency Name

\_\_\_\_\_ Street

\_\_\_\_\_ City State Zip

\_\_\_\_\_ Telephone

NOTE: Failure by any party to sign Bid Guaranty and Contract Bond shall result in rejection of Bid.

**Bid Submission Documents  
Complete & Submit With Bid**

DOCUMENT 001000.6  
CERTIFICATE OF COMPLIANCE

STATE OF OHIO  
DEPARTMENT OF INSURANCE

As **DIRECTOR OF INSURANCE OF THE STATE OF OHIO**, I do hereby certify the \_\_\_\_\_, a corporation located at \_\_\_\_\_ in the State of \_\_\_\_\_, has complied in all respects with the laws of this State applicable to it, and is authorized to transact in this State its appropriate business of insurance as described by Section 3929.01 (A), lines:

- |                          |     |   |                          |    |                       |
|--------------------------|-----|---|--------------------------|----|-----------------------|
| <input type="checkbox"/> | 1   | Fire  | <input type="checkbox"/> | 18 | Aircraft (all perils) |
| <input type="checkbox"/> | 2   | Allied Lines  | <input type="checkbox"/> | 19 | Fidelity              |
| <input type="checkbox"/> | 3   | Farmowners Multiple Peril   | <input type="checkbox"/> | 20 | Surety                |
| <input type="checkbox"/> | 4   | Homeowners Multiple Peril   | <input type="checkbox"/> | 21 | Glass                 |
| <input type="checkbox"/> | 5   | Commercial Multiple Peril   | <input type="checkbox"/> | 22 | Burglary & Theft      |
| <input type="checkbox"/> | 6   | Ocean Marine  | <input type="checkbox"/> | 23 | Boiler & Machinery    |
| <input type="checkbox"/> | 7   | Inland Marine   | <input type="checkbox"/> | 24 | Credit                |
| <input type="checkbox"/> | 8   | Financial Guaranty  | <input type="checkbox"/> | 25 | Reinsurance Only      |
| <input type="checkbox"/> | 9   | Medical Malpractice   | <input type="checkbox"/> | 26 | Other (List)          |
| <input type="checkbox"/> | 10  | Earthquake  |                          |    |                       |
| <input type="checkbox"/> | 11  | Group A & H   |                          |    | _____                 |
| <input type="checkbox"/> | 12  | Credit A & H (Group & Individual)   |                          |    |                       |
| <input type="checkbox"/> | 13a | Collectively Renewable A & H  |                          |    | _____                 |
| <input type="checkbox"/> | 13b | Noncancellable A & H  |                          |    |                       |
| <input type="checkbox"/> | 13c | Guaranteed Renewable A & H  |                          |    | _____                 |
| <input type="checkbox"/> | 13d | Nonrenewable for Stated Reasons Only  |                          |    |                       |
| <input type="checkbox"/> | 13e | Other Accident Only   |                          |    |                       |
| <input type="checkbox"/> | 13f | All Other A & H   |                          |    |                       |
| <input type="checkbox"/> | 14  | Workers' Compensation (to the extent permitted by law)                                      |                          |    |                       |
| <input type="checkbox"/> | 15  | Other Liability   |                          |    |                       |
| <input type="checkbox"/> | 16a | Private Passenger Auto No-Fault (personal injury protection to the extent permitted by law) |                          |    |                       |
| <input type="checkbox"/> | 16b | Other Private Passenger Auto Liability  |                          |    |                       |
| <input type="checkbox"/> | 16c | Commercial Auto No-Fault (personal injury protection to the extent permitted by law)        |                          |    |                       |
| <input type="checkbox"/> | 16d | Other Commercial Auto Liability   |                          |    |                       |
| <input type="checkbox"/> | 17a | Private Passenger Auto Physical Damage  |                          |    |                       |
| <input type="checkbox"/> | 17b | Commercial Auto Physical Damage   |                          |    |                       |

FROM: \_\_\_\_\_, 20\_\_\_\_ UNTIL: \_\_\_\_\_, 20\_\_\_\_  
\_\_\_\_\_, 20\_\_\_\_

In witness whereof, I have signed my name and caused my seal to be affixed at Columbus, Ohio, this day and date

\_\_\_\_\_  
*Director of Insurance of Ohio*



Bid Submission Documents  
Complete & Submit With

DOCUMENT 001000.7

**NON-COLLUSION AFFIDAVIT OF CONTRACTOR**

THIS AFFIDAVIT MUST BE FILLED OUT AND EXECUTED BY THE BIDDER; IF THE BID IS MADE BY A CORPORATION, THEN BY ITS PROPERLY AUTHORIZED AGENT

\_\_\_\_\_

**State of Ohio, County of Hamilton, ss.**

\_\_\_\_\_

*(Name of Bidder or Bidders)*

**being duly sworn does depose and say that \_\_\_\_\_ resides**

*(Bidder's Authorized Representative)*

**at \_\_\_\_\_**

*(Address of Bidder)*

**and that \_\_\_\_\_**

*(Give names of all persons, firms or corporations interested in bid)*

**is/are the only person(s) interested with \_\_\_\_\_**

*(Name of Bidder)*

**in the profits of the Contract to be predicated on the within bid; that the said Contract will be performed without any connection or interest in the profits thereof with any other person making any bid or proposal for said work; that said bid, is on \_\_\_\_\_ part, in all**

*(His/Her/Their)*

**respects fair, and without collusion or fraud; and also that no member of the Board of County Commissioners, or any other officer or employee of Hamilton County, is directly or indirectly interested therein.**

**Subscribed and sworn to this \_\_\_\_\_**

**day of \_\_\_\_\_, 20\_\_ before**

\_\_\_\_\_  
*(Signature of Bidder's Authorized Representative)*

**me \_\_\_\_\_**

*(Notary Public)*

\_\_\_\_\_  
*(Print Name of Bidder's Authorized Representative)*

\_\_\_\_\_

*(Address of Bidder)*

Bid Submission Documents  
Complete & Submit With Bid

DOCUMENT 001000.8  
BIDDER'S CERTIFICATION CONCERNING  
EQUAL EMPLOYMENT OPPORTUNITY REQUIREMENTS

1. \_\_\_\_\_ (Name of Bidder) certify that I intend to use the following listed construction trades in the work under the Contract:

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2. The bidder hereby certifies that he **has** ..., **has not** ..., participated in a previous contract or subcontract subject to the equal opportunity clause, as required by Executive orders 10925, 11114, or 11246, and that he **has** ..., **has not** ..., filed with the Joint Reporting Committee, the Director of the Office of Federal Contract Compliance, a Federal Government Contract Compliance, a Federal Government contracting or administering agency, or the former President's Committee on Equal Employment Opportunity, all reports due under the applicable filing requirements. **The Bidder must circle the appropriate "has or has not" above.**

\_\_\_\_\_  
Authorized Representative of Bidder  
Date

On behalf of \_\_\_\_\_  
(Name of Bidder)

Bid Submission Documents  
Complete & Submit With

DOCUMENT 001000.9  
PERSONAL PROPERTY TAX STATEMENT

In accord with Section 5719.042 of the Ohio Revised Code, I hereby certify that the company I represent is not delinquent in payment of personal property taxes to the State of Ohio or any subdivision thereof.

\_\_\_\_\_  
\_\_\_\_\_  
Title

**TO BE COMPLETED BY NOTARY PUBLIC**

On this day, there appeared before me \_\_\_\_\_  
(Print Full Name)

saying that (he) (she) is \_\_\_\_\_ of  
(Print Title)

\_\_\_\_\_ and that (he) (she)  
(Print Name of Company)

understands all of the implications of the above statement and has signed in good faith.

\_\_\_\_\_  
Signature of Notary Public

Seal

\_\_\_\_\_  
Date

Bid Submission Documents  
Complete & Submit With Bid

DOCUMENT 001000.10

SUBCONTRACTOR AND MATERIAL SUPPLIER LIST

Bidder must list below all subcontractors and material suppliers used in compilation of bid. Branches shall be listed in the order appearing in the Project Manual index except as otherwise indicated. Contractor shall list its name for those branches, which it will complete with its own forces.

BRANCH	MATERIAL SUPPLIER AND/OR SUBCONTRACTOR NAME AND ADDRESS
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
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_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

NOTE: This listing is not meant to commit bidder to material suppliers or subcontractors above. If bidder can show just cause at time of awarding Contract that a specific material supplier or subcontractor has withdrawn its bid or raised its bid, bidder may substitute at no additional cost to the County a material supplier or subcontractor upon written approval of the County.

END OF SECTION

## THE BANKS PROJECT Small Business Enterprise Program Summary

DOCUMENT 001000.11

Hamilton County (the “County”) and the City of Cincinnati (the “City”) are committed to maximizing subcontracting and procurement opportunities for all qualified and available small business enterprises (“SBEs”). For this purpose, the County and the City (The “Public Parties”) have established the Banks Small Business Program (the “SBE Program”). The SBE Program requires Contractors to use their “good faith efforts” to facilitate achievement of SBE participation goals.

The requirements of the SBE Program do not apply to individual contracts and/or procurements valued at \$5,000.00 or less. The SBE Program includes the following components:

- **SBE Participation Goal:** This component **encourages** Contractors to make subcontracting opportunities available to small businesses which have been certified as SBEs by the City in order to achieve the percentage SBE participation goal assigned to the related contract as specified in the bid/RFP/RFQ package. To count towards the SBE participation goal, the SBE must be certified in the commodity or service code(s) that will be used on the project. A list of SBEs certified by the City is available on the City’s website at <http://cincinnati.diversitycompliance.com> or from the City’s Office of Contract Compliance (“OCC”).
- **Outreach/Good Faith Efforts.** This component requires Contractors to provide evidence of the outreach efforts made to SBEs in connection with the contracts related to the Banks Project.

All contracts and procurements awarded for the Banks Project, except those for professional services, will be awarded to the “lowest and best” bidder. Therefore, the inability of a Contractor to meet the SBE goals established under the SBE Program will not exclude the Contractor from award of a contract or procurement if the Contractor’s proposal or bid otherwise is deemed by the County and/or the City, as the case may be, to be the “lowest and best bid.” However, a Contractor’s failure to submit a SBE utilization plan with the Contractor’s proposal or bid may result in a determination that the submitted proposal or bid is non-responsive, and rejection of the proposal or bid.

**Pursuant to the SBE Program requirements, the following items are included in the bid/RFP/RFQ package and must be completed, signed and submitted with each submitted proposal or bid; failure to complete these forms with all the requested information may cause a proposal or bid to be determined to be non-responsive:**

1. **Statement of Good Faith Efforts (Form 2007)**
2. **Outreach/Good Faith Summary Sheet (Form 2007-a)**
3. **Subcontractor Utilization Plan (Form 2003)**

***The following forms are included in the proposal or bid invitation package for information purposes only and do not have to be completed or returned with the proposal or bid.***

1. **Form 2004 – Subcontractor Approval Request: (must be completed and submitted to OCC after contract award and prior to commencement of work on the project).**
2. **Form 2005 – Subcontractor Monthly Business Utilization Report: (must be submitted with monthly invoice).**
3. **Form 2006 – Subcontractor Substitution Form: (must be submitted for advance approval for any proposed change in subcontractors).**

**If you have any questions or need assistance in meeting these requirements, please feel free to contact Sonya Walton (513) 482-5419 or Andra Williams at (513) 946-3894.**

**(The Banks - Revised March, 2019)**

<b>The Banks – Public Infrastructure Development Parking Garage and Street Grid SBE Subcontractor Utilization Plan</b>		
<b>Bid or Proposal Reference Number: _____</b>		
<b>Contract Description:</b>	<b>Total Bid Amount:</b> \$	<b>Date submitted:</b>
<b>Contractor Name/Address/City/State/Zip/Phone:</b>	<b>Federal Tax ID Number:</b>	<b>Type of Inclusion Program (circle one):</b> <b>SBE      DBE</b>

Contractor is certified by the City of Cincinnati Office of Contract Compliance as an SBE and meets the SBE participation goals without using other SBEs:    Yes    or    No  
 OR  
 Contractor is certified through the Ohio DBE Unified Certification Program as a DBE and will self-perform \_\_\_\_\_% of the DBE participation goal.    Yes    or    No

**The above named Contractor proposes to use the services of the following listed subcontractor/supplier(s) demonstrating sufficiency to meet or exceed the SBE/DBE participation goal. The contractor must list all SBEs/DBEs, regardless of contract amount or type of service. Failure to complete this form with all the requested information (as indicated in each column) may cause a bid or proposal to be determined non-responsive.**

Name/Address/City/State Zip/Phone	Federal Tax ID#	Describe Exact Type Of Work /Supplier	Subcontract Dollars	Subcontract/Supplier Percentage of Contractors Total Bid Amount	FOR OFFICE USE ONLY (SBE/DBE CALCULATION)

The Contractor certifies that the above information is true to the best of its knowledge. The Contractor acknowledges and agrees that, if awarded the contract, the information provided on this Form 2003 shall be incorporated into the terms and conditions of the final contract between the Owner and the Contractor, as long as the Subcontractor(s) meet the approval of the Owner (see Form 2004). Contractor acknowledges and agrees that any changes to the above information, after the contract is awarded, must be submitted in writing on the Substitution Form 2006 and approved in advance by the Owner.

**CONTRACTOR REPRESENTATIVE (SIGNATURE):** \_\_\_\_\_

**PRINTED NAME:** \_\_\_\_\_ **Title:** \_\_\_\_\_ **Date:** \_\_\_\_\_

Bid Submission Document	Print Legibly or Type
-------------------------	-----------------------

### The Banks – Public Infrastructure Development Parking Garage and Street Grid

#### Statement of Good Faith Efforts

Bid or Proposal Reference Number: \_\_\_\_\_ Type of Inclusion Program: SBE or DBE

By the signature below of an authorized representative, Contractor certifies that Contractor has utilized the following methods to obtain the maximum practical participation by Small Business Enterprises (SBEs) certified by the City of Cincinnati Office of Contract Compliance or Disadvantaged Business Enterprises (DBEs) certified through the Ohio DBE Unified Certification Program. Please indicate which methods used by placing an X in the appropriate space.

**YOU MUST SUBMIT YOUR SUPPORTING DOCUMENTATION WITH YOUR BID. NEW INFORMATION WILL NOT BE ACCEPTED AFTER THE BID CLOSING DATE.**

1. \_\_\_\_ Identified sufficient subcontracting work to meet goal (attach content of advertisements and written notices to SBEs/DBEs indicating type of work to be subcontracted).
2. \_\_\_\_ Bidder has coordinated SBE/DBE inclusion efforts with the Economic Inclusion Consultant, Messer Construction Co. (513-482-5419 or [swalton@messer.com](mailto:swalton@messer.com)) to ascertain the availability of SBE/DBE subcontractors/subconsultants/suppliers for the scopes of work.
3. \_\_\_\_ Advertising - Attach content of advertisements, which must include project name, Contractor's name, work available, contact person's name and number, information on availability of plans and specifications and Contractor's policy concerning assistance to SBEs/DBEs in obtaining bonding, financing, and/or insurance; also provide date of advertising and names of publications.
4. \_\_\_\_ Written notice to SBEs/DBEs for subcontracting opportunities (submit copy of each letter sent, confirmation of receipt by SBE/DBE, or if available master notification, submit copy of letter and recipient list).
5. \_\_\_\_ Notice described in item 4., above, was sent at least five (5) business days prior to the bid opening date.
6. \_\_\_\_ Follow-up initial solicitations, attach copies of Outreach/Good Faith Summary Sheet (Form 2007-A).
7. \_\_\_\_ Assistance with securing bonding, financing and/or insurance (submit copy advertising and written notice to SBEs/DBEs).
8. \_\_\_\_ Provision of plans, specifications and requirements: Contractor provided interested SBEs/DBEs with access to plans, specifications and requirements for subject project.
9. \_\_\_\_ Provide documentation detailing reason(s) why agreement was not reached with SBEs/DBE (s) who responded affirmatively in writing. Include written explanation for rejection of SBE/DBE proposals.
10. \_\_\_\_ Other (Please list any other methods utilized that are not covered above):

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Name of Contractor

Contractor Representative (Signature)

Date

Contractor Representative (Printed Name)

Title

### The Banks – Public Infrastructure Development Parking Garage and Street Grid SBE Outreach & Good Faith Efforts Summary Sheet

Bid or Proposal Reference Number: \_\_\_\_\_

Contractor/Consultant Name:			Address/City/State/Zip/Telephone:		
Bid/Proposal Name:			Bid/Proposal Due Date:		Type of Bid Package: DBE or SBE
SBE Subcontractor/ Supplier's (Name/Address/ City/State/Zip)	Type of Work/Supplies Solicited	Indicate Date and How SBE Contacted (e.g., Letter, Phone, Fax, etc)	SBE Response to Solicitation (e.g., Will Submit Bid, No Response, Not Interested) and Date	Contact Person	Phone Number
Please list above the name(s) of all firms contacted and their responses to the specified proposal or bid package. If additional space is required this form may be duplicated.					

I hereby certify that the above information is true and accurate:

\_\_\_\_\_  
Contractor Representative Signature

\_\_\_\_\_  
Print Name/Title

\_\_\_\_\_  
Date



The Banks – Lot 28 BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

Bid Submission Documents  
Complete & Submit With Bid

DOCUMENT 001000.15

**WARRANTY AGAINST AN  
UNRESOLVED FINDING FOR RECOVERY**

In accordance with Section 9.24 of the Ohio Revised Code, the undersigned hereby warrants that the Contractor is not subject to an unresolved finding for recovery under ORC 9.24.

\_\_\_\_\_  
CONTRACTOR'S NAME

\_\_\_\_\_  
SIGNATURE

\_\_\_\_\_  
PRINT NAME

\_\_\_\_\_  
TITLE

**TO BE COMPLETED BY NOTARY PUBLIC**

On \_\_\_\_\_, there appeared before me  
DATE

\_\_\_\_\_, saying that he/she is  
PRINT NAME

\_\_\_\_\_ of,  
PRINT TITLE

\_\_\_\_\_  
PRINT NAME OF CONTRACTOR

and that he/she understands all of the implications of the above statement and has signed  
in good faith.

\_\_\_\_\_  
SIGNATURE OF NOTARY PUBLIC

## DOCUMENT 001000.17

### Responsible Bidder Certification

\_\_\_\_\_  
Name of Bidder

Project: The Banks – Phase 3C Lot 28 Banks Subdivision  
Garage and Park, Bid Package #2

\_\_\_\_\_  
Address of Bidder

Bid Reference No. \_\_\_\_\_

\_\_\_\_\_  
Date

\_\_\_\_\_ (“Bidder”) hereby certifies to the Board of County Commissioners of Hamilton County, Ohio (“County”) that it will adhere to the Responsible Bidder Requirements (the “Responsible Bidder Requirements”) set forth in the Bid Documents, and does hereby further certify to the County the following:

1. Bidder will require all contractors who bid or perform any work pursuant to the contract on which the Bidder is bidding to satisfy all of the Responsible Bidder Requirements set forth in the Project Manual.
2. Bidder will pay prevailing wages as set forth in the Project Manual and Bid Documents for the Project.
3. Prior to award of a contract or subcontract of Two Hundred and Fifty Thousand Dollars (\$250,000) or more, the Bidder will engage in a review of the constructability and scope of the bid to verify that the contractor included all required work.
4. In the event Bidder submits the lowest bid and such bid is more than twenty percent (20%) below the bid of the next lowest bidder, the Bidder shall identify three (3) construction projects that it has successfully completed within five (5) years of the Bid date.
5. Bidder will employ supervisory personnel on the project that (a) are qualified to perform in such supervisory capacity and (b) have any license or licenses required by applicable law to perform in such capacity.
6. Bidder is not currently debarred from performing state or federal construction contracts (after all appeals), because of a violation of the Fair Labor Standards Act and/or any state or federal prevailing wage law. A list of every occasion on which Bidder has been debarred from performing local, state or federal

construction contracts (after all appeals), because of a violation of the Fair Labor Standards Act and/or any state of federal prevailing wage law, during the last ten years, if any such debarments have occurred, are listed below:

\_\_\_\_\_  
\_\_\_\_\_

- 7. Bidder, and each of its subcontractors have implemented an OSHA-compliant Safety Program which includes: a) with respect to all supervisors, completion of OSHA's thirty (30) hour safety course; and b) with respect to all field employees, completion of OSHA's ten (10) hour safety program. Bidder shall provide evidence of implementation of an OSHA-compliant safety program to the Construction Manager.
- 8. Bidder has implemented a substance-abuse policy that is in compliance with Ohio's Drug Free Workplace Requirements. Bidder will provide evidence of implementation of such policies to the Construction Manager.
- 9. Bidder has all licenses required by applicable state law and regulation to perform work required herein.
- 10. Any and all professional license or licenses that have been revoked by Ohio or revoked by any other state within five (5) years prior to the Bid date as listed below:

\_\_\_\_\_  
\_\_\_\_\_

- 11. Bidder has no final judgments against it which are not secured by payment bond or other surety at the time of award which are equal to or exceed fifty percent (50%) of the Bidder's net worth.
- 12. Bidder has complied with applicable unemployment and workers compensation laws for at least two (2) years preceding the date of bid submittal.
- 13. Bidder will not subcontract more than seventy percent (70%) of the bid amount of the Contract. Bidder acknowledges it may apply for a waiver of the foregoing requirement by the County, which waiver shall be subject to the review and approval of the County.
- 14. Bidder does not have an Experience Modification Rating of more than 1.3 (a penalty rated employer) with respect to the Ohio Bureau of Workers' Compensation risk assessment rating.
- 15. Bidder is not debarred from bidding on the contracts that are the subject of this bid.

- 16. Bidder hereby acknowledges and agrees that bidder's falsification of any of the certifications herein or failure to comply with the requirements set forth herein, shall be the basis for a default termination of the Contract.

State of \_\_\_\_\_ )  
 )ss.  
County of \_\_\_\_\_ )

BY: \_\_\_\_\_  
ITS: \_\_\_\_\_

Sworn to and subscribed by \_\_\_\_\_ in my presence this \_\_\_\_\_ day of \_\_\_\_\_ 201\_\_.

\_\_\_\_\_  
NOTARY PUBLIC

The Banks – Lot 28 BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

DOCUMENT 001000.18

**TAX EXEMPT STATEMENT**

Purchases of building and construction materials and services by Contractor for incorporation into the Work or a portion of the Work that constitutes a structure or improvement to real property are not subject to Ohio sales or use tax pursuant to Ohio Revised Code 5739.02(B)(B)(13) and 5741.02(C)(2). Purchases by Contractor of expendable items or items consumed by Contractor in performance of the Work are not incorporated into a structure or improvement to real property and are not exempt from Ohio sales or use taxes as provided above. Examples of such purchases include, but are not limited to, form lumber, tools, oils, greases, fuel, equipment and trailer rental, temporary fencing and temporary road materials and temporary power equipment.

**DOCUMENT 001000.21**

**CERTIFIED CHECK**

If you are submitting a Certified Check: Check # \_\_\_\_\_ dollars

drawn on \_\_\_\_\_ **bank** is herewith submitted and

deposited in lieu of bond under the same terms and conditions as set forth in the bond.

PRINT NAME \_\_\_\_\_ of,

PRINT NAME OF COMPANY \_\_\_\_\_

Date

---

SIGNATURE

**BID SUBMISSION DOCUMENT  
COMPLETE & SUBMIT WITH BID**

**DOCUMENT 001000.22  
REGISTRATION FORM**

**PLEASE READ AND ACKNOWLEDGE RECEIPT OF THIS DOCUMENT**

The Banks–Phase 3C Public Infrastructure Development–Park & Garage, **Bid Package No. 2**

**All inquiries regarding this ITB are to be in writing and are to be mailed or faxed to:**

Gina Richmond, Hamilton County Purchasing Dept.  
138 E. Court Street, Room 507  
Cincinnati, Ohio 45202  
Fax #: (513) 946-4335

The County will not entertain any oral questions regarding this ITB. Other than specified above, no bidder may contact any county official, employee, project team member or evaluation team member. Bidders are not to schedule appointments or have contact with any of the individuals connected to or having decision-making authority regarding the award of this ITB. **Inappropriate contact, including attempts to influence the ITB process, evaluation process or the award process by Bidders or by others on their behalf, will result in bid rejection.**

***The only appropriate contact is with the Purchasing Department as listed above.***

**Have you been banned from doing business with the State of Ohio? \_\_\_\_\_.**

Please fax this page to the Purchasing Department at (513) 946-4335.

By faxing this page to the Purchasing Department you will be registering your company's interest in this ITB, attendance at pre-bid conference and all ensuing addenda. Your signature is an acknowledgement that you have read and understand the information contained on this page.

<b>DATE:</b>	
<b>COMPANY NAME:</b>	
<b>ADDRESS:</b>	
<b>REPRESENTATIVE'S NAME:</b>	
<b>TELEPHONE NUMBER:</b>	
<b>FACSIMILE NUMBER:</b>	
<b>EMAIL ADDRESS:</b>	
<b>NUMBER OF PEOPLE ATTENDING PREBID (where applicable)</b>	
<b>SIGNATURE:</b>	

Registration helps insure that vendors will receive any addenda to or correspondence regarding this bid invitation in a timely manner. Hamilton County will not be responsible for the timeliness of delivery via the U.S. Mail.

Document 001000.23

## Appendix A

### Prevailing Wage Rates



# Prevailing Wage Rate Skilled Crafts

**Name of Union: Carpenter NE District Industrial Dock & Door**

**Change # : LCN01-2014fbCarpNEStatewide**

**Craft : Carpenter Effective Date : 03/05/2014 Last Posted : 03/05/2014**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
<b>Classification</b>												
Carpenter	\$19.70		\$5.05	\$1.00	\$0.15	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$25.90	\$35.75
<b>Trainee</b>	<b>Percent</b>											
1st Year	60.00	\$11.82	\$5.05	\$1.00	\$0.15	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$18.02	\$23.93
2nd Year	80.20	\$15.80	\$5.05	\$1.00	\$0.15	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$22.00	\$29.90

**Special Calculation Note :** No special calculations for this skilled craft wage rate are required at this time.

**Ratio :**

1 Journeymen to 1 Trainee

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, ALLEN, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, CUYAHOGA, DARKE, DEFIANCE, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GEAUGA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LAKE, LAWRENCE, LICKING, LOGAN, LORAIN, LUCAS, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, UNION, VAN WERT, VINTON, WARREN, WASHINGTON, WAYNE, WILLIAMS, WOOD, WYANDOT

**Special Jurisdictional Note :** Industrial Dock and Door is the installation of overhead doors, roll up doors and dock leveling equipment

**Details :**

10/27/10 New Contract jc

# Prevailing Wage Rate

## Skilled Crafts

Name of Union: Painter Local 639 Zone 2 Sign

Change # : LCN01-2016fbLoc639

Craft : Painter Effective Date : 08/03/2016 Last Posted : 08/03/2016

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Painter Sign Journeyman Tech/Team Leader Class A	\$21.25	\$1.33	\$0.14	\$0.00	\$0.00	\$0.00	\$0.57	\$0.00	\$0.00	\$23.29	\$33.92
Painter Sign Journeyman Tech/Team Leader Class B	\$21.25	\$1.33	\$0.14	\$0.00	\$0.41	\$0.00	\$0.57	\$0.00	\$0.00	\$23.70	\$34.32
Painter Sign Journeyman Tech/Team Leader Class C	\$21.25	\$1.33	\$0.14	\$0.00	\$0.82	\$0.00	\$0.57	\$0.00	\$0.00	\$24.11	\$34.74
Painter Sign Journeyman Tech/Team Leader Class D	\$21.25	\$1.33	\$0.14	\$0.00	\$1.23	\$0.00	\$0.57	\$0.00	\$0.00	\$24.52	\$35.14
Sign Journeyman Class A	\$20.98	\$1.33	\$0.14	\$0.00	\$0.00	\$0.00	\$0.56	\$0.00	\$0.00	\$23.01	\$33.50
Sign Journeyman Class B	\$20.98	\$1.33	\$0.14	\$0.00	\$0.40	\$0.00	\$0.56	\$0.00	\$0.00	\$23.41	\$33.90
Sign Journeyman Class C	\$20.98	\$1.33	\$0.14	\$0.00	\$0.81	\$0.00	\$0.56	\$0.00	\$0.00	\$23.82	\$34.31
Sign Journeyman Class D	\$20.98	\$1.33	\$0.14	\$0.00	\$1.21	\$0.00	\$0.56	\$0.00	\$0.00	\$24.22	\$34.71
Tech Sign Fabrication/ Erector Class A	\$15.90	\$1.33	\$0.14	\$0.00	\$0.00	\$0.00	\$0.43	\$0.00	\$0.00	\$17.80	\$25.75
Tech Sign	\$15.90	\$1.33	\$0.14	\$0.00	\$0.31	\$0.00	\$0.43	\$0.00	\$0.00	\$18.11	\$26.06

Fabrication/ Erector Class B												
Tech Sign Fabrication/ Erector Class C	\$15.90	\$1.33	\$0.14	\$0.00	\$0.61	\$0.00	\$0.43	\$0.00	\$0.00	\$18.41	\$26.36	
Tech Sign Fabrication/ Erector Class D	\$15.90	\$1.33	\$0.14	\$0.00	\$0.92	\$0.00	\$0.43	\$0.00	\$0.00	\$18.72	\$26.67	

**Special Calculation Note :** Other is for paid holidays.

**Ratio :**

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, ALLEN, AUGLAIZE, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, DARKE, DEFIANCE, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GREENE, HAMILTON, HANCOCK, HARDIN, HENRY, HIGHLAND, HOLMES, HURON, JACKSON, KNOX, LICKING, LOGAN, LORAIN, LUCAS, MADISON, MAHONING, MARION, MERCER, MIAMI, MONTGOMERY, MORROW, MUSKINGUM, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PREBLE, PUTNAM, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, TRUMBULL, TUSCARAWAS, UNION, VAN WERT, WARREN, WAYNE, WILLIAMS, WOOD, WYANDOT

**Special Jurisdictional Note :**

**Details :**

- Class A: less that 1 year.
- Class B: 1-3 years.
- Class C; 3-10 years.
- Class D: More than 10 years.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Asbestos Local 207 OH**

**Change # : LCN01-2018fbLoc207OH**

**Craft : Asbestos Worker Effective Date : 08/23/2018 Last Posted : 08/23/2018**

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Asbestos Abatement	\$25.50	\$7.25	\$6.45	\$0.65	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$39.92	\$52.67
Trainee	\$16.50	\$7.25	\$1.50	\$0.65	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$25.97	\$34.22

**Special Calculation Note :**

**Ratio :**

3 Journeymen to 1 Trainee

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, ASHLAND, ASHTABULA\*, ATHENS, AUGLAIZE, BROWN, BUTLER\*, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, CUYAHOGA, DARKE, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, GEAUGA, GREENE, GUERNSEY, HAMILTON, HARDIN, HARRISON, HIGHLAND, HOCKING, HOLMES, HURON, KNOX, LAKE, LICKING, LOGAN, LORAIN, MADISON, MAHONING, MARION, MEDINA, MIAMI, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, PERRY, PICKAWAY, PORTAGE, PREBLE, RICHLAND, ROSS, SHELBY, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, UNION, VINTON, WARREN\*, WAYNE

**Special Jurisdictional Note :** Butler County:( townships of Fairfield,Hanover,Liberty,Milford,Morgan,Oxford,Ripley,Ross,StClair,Union & Wayne.) (Lemon & Madison) Warren County: (townships of: Deerfield, Hamilton, Harlan, Salem, Union & Washington). ( Clear Creek, Franklin, Mossie, Turtle Creek & Wayney). Ashtabula County: (post offices & townships of Ashtabula, Austinburg, Geneva, Harperfield, Jefferson, Plymouth & Saybrook) (townships of Andover, Cherry Valley, Colbrook, Canneaut, Denmark, Dorset, East Orwell, Hartsgrove, Kingville, Lenox, Monroe,Morgan,New Lyme,North Kingsville, Orwell, Pierpoint, Richmond Rock Creek, Rome, Sheffield, Trumbull, Wayne, Williamsfield & Windsor) Erie County:(post offices & townships of Berlin, Berlin Heights,Birmingham,Florence ,Huron, Milan, Shinrock & Vermillion)

**Details :**

Asbestos & lead paint abatement including,but not limited to the removal or encapsulation of asbestos & lead paint,all work in conjunction with the preparation of the removal of same & all work in conjunction with the

clean up after said removal. The removal of all insulation materials, whether they contain asbestos or not, from mechanical systems (pipes, boilers, ducts, flues, breaching, etc.) is recognized as being the exclusive work of the Asbestos Abatement Workers.

On all mechanical systems (pipes, boilers, ducts, flues, breaching, etc.) that are going to be demolished, the removal of all insulating materials whether they contain asbestos or not shall be the exclusive work of the Laborers.

An Abatement Journeyman is anyone who has more than 300 hours in the Asbestos Abatement field.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Electrical Local 212 Inside Lt Commercial South West**

**Change # : LCN01-2018fbLoc212in**

**Craft : Electrical Effective Date : 01/01/2019 Last Posted : 12/28/2018**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Electrician	\$28.39		\$6.60	\$9.00	\$0.63	\$0.00	\$2.10	\$0.65	\$0.00	\$0.00	\$47.37	\$61.57
CE-3 12,001-14,000 Hrs	\$21.89		\$5.95	\$0.66	\$0.66	\$0.00	\$0.66	\$0.00	\$0.00	\$0.00	\$29.82	\$40.76
CE-2 10,001-12,000 Hrs	\$17.20		\$5.95	\$0.52	\$0.66	\$0.00	\$0.52	\$0.00	\$0.00	\$0.00	\$24.85	\$33.45
CE-1 8,001-10,000 Hrs	\$15.64		\$5.95	\$0.47	\$0.66	\$0.00	\$0.47	\$0.00	\$0.00	\$0.00	\$23.19	\$31.01
CW-4 6,001-8,000 Hrs	\$14.07		\$5.95	\$0.42	\$0.66	\$0.00	\$0.42	\$0.00	\$0.00	\$0.00	\$21.52	\$28.56
CW-3 4,001-6,000 Hrs	\$12.51		\$5.95	\$0.38	\$0.66	\$0.00	\$0.38	\$0.00	\$0.00	\$0.00	\$19.88	\$26.13
CW-2 2,001-4,000 Hrs	\$11.73		\$5.95	\$0.35	\$0.66	\$0.00	\$0.35	\$0.00	\$0.00	\$0.00	\$19.04	\$24.91
CW-1 0-2,000 Hrs	\$10.94		\$5.95	\$0.33	\$0.66	\$0.00	\$0.33	\$0.00	\$0.00	\$0.00	\$18.21	\$23.68
Indentured After 01/01/2017 45%	\$12.78		\$6.60	\$0.38	\$0.39	\$0.00	\$0.35	\$0.00	\$0.00	\$0.00	\$20.50	\$26.89
48%	\$13.63		\$6.60	\$0.41	\$0.40	\$0.00	\$0.35	\$0.00	\$0.00	\$0.00	\$21.39	\$28.21
50%	\$14.20		\$6.60	\$4.51	\$0.41	\$0.00	\$1.30	\$0.65	\$0.00	\$0.00	\$27.67	\$34.77
52%	\$14.76		\$6.60	\$4.68	\$0.42	\$0.00	\$1.35	\$0.65	\$0.00	\$0.00	\$28.46	\$35.84
57%	\$16.18		\$6.60	\$5.14	\$0.44	\$0.00	\$1.40	\$0.65	\$0.00	\$0.00	\$30.41	\$38.50
68%	\$19.31		\$6.60	\$6.12	\$0.49	\$0.00	\$1.60	\$0.65	\$0.00	\$0.00	\$34.77	\$44.42
<b>Apprentice Indentured Before 01/01/2017</b>	<b>Percent</b>											
1st period	40.00	\$11.36	\$6.60	\$0.34	\$0.37	\$0.00	\$0.35	\$0.00	\$0.00	\$0.00	\$19.02	\$24.69

0-1000 hrs												
2nd period 1000- 2000 hrs	44.00	\$12.49	\$6.60	\$0.37	\$0.39	\$0.00	\$0.35	\$0.00	\$0.00	\$0.00	\$20.20	\$26.45
3rd period 2000- 3500 hrs	49.00	\$13.91	\$6.60	\$4.41	\$0.41	\$0.00	\$1.30	\$0.65	\$0.00	\$0.00	\$27.28	\$34.24
4th period 3500- 5000 hrs	53.00	\$15.05	\$6.60	\$4.77	\$0.43	\$0.00	\$1.35	\$0.65	\$0.00	\$0.00	\$28.85	\$36.37
5th period 5000- 6500 hrs	58.00	\$16.47	\$6.60	\$5.22	\$0.45	\$0.00	\$1.45	\$0.65	\$0.00	\$0.00	\$30.84	\$39.07
6th period 6500- 8000 hrs	73.00	\$20.72	\$6.60	\$6.57	\$0.51	\$0.00	\$1.65	\$0.65	\$0.00	\$0.00	\$36.70	\$47.07

**Special Calculation Note :** Other is; Supplemental Unemployment

**Ratio :**

Each Job site shall be allowed a ratio of two (2) Apprentices to every three (3) Journeyman Wireman.

- 1 to 3 Journeyman to 2 Apprentices
- 4 to 6 Journeyman to 4 Apprentices
- Etc.

**Jurisdiction ( \* denotes special jurisdictional note ) :**

BROWN, CLERMONT, HAMILTON

**Construction Electrician and Construction Wireman Ratio**

There shall be a minimum ratio of one inside Journeyman to every (4) employees of different classification per jobsite. An inside Journeyman Wireman is required on the project as the fifth (5th) worker or when apprentices are used.

**Special Jurisdictional Note :** The scope of work for the light commercial agreement shall apply to the following facilities not to exceed 200,000 square feet; office buildings, shopping centers, auto sales agencies and garages, churches, funeral homes, nursing homes, hotels, retail and wholesale facilities, small stand-alone manufacturing facilities when free standing and not part of a larger facility (not to exceed 50,000 square fee), solar projects (500 panels or less) unless otherwise covered under the agreement, lighting retrofits (when not associated with remodels involving branch re-circuiting) lighting retrofits shall be defined as the changing of lamps and ballasts in existing light fixtures and shall also include the one for one replacement of existing fixtures, warehouses, gas stations, food service centers, restaurants, entertainment facilities, hospitals, clinics, motels, residential buildings.

**Details :**



# Prevailing Wage Rate Skilled Crafts

Name of Union: Elevator Local 11

**Change # : LCN01-2020fbLoc11**

**Craft : Elevator Effective Date : 01/05/2021 Last Posted : 01/05/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
<b>Classification</b>												
Elevator Mechanic	\$48.82		\$15.88	\$10.46	\$0.64	\$3.91	\$8.85	\$1.56	\$0.00	\$0.00	\$90.12	\$114.53
Probationary Apprentice	50.00	\$24.41	\$0.00	\$0.00	\$0.00	\$1.46	\$0.00	\$0.78	\$0.00	\$0.00	\$26.65	\$38.86
1st year	55.00	\$26.85	\$15.88	\$10.46	\$0.64	\$1.61	\$8.85	\$0.86	\$0.00	\$0.00	\$65.15	\$78.58
2nd year	65.00	\$31.73	\$15.88	\$10.46	\$0.64	\$1.90	\$8.85	\$1.02	\$0.00	\$0.00	\$70.48	\$86.35
3rd year	70.00	\$34.17	\$15.88	\$10.46	\$0.64	\$2.05	\$8.85	\$1.09	\$0.00	\$0.00	\$73.14	\$90.23
4th year	80.00	\$39.06	\$15.88	\$10.46	\$0.64	\$2.34	\$8.85	\$1.25	\$0.00	\$0.00	\$78.48	\$98.00
Helper	70.00	\$34.17	\$15.88	\$10.46	\$0.64	\$2.05	\$8.85	\$1.09	\$0.00	\$0.00	\$73.14	\$90.23
Assistant Mechanic	80.00	\$39.06	\$15.88	\$10.46	\$0.64	\$2.34	\$8.85	\$1.25	\$0.00	\$0.00	\$78.48	\$98.00

**Special Calculation Note :** Other is Holiday Pay. Vacation calculated at 6%.

**Ratio :**

The total number of Helpers & Apprentices employed shall not exceed the number of Mechanics on any one job, except on jobs where (2) teams or more are working, (1) extra Helper or Apprentice may be employed for the first (2) teams and an extra Helper or Apprentice for each additional (3) teams.

- 1 Journeymen to 1 Apprentice
- 2 Journeymen to 5 Apprentice
- 3 Journeymen to 6 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, BROWN, BUTLER, CLERMONT, CLINTON, DARKE, GREENE, HAMILTON, HIGHLAND, MIAMI, MONTGOMERY, PREBLE, SCIOTO, SHELBY, WARREN

**Special Jurisdictional Note :**

**Details :**

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Bricklayer Local 18 Tile Finisher**

**Change # : LCN01-2020fbLoc18**

**Craft : Bricklayer Effective Date : 09/01/2020 Last Posted : 08/20/2020**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Bricklayer Tile Marble Terrazzo Finisher	\$25.74		\$9.47	\$5.29	\$0.51	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$41.01	\$53.88
Terrazzo Base Grinder	\$26.24		\$9.47	\$5.29	\$0.51	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$41.51	\$54.63
Marble Sander Polisher	\$25.84		\$9.47	\$5.29	\$0.51	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$41.11	\$54.03
Apprentices	Percent											
1st 6 months 0-600 hrs	60.00	\$15.44	\$9.47	\$5.29	\$0.51	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$30.71	\$38.44
2nd 6 months 601-1200 hrs	65.00	\$16.73	\$9.47	\$5.29	\$0.51	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$32.00	\$40.37
3rd 6 months 1201-1800 hrs	70.00	\$18.02	\$9.47	\$5.29	\$0.51	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$33.29	\$42.30
4th 6 months 1801-2400 hrs	75.00	\$19.30	\$9.47	\$5.29	\$0.51	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$34.57	\$44.23
5th 6 months 2401-3000 hrs	80.00	\$20.59	\$9.47	\$5.29	\$0.51	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$35.86	\$46.16
6th 6 months 3001-3600	90.00	\$23.17	\$9.47	\$5.29	\$0.51	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$38.44	\$50.02
1-30 Days Prior to Entering Apprenticeship	50.00	\$12.87	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$12.87	\$19.30

**Special Calculation Note :** Classification title contains "Bricklayer" because contract originates within the Bricklayer Local.

Note that the classification description is clarified after the local union number at the top of the page.

**\*\*In order to utilize a Pre-Apprentice, you must have 1 Registered Apprentice in your employ.\*\***

**Ratio :**

- 1 Journeyman to 1 Apprentice
- 5 Journeymen to 1 Apprentice
- 10 Journeymen to 2 Apprentices

**Jurisdiction ( \* denotes special jurisdictional note ) :**

- ADAMS, BROWN, BUTLER, CLERMONT, GALLIA, HAMILTON, LAWRENCE, PREBLE\*, SCIOTO, WARREN, WARREN\*

15 Journeymen to 3 Apprentices  
20 Journeymen to 4 Apprentices  
25 Journeymen to 5 Apprentices

**Special Jurisdictional Note :** Warren in the townships of Dixon, Gasper, Isrsel, Somers & Gratis in Prebble County

**Details :**

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Bricklayer Local 18 Tile Mechanic**

**Change # : LCN01-2020fbLoc18**

**Craft : Bricklayer Effective Date : 09/01/2020 Last Posted : 08/20/2020**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Bricklayer Tile Terrazzo Marble Mason Mechanic	\$30.28		\$9.47	\$5.29	\$0.56	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45.60	\$60.74
Marble Layout Work	\$30.78		\$9.47	\$5.29	\$0.56	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$46.10	\$61.49
Swing Scaffold Worker	\$31.78		\$9.47	\$5.29	\$0.56	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$47.10	\$62.99
Apprentice after 2 years (2400 hrs) as Apprentice Finisher												
5th/6 Months 0- 600 hrs.	70.00	\$21.20	\$9.47	\$5.29	\$0.56	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$36.52	\$47.11
6th/6 months 601-1200 hrs.	75.00	\$22.71	\$9.47	\$5.29	\$0.56	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$38.03	\$49.39
7th/6 months 1201-1800 hrs.	80.00	\$24.22	\$9.47	\$5.29	\$0.56	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$39.54	\$51.66
8th/6 months 1801-2400 hrs.	90.00	\$27.25	\$9.47	\$5.29	\$0.56	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$42.57	\$56.20

**Special Calculation Note :** Classification title contains "Bricklayer" because contract originates within the Bricklayer Local.

Note that the classification description is clarified after the local union number at the top of the page.

**Ratio :**

1 Journeyman to 1 Apprentice  
5 Journeymen to 1 Apprentice  
10 Journeymen to 2 Apprentices  
15 Journeymen to 3 Apprentices  
20 Journeymen to 4 Apprentices  
25 Journeymen to 5 Apprentices

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, BROWN, BUTLER, CLERMONT, GALLIA,  
HAMILTON, LAWRENCE, PREBLE\*, SCIOTO,  
WARREN

**Special Jurisdictional Note :** In Preble County the Townships of Dixon, Israel, Gasper, Lanier, Somers and Gratis.

**Details :**

\*\*In order to utilize a Pre-Apprentice, you must have 1 Registered Apprentice in your employ.\*\*

# Prevailing Wage Rate Skilled Crafts

Name of Union: **Glazier Local 387**

**Change # : LCN01-2020fbLoc387**

**Craft : Glazier Effective Date : 11/01/2020 Last Posted : 10/28/2020**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
<b>Classification</b>												
Glazier	\$27.93		\$5.67	\$10.10	\$0.25	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$43.95	\$57.92
<b>Apprentice</b>	<b>Percent</b>											
1st 6 months	53.70	\$15.00	\$5.67	\$0.00	\$0.25	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$20.92	\$28.42
2nd 6 months	65.00	\$18.15	\$5.67	\$6.19	\$0.25	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$30.26	\$39.34
3rd 6 months	70.00	\$19.55	\$5.67	\$6.71	\$0.25	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$32.18	\$41.96
4th 6 months	75.00	\$20.95	\$5.67	\$6.85	\$0.25	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$33.72	\$44.19
5th 6 months	80.00	\$22.34	\$5.67	\$7.43	\$0.25	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$35.69	\$46.87
6th 6 months	85.00	\$23.74	\$5.67	\$7.57	\$0.25	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$37.23	\$49.10
7th 6 months	90.00	\$25.14	\$5.67	\$8.09	\$0.25	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$39.15	\$51.72
8th 6 months	95.00	\$26.53	\$5.67	\$8.68	\$0.25	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$41.13	\$54.40

**Special Calculation Note :** No special calculations for this skilled craft wage rate are required at this time.

**Ratio :**

Each employer may employ and train Apprentices in the following ratio to journeymen workers employed.  
1 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, BROWN, BUTLER, CHAMPAIGN, CLARK, CLERMONT, CLINTON, DARKE, FAYETTE\*, GREENE, HAMILTON, HIGHLAND, MIAMI, MONTGOMERY, PREBLE, SHELBY\*, WARREN

**Special Jurisdictional Note :** Fayette County: Eastern portion of route #41 being the dividing line between locals 372 and 387. Local 387 has jurisdiction of projects built on property which borders route #41 East. Shelby County: Southern portion of routes #47 & 29.

**Details :**



# Prevailing Wage Rate Skilled Crafts

**Name of Union: Asbestos Local 8 Heat & Frost Insulators**

**Change # : LCN01-2021fbAsbLoc8**

**Craft : Asbestos Worker Effective Date : 03/10/2021 Last Posted : 03/10/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
<b>Classification</b>												
Asbestos Insulators	\$31.82		\$7.14	\$9.35	\$0.41	\$0.00	\$2.60	\$0.00	\$0.00	\$0.00	\$51.32	\$67.23
<b>Apprentice</b>	<b>Percent</b>											
1st year	46.67	\$14.85	\$7.14	\$5.10	\$0.41	\$0.00	\$2.60	\$0.00	\$0.00	\$0.00	\$30.10	\$37.53
2nd year	53.58	\$17.05	\$7.14	\$6.65	\$0.41	\$0.00	\$2.60	\$0.00	\$0.00	\$0.00	\$33.85	\$42.37
3rd year	58.30	\$18.55	\$7.14	\$6.65	\$0.41	\$0.00	\$2.60	\$0.00	\$0.00	\$0.00	\$35.35	\$44.63
4th year	63.01	\$20.05	\$7.14	\$6.65	\$0.41	\$0.00	\$2.60	\$0.00	\$0.00	\$0.00	\$36.85	\$46.87

**Special Calculation Note :** No special calculations for this skilled craft wage rate are required at this time.

**Ratio :**

- 1 Journeymen to 1 Apprentice
- 2 Journeymen to 2 Apprentice
- 3 Journeymen to 3 Apprentice
- 3 Journeymen to 1 Apprentice there After

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, BROWN, BUTLER\*, CLERMONT, HAMILTON, HIGHLAND, WARREN\*

**Special Jurisdictional Note :** In Butler County: townships of Fairfield, Hanover, Liberty, Milford, Morgan, Oxford, Ripley, Ross, St. Clair, Union & Wayne. In Warren County: Townships of Deerfield, Hamilton, Harlan, Salem, Union & Washington

**Details :**

All work in connection with Asbestos Removal, Abatement, Encapsulation, Lead Abatement, Hazardous Materials and Fire Stopping which is performed by employees in the Mechanic or Apprentice Classification shall be covered under the terms of this Agreement.



# Prevailing Wage Rate Skilled Crafts

**Name of Union: Cement Mason Bricklayer Local 97 HevHwy B**

**Change # : LCN01-2021fbHvyHwy**

**Craft : Bricklayer Effective Date : 06/01/2021 Last Posted : 05/26/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
<b>Classification</b>												
Cement Mason Bricklayer Power Plants Tunnels Amusement Parks B	\$31.39		\$9.50	\$7.57	\$0.49	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$48.95	\$64.64
<b>Apprentice</b>	<b>Percent</b>											
1st year	50.00	\$15.70	\$9.50	\$7.57	\$0.49	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$33.26	\$41.10
2nd year	70.00	\$21.97	\$9.50	\$7.57	\$0.49	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$39.53	\$50.52
3rd year	90.00	\$28.25	\$9.50	\$7.57	\$0.49	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45.81	\$59.94

**Special Calculation Note : NOT FOR BUILDING CONSTRUCTION.**

**Ratio :**

- 3 Journeymen to 1 Apprentice
- 6 Journeymen to 2 Apprentice
- 9 Journeymen to 2 Apprentice
- 12 Journeymen to 4 Apprentice
- 15 Journeymen to 5 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

- ADAMS, ALLEN, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, CUYAHOGA, DARKE, DEFIANCE, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GEAUGA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LAKE, LAWRENCE, LICKING, LOGAN, LORAIN, LUCAS, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, SUMMIT,

TRUMBULL, TUSCARAWAS, UNION, VAN WERT,  
VINTON, WARREN, WASHINGTON, WAYNE

**Special Jurisdictional Note :**

**Details :**

(A) Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site Heavy Construction, Airport Construction Or Railroad Construction Work.

(B) Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work ,Pollution Control,Sewer Plant, Waste Plant, & Water Treatment Facilities, Construction.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Cement Mason Bricklayer Local 97 HevHwy A**

**Change # : LCN01-2021fbHvyHwy**

**Craft : Bricklayer Effective Date : 06/01/2021 Last Posted : 05/26/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
<b>Classification</b>												
Cement Mason Bricklayer Sewer Water Works A	\$30.40		\$9.50	\$7.57	\$0.48	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$47.95	\$63.15
<b>Apprentice</b>	<b>Percent</b>											
1st year	50.00	\$15.20	\$9.50	\$7.57	\$0.48	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$32.75	\$40.35
2nd year	70.00	\$21.28	\$9.50	\$7.57	\$0.48	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$38.83	\$49.47
3rd year	90.00	\$27.36	\$9.50	\$7.57	\$0.48	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$44.91	\$58.59

**Special Calculation Note : NOT FOR BUILDING CONSTRUCTION.**

**Ratio :**

- 3 Journeymen to 1 Apprentice
- 6 Journeymen to 2 Apprentice
- 9 Journeymen to 3 Apprentice
- 12 Journeymen to 4 Apprentice
- 15 Journeymen to 5 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, ALLEN, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, CUYAHOGA, DARKE, DEFIANCE, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GEauga, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LAKE, LAWRENCE, LICKING, LOGAN, LORAIN, LUCAS, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, UNION, VAN WERT, VINTON, WARREN, WASHINGTON, WAYNE

**Special Jurisdictional Note :**

**Details :**

(A) Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site Heavy Construction, Airport Construction Or Railroad Construction Work.

(B) Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work ,Pollution Control,Sewer Plant, Waste Plant, & Water Treatment Facilities, Construction.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Electrical Local 71 High Tension Pipe Type Cable**

**Change # : LCN01-2021fbLoc7**

**Craft : Lineman Effective Date : 03/16/2021 Last Posted : 03/16/2021**

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Electrical Lineman	\$45.61	\$6.75	\$1.37	\$0.46	\$0.00	\$10.95	\$0.60	\$0.00	\$0.00	\$65.74	\$88.54
Certified Lineman Welder	\$45.61	\$6.75	\$1.37	\$0.46	\$0.00	\$10.95	\$0.60	\$0.00	\$0.00	\$65.74	\$88.54
Certified Cable Splicer	\$45.61	\$6.75	\$1.37	\$0.46	\$0.00	\$10.95	\$0.60	\$0.00	\$0.00	\$65.74	\$88.54
Operator A	\$40.88	\$6.75	\$1.23	\$0.41	\$0.00	\$9.81	\$0.60	\$0.00	\$0.00	\$59.68	\$80.12
Operator B	\$36.20	\$6.75	\$1.09	\$0.36	\$0.00	\$8.69	\$0.60	\$0.00	\$0.00	\$53.69	\$71.79
Operator C	\$29.12	\$6.75	\$0.87	\$0.29	\$0.00	\$6.99	\$0.60	\$0.00	\$0.00	\$44.62	\$59.18
Groundman 0-12 months Exp	\$22.81	\$6.75	\$0.68	\$0.23	\$0.00	\$5.47	\$0.60	\$0.00	\$0.00	\$36.54	\$47.94
Groundman 0-12 months Exp w/CDL	\$25.09	\$6.75	\$0.75	\$0.25	\$0.00	\$6.02	\$0.60	\$0.00	\$0.00	\$39.46	\$52.01
Groundman 1 yr or more	\$25.09	\$6.75	\$0.75	\$0.25	\$0.00	\$6.02	\$0.60	\$0.00	\$0.00	\$39.46	\$52.01
Groundman 1 yr or more w/CDL	\$29.65	\$6.75	\$0.85	\$0.28	\$0.00	\$6.50	\$0.60	\$0.00	\$0.00	\$44.63	\$59.46
Equipment Mechanic A	\$36.20	\$6.75	\$1.09	\$0.36	\$0.00	\$8.69	\$0.60	\$0.00	\$0.00	\$53.69	\$71.79
Equipment Mechanic B	\$32.66	\$6.75	\$0.98	\$0.33	\$0.00	\$7.84	\$0.60	\$0.00	\$0.00	\$49.16	\$65.49
Equipment Mechanic C	\$29.12	\$6.75	\$0.87	\$0.29	\$0.00	\$6.99	\$0.60	\$0.00	\$0.00	\$44.62	\$59.18
X-Ray Technician	\$45.61	\$6.75	\$1.37	\$0.46	\$0.00	\$10.95	\$0.60	\$0.00	\$0.00	\$65.74	\$88.54

Apprentice	Percent											
1st 1000 hrs	60.00	\$27.37	\$6.75	\$0.82	\$0.27	\$0.00	\$6.57	\$0.60	\$0.00	\$0.00	\$42.38	\$56.06
2nd 1000 hrs	65.00	\$29.65	\$6.75	\$0.89	\$0.30	\$0.00	\$7.12	\$0.60	\$0.00	\$0.00	\$45.31	\$60.13
3rd 1000 hrs	70.00	\$31.93	\$6.75	\$0.96	\$0.32	\$0.00	\$7.66	\$0.60	\$0.00	\$0.00	\$48.22	\$64.18
4th 1000 hrs	75.00	\$34.21	\$6.75	\$1.03	\$0.34	\$0.00	\$8.21	\$0.60	\$0.00	\$0.00	\$51.14	\$68.24
5th 1000 hrs	80.00	\$36.49	\$6.75	\$1.09	\$0.36	\$0.00	\$8.76	\$0.60	\$0.00	\$0.00	\$54.05	\$72.29
6th 1000 hrs	85.00	\$38.77	\$6.75	\$1.16	\$0.39	\$0.00	\$9.30	\$0.60	\$0.00	\$0.00	\$56.97	\$76.35
7th 1000 hrs	90.00	\$41.05	\$6.75	\$1.23	\$0.41	\$0.00	\$9.85	\$0.60	\$0.00	\$0.00	\$59.89	\$80.41

**Special Calculation Note :** Other is Health Retirement Account

#### Operator "A"

John Henry Rock Drill, D-6 (or equivalent) and above, Trackhoe Digger, (320 Track excavator), Cranes (greater then 25 tons and less than 45 tons).

#### Operator "B"

Cranes (greater than 6 tons and up to 25 tons), Backhoes, Road Tractor, Dozer up to D-5, Pressure Digger- wheeled or tracked, all Tension wire Stringing equipment.

#### Operator "C"

Trench, Backhoe, Riding type vibratory Compactor, Ground Rod Driver, Boom Truck (6 ton & below), Skid Steer Loaders, Material Handler.

\*All Operators of cranes 45 ton or larger shall be paid the journeyman rate of pay. \$0.30 is for Health Retirement Account.

#### Ratio :

1 Journeyman to 1 Apprentice

#### Jurisdiction ( \* denotes special jurisdictional note ) :

ADAMS, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, CUYAHOGA, DARKE, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, GALLIA, GEauga, GREENE, GUERNSEY, HAMILTON, HARRISON, HIGHLAND, HOCKING, HOLMES, JACKSON, JEFFERSON, KNOX, LAKE, LAWRENCE, LICKING, LOGAN, LORAIN, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE, RICHLAND, ROSS, SCIOTO, SHELBY, STARK, SUMMIT, TRUMBULL,

TUSCARAWAS, UNION, VINTON, WARREN,  
WASHINGTON, WAYNE

**Special Jurisdictional Note :**

**Details :**

Heli - Arc Welding will be paid \$.30 above Journeyman rate. Additional compensation of 10% over the Journeyman Lineman and Journeyman Technician for performing work on structures outside of buildings such as water towers, smoke stacks, radio and television towers, more than 75' above the ground.

# Prevailing Wage Rate Skilled Crafts

Name of Union: **Bricklayer Local 18**

**Change # : LCN01-2021fbLoc18**

**Craft : Bricklayer Effective Date : 06/01/2021 Last Posted : 05/26/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Bricklayer	\$30.87		\$9.45	\$5.79	\$0.63	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$46.74	\$62.17
Stone Mason	\$30.87		\$9.45	\$5.79	\$0.63	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$46.74	\$62.17
Pointer Caulker Cleaner	\$30.87		\$9.45	\$5.79	\$0.63	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$46.74	\$62.17
Refractory Workers	\$31.87		\$9.45	\$5.79	\$0.63	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$47.74	\$63.67
Refractory Worker Hot Pay	\$33.87		\$9.45	\$5.79	\$0.63	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.74	\$66.67
Sawman	\$31.12		\$9.45	\$5.79	\$0.63	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$46.99	\$62.55
Layout Man	\$31.12		\$9.45	\$5.79	\$0.63	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$46.99	\$62.55
Free Standing Chimney	\$31.37		\$9.45	\$5.79	\$0.63	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$47.24	\$62.92
Apprentice	Percent											
1st 6 months	60.00	\$18.52	\$9.45	\$5.79	\$0.63	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$34.39	\$43.65
2nd 6 months	65.00	\$20.07	\$9.45	\$5.79	\$0.63	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$35.94	\$45.97
3rd 6 months	70.00	\$21.61	\$9.45	\$5.79	\$0.63	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$37.48	\$48.28
4th 6 months	75.00	\$23.15	\$9.45	\$5.79	\$0.63	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$39.02	\$50.60
5th 6 months	80.00	\$24.70	\$9.45	\$5.79	\$0.63	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$40.57	\$52.91
6th 6 months	85.00	\$26.24	\$9.45	\$5.79	\$0.63	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$42.11	\$55.23
7th 6 months	90.00	\$27.78	\$9.45	\$5.79	\$0.63	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$43.65	\$57.54
8th 6 months	95.00	\$29.33	\$9.45	\$5.79	\$0.63	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45.20	\$59.86



MASON FINISHER 1st 180 Days	45.00	\$13.89	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$13.89	\$20.84
1st Year H&W after 6 months	45.00	\$13.89	\$9.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.34	\$30.29
2nd Year	50.00	\$15.44	\$9.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$24.88	\$32.60

**Special Calculation Note :** \*\*In order to utilize a Pre-Apprentice, you must have 1 Registered Apprentice in your employ.

**Ratio :**

- 1-2 Journeyman to 1 Apprentice
- 3-4 Journeyman to 2 Apprentice
- 5-6 Journeyman to 2 Apprentice
- 7-10 Journeyman to 3 Apprentice

- 1 Apprentice permits 1 Mason Trainee
- 2 Apprentice permits 1 Mason Trainee
- 3 Apprentice permits 2 Mason Trainees
- 4 Apprentice permits 2 Mason Trainees

For each additional 5 Journeyman to 1 Apprentice, for every 3 additional Apprentices, 1 Mason Finisher may be added

**Jurisdiction ( \* denotes special jurisdictional note ) :**

BROWN, BUTLER, CLERMONT, HAMILTON, PREBLE\*, WARREN

**Special Jurisdictional Note :** In Preble County the following townships are included: (Dixon, Gasper, Graits, Israel, Lanier and Somers)

**Details :**

MASON FINISHER:duties shall be to work in all aspects of Masonry construction taking direction from the employer and the Journeyman Bricklayer & Stone Mason's working on the job. Mason Finisher's may work on job site only when a registered apprentice is on job and the ratios in table above will strictly be enforced.

Refractory work is classified as working with any of the following materials:  
Acid brick, carbon black brick or carbon black block, firebrick grinding, plastics (with a gun) and any resinous cement.

Fifty cents (\$0.50) per hour above scale shall be paid to employees working on free standing industrial or institutional chimneys which are completely detached from any building structure.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Sheet Metal Local 24 (Cincinnati)**

**Change # : LCN01-2021fbLoc24(Cin)**

**Craft : Sheet Metal Worker Effective Date : 07/14/2021 Last Posted : 07/14/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Sheet Metal Worker	\$31.51		\$7.57	\$13.20	\$0.86	\$0.00	\$0.00	\$0.95	\$0.00	\$0.00	\$54.09	\$69.84
Apprentice	Percent											
1st 6 Month	45.00	\$14.18	\$7.57	\$4.34	\$0.86	\$0.00	\$0.00	\$0.60	\$0.00	\$0.00	\$27.55	\$34.64
2nd 6 Month.	45.00	\$14.18	\$7.57	\$4.34	\$0.86	\$0.00	\$0.00	\$0.60	\$0.00	\$0.00	\$27.55	\$34.64
3rd 6 Month.	47.50	\$14.97	\$7.57	\$4.58	\$0.86	\$0.00	\$0.00	\$0.60	\$0.00	\$0.00	\$28.58	\$36.06
4th 6 Month.	50.00	\$15.76	\$7.57	\$4.82	\$0.86	\$0.00	\$0.00	\$0.60	\$0.00	\$0.00	\$29.61	\$37.48
5th 6 Month.	52.50	\$16.54	\$7.57	\$8.62	\$0.86	\$0.00	\$0.00	\$0.60	\$0.00	\$0.00	\$34.19	\$42.46
6th 6 Month.	55.00	\$17.33	\$7.57	\$8.86	\$0.86	\$0.00	\$0.00	\$0.60	\$0.00	\$0.00	\$35.22	\$43.89
7th 6 Month.	60.00	\$18.91	\$7.57	\$9.34	\$0.86	\$0.00	\$0.00	\$0.60	\$0.00	\$0.00	\$37.28	\$46.73
8th 6 Month.	65.00	\$20.48	\$7.57	\$9.83	\$0.86	\$0.00	\$0.00	\$0.60	\$0.00	\$0.00	\$39.34	\$49.58
9th 6 Month.	70.00	\$22.06	\$7.57	\$10.31	\$0.86	\$0.00	\$0.00	\$0.60	\$0.00	\$0.00	\$41.40	\$52.43
10th 6 Month.	75.00	\$23.63	\$7.57	\$10.79	\$0.86	\$0.00	\$0.00	\$0.60	\$0.00	\$0.00	\$43.45	\$55.27

**Special Calculation Note : OTHER IS: Supplemental unemployment benefits**

**Ratio :**

- 1 Journeymen to 1 Apprentice
- 4 Journeymen to 2 Apprentices
- 7 Journeymen to 3 Apprentices
- 10 Journeymen to 4 Apprentices
- Thereafter, 3 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

BROWN, CLERMONT, HAMILTON, HIGHLAND

**Special Jurisdictional Note :**

**Details :**

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Electrical Local 71 Outside Utility Power**

**Change # : LCN01-2021fbLoc7**

**Craft : Lineman Effective Date : 03/16/2021 Last Posted : 03/16/2021**

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
<b>Classification</b>											
Electrical Lineman	\$43.22	\$6.75	\$1.30	\$0.43	\$0.00	\$10.37	\$0.60	\$0.00	\$0.00	\$62.67	\$84.28
Substation Technician	\$43.22	\$6.75	\$1.30	\$0.43	\$0.00	\$10.37	\$0.60	\$0.00	\$0.00	\$62.67	\$84.28
Cable Splicer	\$45.26	\$6.75	\$1.36	\$0.45	\$0.00	\$10.86	\$0.60	\$0.00	\$0.00	\$65.28	\$87.91
Operator A	\$38.75	\$6.75	\$1.16	\$0.39	\$0.00	\$9.30	\$0.60	\$0.00	\$0.00	\$56.95	\$76.32
Operator B	\$34.27	\$6.75	\$1.03	\$0.34	\$0.00	\$8.22	\$0.60	\$0.00	\$0.00	\$51.21	\$68.34
Operator C	\$27.54	\$6.75	\$0.83	\$0.28	\$0.00	\$6.61	\$0.60	\$0.00	\$0.00	\$42.61	\$56.38
Groundman 0-12 months Exp	\$21.61	\$6.75	\$0.65	\$0.22	\$0.00	\$5.19	\$0.60	\$0.00	\$0.00	\$35.02	\$45.82
Groundman 0-12 months Exp w/CDL	\$23.77	\$6.75	\$0.71	\$0.24	\$0.00	\$5.70	\$0.60	\$0.00	\$0.00	\$37.77	\$49.66
Groundman 1 yr or more	\$23.77	\$6.75	\$0.71	\$0.24	\$0.00	\$5.70	\$0.60	\$0.00	\$0.00	\$37.77	\$49.66
Groundman 1 yr or more w/CDL	\$28.09	\$6.75	\$0.84	\$0.28	\$0.00	\$6.74	\$0.60	\$0.00	\$0.00	\$43.30	\$57.35
Equipment Mechanic A	\$34.27	\$6.75	\$1.03	\$0.34	\$0.00	\$8.22	\$0.60	\$0.00	\$0.00	\$51.21	\$68.34
Equipment Mechanic B	\$30.91	\$6.75	\$0.93	\$0.31	\$0.00	\$7.42	\$0.60	\$0.00	\$0.00	\$46.92	\$62.38
Equipment Mechanic C	\$27.54	\$6.75	\$0.83	\$0.28	\$0.00	\$6.61	\$0.60	\$0.00	\$0.00	\$42.61	\$56.38
Line Truck w/uuger	\$30.44	\$6.75	\$0.91	\$0.30	\$0.00	\$7.31	\$0.60	\$0.00	\$0.00	\$46.31	\$61.53
<b>Apprentice</b>	<b>Percent</b>										

1st 1000 hrs	60.00	\$25.93	\$6.75	\$0.78	\$0.26	\$0.00	\$6.22	\$0.60	\$0.00	\$0.00	\$40.54	\$53.51
2nd 1000 hrs	65.00	\$28.09	\$6.75	\$0.84	\$0.28	\$0.00	\$6.74	\$0.60	\$0.00	\$0.00	\$43.30	\$57.35
3rd 1000 hrs	70.00	\$30.25	\$6.75	\$0.91	\$0.30	\$0.00	\$7.26	\$0.60	\$0.00	\$0.00	\$46.07	\$61.20
4th 1000 hrs	75.00	\$32.42	\$6.75	\$0.97	\$0.32	\$0.00	\$7.78	\$0.60	\$0.00	\$0.00	\$48.84	\$65.04
5th 1000 hrs	80.00	\$34.58	\$6.75	\$1.04	\$0.35	\$0.00	\$8.30	\$0.60	\$0.00	\$0.00	\$51.62	\$68.90
6th 1000 hrs	85.00	\$36.74	\$6.75	\$1.10	\$0.37	\$0.00	\$8.82	\$0.60	\$0.00	\$0.00	\$54.38	\$72.75
7th 1000 hrs	90.00	\$38.90	\$6.75	\$1.17	\$0.39	\$0.00	\$9.34	\$0.60	\$0.00	\$0.00	\$57.15	\$76.60

**Special Calculation Note :** Other is Health Retirement Account

**Operator "A"**

John Henry Rock Drill, D-6 (or equivalent) and above, Trackhoe Digger, (320 Track excavator), Cranes (greater then 25 tons and less than 45 tons).

**Operator "B"**

Cranes (greater than 6 tons and up to 25 tons), Backhoes, Road Tractor, Dozer up to D-5, Pressure Digger- wheeled or tracked, all Tension wire Stringing equipment.

**Operator "C"**

Trench, Backhoe, Riding type vibratory Compactor, Ground Rod Driver, Boom Truck (6 ton & below), Skid Steer Loaders, Material Handler.

**Ratio :**

(1) Journeyman Lineman to (1) Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, CUYAHOGA, DARKE, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, GALLIA, GEAUGA, GREENE, GUERNSEY, HAMILTON, HARRISON, HIGHLAND, HOCKING, HOLMES, JACKSON, JEFFERSON, KNOX, LAKE, LAWRENCE, LICKING, LOGAN, LORAIN, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE, RICHLAND, ROSS, SCIOTO, SHELBY, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, UNION, VINTON, WARREN, WASHINGTON, WAYNE

**Special Jurisdictional Note :** 0.30 is for Health Retirement Account.

**Details :**

Heli - Arc Welding will be paid \$.30 above Journeyman rate. Additional compensation of 10% over the Journeyman Lineman and Journeyman Technician for performing work on structures outside of buildings such

as water towers, smoke stacks, radio and television towers, more than 75' above the ground.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Electrical Local 71 Outside Cincinnati**

**Change # : LCN01-2021fbLoc71Cincinnati**

**Craft : Lineman Effective Date : 03/16/2021 Last Posted : 03/16/2021**

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Electrical Lineman	\$40.31	\$6.75	\$1.21	\$0.40	\$0.00	\$7.66	\$0.06	\$0.00	\$0.00	\$56.39	\$76.54
Traffic Signal & Lighting Journeyman	\$38.77	\$6.75	\$1.16	\$0.39	\$0.00	\$7.37	\$0.06	\$0.00	\$0.00	\$54.50	\$73.89
Equipment Operator	\$35.41	\$6.75	\$1.06	\$0.35	\$0.00	\$6.73	\$0.06	\$0.00	\$0.00	\$50.36	\$68.06
Groundman 0-12 months (W/O CDL)	\$21.47	\$6.75	\$0.64	\$0.21	\$0.00	\$4.08	\$0.06	\$0.00	\$0.00	\$33.21	\$43.95
Groundman 0-21 Months (W/CDL)	\$23.46	\$6.75	\$0.70	\$0.23	\$0.00	\$4.46	\$0.06	\$0.00	\$0.00	\$35.66	\$47.39
Groundman 1 Year or More (W/CDL)	\$25.45	\$6.75	\$0.76	\$0.25	\$0.00	\$4.84	\$0.06	\$0.00	\$0.00	\$38.11	\$50.83
Traffic Signal Apprentices											
1st 1,000 hours	\$23.26	\$6.75	\$0.70	\$0.23	\$0.00	\$4.42	\$0.06	\$0.00	\$0.00	\$35.42	\$47.05
2nd 1,000 hours	\$25.20	\$6.75	\$0.76	\$0.25	\$0.00	\$4.79	\$0.06	\$0.00	\$0.00	\$37.81	\$50.41
3rd 1,000 hours	\$27.14	\$6.75	\$0.81	\$0.27	\$0.00	\$5.16	\$0.06	\$0.00	\$0.00	\$40.19	\$53.76
4th 1,000 hours	\$29.08	\$6.75	\$0.87	\$0.29	\$0.00	\$5.53	\$0.06	\$0.00	\$0.00	\$42.58	\$57.12
5th 1,000 hours	\$31.01	\$6.75	\$0.93	\$0.31	\$0.00	\$5.89	\$0.06	\$0.00	\$0.00	\$44.95	\$60.46
6th 1,000 hours	\$34.89	\$6.75	\$1.05	\$0.35	\$0.00	\$6.63	\$0.06	\$0.00	\$0.00	\$49.73	\$67.17

Apprentice Lineman	Percent											
1st 1,000 Hours	60.00	\$24.19	\$6.75	\$0.73	\$0.24	\$0.00	\$4.60	\$0.06	\$0.00	\$0.00	\$36.57	\$48.66
2nd 1,000 Hours	65.00	\$26.20	\$6.75	\$0.79	\$0.26	\$0.00	\$4.98	\$0.06	\$0.00	\$0.00	\$39.04	\$52.14
3rd 1,000 Hours	70.00	\$28.22	\$6.75	\$0.85	\$0.28	\$0.00	\$5.36	\$0.06	\$0.00	\$0.00	\$41.52	\$55.63
4th 1,000 Hours	75.00	\$30.23	\$6.75	\$0.91	\$0.30	\$0.00	\$5.74	\$0.06	\$0.00	\$0.00	\$43.99	\$59.11
5th 1,000 Hours	80.00	\$32.25	\$6.75	\$0.97	\$0.32	\$0.00	\$6.13	\$0.06	\$0.00	\$0.00	\$46.48	\$62.60
6th 1,000 Hours	85.00	\$34.26	\$6.75	\$1.03	\$0.34	\$0.00	\$6.51	\$0.06	\$0.00	\$0.00	\$48.95	\$66.09
7th 1,000 Hours	90.00	\$36.28	\$6.75	\$1.09	\$0.36	\$0.00	\$6.89	\$0.06	\$0.00	\$0.00	\$51.43	\$69.57

**Special Calculation Note :** Other is Safety & Education Fund.

**Ratio :**

1 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

BROWN, BUTLER, CLERMONT, HAMILTON, WARREN

**Special Jurisdictional Note :**

**Details :**

A groundman when directed shall assist a Journeyman in the performance of his/her work on the ground, including the use of hand tools. A Groundman under no circumstances shall climb poles, towers, ladders, or work from an elevated platform or bucket truck.

No more than three (3) Groundmen shall work alone. Jobs with more than three Groundmen shall be supervised by a Groundcrew Foreman, Journeyman Lineman, Journeyman Traffic Signal Technician or an Equipment Operator.

Scope of Work: installation and maintenance of highway and street lighting, highway and street sign lighting, electronic message boards and traffic control systems, camera systems, traffic signal work, substation and line construction including overhead and underground projects for private and industrial work as in accordance with the IBEW Constitution. This Agreement includes the operation of all tools and equipment necessary for the installation of the above projects.



# Prevailing Wage Rate Skilled Crafts

**Name of Union: Carpenter & Pile Driver SW District HevHwy**

**Change # : LCN01-2021fbLoc126**

**Craft : Carpenter Effective Date : 06/17/2021 Last Posted : 06/17/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
<b>Classification</b>												
Carpenter	\$31.62		\$8.09	\$6.95	\$0.40	\$0.00	\$3.30	\$0.13	\$0.00	\$0.00	\$50.49	\$66.30
Pile Driver	\$29.34		\$6.63	\$6.95	\$0.40	\$0.00	\$1.97	\$0.10	\$0.00	\$0.00	\$45.39	\$60.06
<b>Apprentice</b>	<b>Percent</b>											
1st 6 Months	60.00	\$18.97	\$8.09	\$6.95	\$0.40	\$0.00	\$3.30	\$0.13	\$0.00	\$0.00	\$37.84	\$47.33
2nd 6 Months	65.00	\$20.55	\$8.09	\$6.95	\$0.40	\$0.00	\$3.30	\$0.13	\$0.00	\$0.00	\$39.42	\$49.70
3rd 6 Months	70.00	\$22.13	\$8.09	\$6.95	\$0.40	\$0.00	\$3.30	\$0.13	\$0.00	\$0.00	\$41.00	\$52.07
4th 6 Months	75.00	\$23.71	\$8.09	\$6.95	\$0.40	\$0.00	\$3.30	\$0.13	\$0.00	\$0.00	\$42.59	\$54.44
5th 6 Months	80.00	\$25.30	\$8.09	\$6.95	\$0.40	\$0.00	\$3.30	\$0.13	\$0.00	\$0.00	\$44.17	\$56.81
6th 6 Months	85.00	\$26.88	\$8.09	\$6.95	\$0.40	\$0.00	\$3.30	\$0.13	\$0.00	\$0.00	\$45.75	\$59.19
7th 6 Months	90.00	\$28.46	\$8.09	\$6.95	\$0.40	\$0.00	\$3.30	\$0.13	\$0.00	\$0.00	\$47.33	\$61.56
8th 6 Months	95.00	\$30.04	\$8.09	\$6.95	\$0.40	\$0.00	\$3.30	\$0.13	\$0.00	\$0.00	\$48.91	\$63.93

**Special Calculation Note :** Other is UBC National Fund.

**Ratio :**

1 Journeymen to 1 Apprentice

An employer shall have the right to employ one (1) Apprentice for one (1) Journeyman Carpenter in its employment for the first Apprentice employed, and 1 (1) Apprentice for two (2) Journeyman Carpenter for additional Apprentices employed.

Thereafter, every third additional carpenter hired shall be an apprentice, if available, and if practical for the type of work being performed.

**Jurisdiction ( \* denotes special jurisdictional note ) :**

BROWN, BUTLER, CHAMPAIGN, CLARK, CLERMONT, CLINTON, DARKE, GREENE, HAMILTON, LOGAN, MIAMI, MONTGOMERY, PREBLE, SHELBY, WARREN

**Special Jurisdictional Note :****Details :**

Highway Construction, Airport Construction, Heavy Construction but not limited to:(tunnels,subways,drainage projects,flood control,reservoirs). Railroad Construction,Sewer Waterworks & Utility Construction but not limited to: (storm sewers, waterlines, gaslines). Industrial & Building Site, Power Plant, Amusement Park, Athletic Stadium Site, Sewer and Water Plants.

When the Contractor furnishes the necessary underwater gear for the Diver, the Diver shall be paid one and one half (1&1/2) times the journeyman rate for the time spent in the water.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Carpenter & Pile Driver  
SW Zone 2**

**Change # : LCN01-2021fbLoc126**

**Craft : Carpenter Effective Date : 07/14/2021 Last Posted : 07/14/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Carpenter	\$28.67		\$7.88	\$6.95	\$0.43	\$0.00	\$1.91	\$0.13	\$0.00	\$0.00	\$45.97	\$60.31
Pile Driver	\$25.84		\$6.62	\$6.95	\$0.40	\$0.00	\$0.91	\$0.10	\$0.00	\$0.00	\$40.82	\$53.74
Apprentice	Percent											
1st 3 Months	60.00	\$17.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$17.20	\$25.80
2nd 3 Months	60.00	\$17.20	\$7.88	\$0.00	\$0.43	\$0.00	\$1.91	\$0.13	\$0.00	\$0.00	\$27.55	\$36.15
2rd 6 Months	60.00	\$17.20	\$7.88	\$0.00	\$0.43	\$0.00	\$1.91	\$0.13	\$0.00	\$0.00	\$27.55	\$36.15
3rd 6 Months	65.00	\$18.64	\$7.88	\$0.00	\$0.43	\$0.00	\$1.91	\$0.13	\$0.00	\$0.00	\$28.99	\$38.30
4th 6 Months	65.00	\$18.64	\$7.88	\$0.00	\$0.43	\$0.00	\$1.91	\$0.13	\$0.00	\$0.00	\$28.99	\$38.30
5th 6 Months	70.00	\$20.07	\$7.88	\$6.95	\$0.43	\$0.00	\$1.91	\$0.13	\$0.00	\$0.00	\$37.37	\$47.40
6th 6 Months	75.00	\$21.50	\$7.88	\$6.95	\$0.43	\$0.00	\$1.91	\$0.13	\$0.00	\$0.00	\$38.80	\$49.55
7th 6 Months	80.00	\$22.94	\$7.88	\$6.95	\$0.43	\$0.00	\$1.91	\$0.13	\$0.00	\$0.00	\$40.24	\$51.70
8th 6 Months	85.00	\$24.37	\$7.88	\$6.95	\$0.43	\$0.00	\$1.91	\$0.13	\$0.00	\$0.00	\$41.67	\$53.85

**Special Calculation Note :** Other is for UBC National Fund.

**Ratio :**

After employing 1 Journeymen, the next carpenter employed my be an Apprentice. After the first apprentice is employed, the ratio of Apprentice to Journeymen shall not exceed 2 Journeymen for 1 Apprentice.

**Jurisdiction ( \* denotes special jurisdictional note ) :**

BROWN, BUTLER, CLERMONT, CLINTON, HAMILTON, WARREN

**Special Jurisdictional Note :**

**Details :**

Carpenter duties shall include but not limited to: Pile driving, milling, fashioning, joining, assembling, erecting, fastening, or dismantling of all material of wood, plastic, metal, fiber, cork, and composition, and all other substitute materials: pile driving, cutting, fitting, and placing of lagging, and the handling, cleaning, erecting, installing, and dismantling of machinery, equipment, and erecting pre-engineered metal buildings.

Pile Drivers work but not limited to: unloading, assembling, erection, repairs, operation, signaling, dismantling, and reloading all equipment that is used for pile driving including pile butts. pile butts is defined as sheeting or scrap piling. Underwater work that may be required in connection with the installation of piling. The diver and his tender work as a team and shall arrive at their own financial arrangements with the contractor. Any configuration of wood, steel, concrete, or composite that is jettied, driven, or vibrated onto the ground by conventional pile driving equipment for the purpose of supporting a future load that may be permanent or temporary.

Driving bracing, plumbing, cutting off and capping of all piling whether wood, metal, pipe piling or composite. loading, unloading, erecting, framing, dismantling, moving, and handling of pile driving equipment. piling used in the construction and repair of all wharves, docks, piers, trestles, caissons, cofferdams, and the erection of all sea walls and breakwaters. All underwater and marine work on bulkheads, wharves, docks, shipyards, caissons, piers, bridges, pipeline work, viaducts, marine cable and trestles, as well as salvage and reclamation work where divers are employed.

Rate shall include carpenters, acoustic, and ceiling installers, drywall installers, pile drivers, and floorlayers.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Cement Mason Local 132 (Cincinnati)**

**Change # : LCN01-2021fbLoc132**

**Craft : Cement Effective Date : 07/14/2021 Last Posted : 07/14/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
<b>Classification</b>												
Cement Mason	\$28.00		\$7.15	\$6.50	\$0.65	\$0.00	\$0.10	\$0.00	\$0.00	\$0.00	\$42.40	\$56.40
<b>Apprentice</b>	<b>Percent</b>											
1st yr	70.00	\$19.60	\$7.15	\$6.50	\$0.65	\$0.00	\$0.10	\$0.00	\$0.00	\$0.00	\$34.00	\$43.80
2nd yr	80.00	\$22.40	\$7.15	\$6.50	\$0.65	\$0.00	\$0.10	\$0.00	\$0.00	\$0.00	\$36.80	\$48.00
3rd yr	90.00	\$25.20	\$7.15	\$6.50	\$0.65	\$0.00	\$0.10	\$0.00	\$0.00	\$0.00	\$39.60	\$52.20

**Special Calculation Note :** No special calculations for this skilled craft wage rate are required at this time.

**Ratio :**

- 1 Journeymen to 1 Apprentice
- 4 Journeymen to 2 Apprentice
- 7 Journeymen to 3 Apprentice
- 10 Journeymen to 4 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

BROWN, BUTLER, CLERMONT, HAMILTON, HIGHLAND, WARREN

**Special Jurisdictional Note :**

**Details :**

- \*Cement Masons working on silo & slip form work shall receive \$.50 per hour over Journeyman scale.
- \*Cement Masons working on swinging scaffolds shall receive \$.50 per hour over Journeyman scale.
- \*Cement Masons working on high lifts from 20' and above shall receive \$.50 per hour over Journeyman scale.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Electrical Local 212 Inside**

**Change # : LCN01-2021fbLoc212in**

**Craft : Electrical Effective Date : 06/07/2021 Last Posted : 06/03/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
<b>Classification</b>												
Electrician	\$32.32		\$7.00	\$9.72	\$0.58	\$0.00	\$2.55	\$0.65	\$0.00	\$0.00	\$52.82	\$68.98
Apprentice Indentured BEFORE 1/1/2017												
1st	\$12.93		\$7.00	\$0.39	\$0.23	\$0.00	\$0.35	\$0.00	\$0.00	\$0.00	\$20.90	\$27.37
2nd	\$14.22		\$7.00	\$0.43	\$0.26	\$0.00	\$0.35	\$0.00	\$0.00	\$0.00	\$22.26	\$29.37
3rd	\$15.84		\$7.00	\$4.77	\$0.29	\$0.00	\$1.50	\$0.65	\$0.00	\$0.00	\$30.05	\$37.97
4th	\$17.13		\$7.00	\$5.15	\$0.31	\$0.00	\$1.60	\$0.65	\$0.00	\$0.00	\$31.84	\$40.41
5th	\$18.75		\$7.00	\$5.64	\$0.34	\$0.00	\$1.65	\$0.65	\$0.00	\$0.00	\$34.03	\$43.41
6th	\$23.59		\$7.00	\$7.10	\$0.42	\$0.00	\$2.00	\$0.65	\$0.00	\$0.00	\$40.76	\$52.56
Apprentice Indentured AFTER 1/1/2017	Percent											
1st period 0-1000 hrs	45.00	\$14.54	\$7.00	\$0.44	\$0.26	\$0.00	\$0.35	\$0.00	\$0.00	\$0.00	\$22.59	\$29.87
2nd period 1000-2000 hrs	48.00	\$15.51	\$7.00	\$0.47	\$0.28	\$0.00	\$0.35	\$0.00	\$0.00	\$0.00	\$23.61	\$31.37
3rd period 2000-3500 hrs	50.00	\$16.16	\$7.00	\$4.86	\$0.29	\$0.00	\$1.55	\$0.65	\$0.00	\$0.00	\$30.51	\$38.59
4th period 3500-5000 hrs	52.00	\$16.81	\$7.00	\$5.05	\$0.30	\$0.00	\$1.60	\$0.65	\$0.00	\$0.00	\$31.41	\$39.81
5th period 5000-6500 hrs	57.00	\$18.42	\$7.00	\$5.54	\$0.33	\$0.00	\$1.65	\$0.65	\$0.00	\$0.00	\$33.59	\$42.80
6th period 6500-8000 hrs	68.00	\$21.98	\$7.00	\$6.61	\$0.40	\$0.00	\$1.90	\$0.65	\$0.00	\$0.00	\$38.54	\$49.53

**Special Calculation Note : Other is; Supplemental Unemployment**

**Ratio :**

- 1 - 3 Journeyman to 2 Apprentices
- 4 - 6 Journeyman to 4 Apprentices
- 7 - 9 Journeyman to 6 Apprentices

**Jurisdiction ( \* denotes special jurisdictional note ) :**

BROWN, CLERMONT, HAMILTON

**Special Jurisdictional Note :**

**Details :**

# Prevailing Wage Rate Skilled Crafts

Name of Union: Labor Local 265 Building

**Change # : LCN01-2021fbLoc265**

**Craft : Laborer Effective Date : 06/29/2021 Last Posted : 06/29/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Laborer Group 1	\$23.05		\$7.50	\$9.20	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$40.25	\$51.78
Group 2	\$23.05		\$7.50	\$9.20	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$40.25	\$51.78
Group 3	\$23.05		\$7.50	\$9.20	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$40.25	\$51.78
Group 5	\$23.55		\$7.50	\$9.20	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$40.75	\$52.53
Group 6	\$23.80		\$7.50	\$9.20	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$41.00	\$52.90
Apprentice	Percent											
0-1000 Hours	60.00	\$13.83	\$7.50	\$9.20	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$31.03	\$37.95
1001 - 2000 Hours	70.00	\$16.13	\$7.50	\$9.20	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$33.33	\$41.40
2001 - 3000 Hours	80.00	\$18.44	\$7.50	\$9.20	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$35.64	\$44.86
3001 - 4000 Hours	90.00	\$20.75	\$7.50	\$9.20	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$37.95	\$48.32
More than 4000 Hours	100.00	\$23.05	\$7.50	\$9.20	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$40.25	\$51.78

**Special Calculation Note :** No special calculations for this skilled craft wage rate are required at this time.

**Ratio :**

1 Journeymen to 1 Apprentice  
3 Journeymen to 1 Apprentice  
thereafter per project

**Jurisdiction ( \* denotes special jurisdictional note ) :**

BROWN, CLERMONT, CLINTON, HAMILTON

**Special Jurisdictional Note :**

**Details :**

Classification Descriptions :

**Group 1**

Building & Common Laborer, Asbestos Removal, Cement Mason Helpers, Hand Operated Mechanical Mule, Mechanical Mule, Mechanical Sweeper, Signaler, Flagger, Wrecking Laborer



Group 2

Bottom Man, Pipe Layer

Group 3

Skid Steer, Industrial Fork Lift Operator, Burning Torch Operator, Jack Hammer, Air Spade, Chipping Hammer, Mechanical & Air Tamper Operator, Mechanical Concrete Buggies, Power Operated Mechanical Mule, Concrete Pump Hose Man, Vibrator Man, CERCLA Trained Hazardous Material Removal - (levels A, B, & C), High lifts, Lulls & Dingo

Group 5

Tunnel Laborer

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Plumber Pipefitter Local 392**

**Change # : LCN01-2021fbLoc392**

**Craft : Plumber/Pipefitter Effective Date : 06/03/2021 Last Posted : 06/03/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
<b>Classification</b>												
Plumber Pipefitter	\$35.21		\$8.38	\$13.59	\$0.54	\$0.00	\$0.00	\$0.48	\$0.00	\$0.00	\$58.20	\$75.81
Plumber Helper	\$21.33		\$7.30	\$6.59	\$0.50	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$35.72	\$46.38
<b>Apprentice</b>	<b>Percent</b>											
1st yr	45.00	\$15.84	\$8.18	\$0.95	\$0.54	\$0.00	\$0.00	\$0.48	\$0.00	\$0.00	\$25.99	\$33.92
2nd yr	50.00	\$17.60	\$8.18	\$0.95	\$0.54	\$0.00	\$0.00	\$0.48	\$0.00	\$0.00	\$27.75	\$36.56
3rd yr	55.00	\$19.37	\$8.18	\$7.47	\$0.54	\$0.00	\$0.00	\$0.48	\$0.00	\$0.00	\$36.04	\$45.72
4th yr	60.00	\$21.13	\$8.18	\$7.47	\$0.54	\$0.00	\$0.00	\$0.48	\$0.00	\$0.00	\$37.80	\$48.36
5th yr	75.00	\$26.41	\$8.18	\$13.59	\$0.54	\$0.00	\$0.00	\$0.48	\$0.00	\$0.00	\$49.20	\$62.40

**Special Calculation Note : OTHER IS: SUPPLEMENTAL UNEMPLOYMENT BENEFITS.**

**Ratio :**

- 1 Journeymen to 1 Apprentice
- 4 Journeymen to 2 Apprentices
- 6 Journeymen to 3 Apprentices
- 10 Journeymen to 4 Apprentices
- 16 Journeymen to 5 Apprentices

**Jurisdiction ( \* denotes special jurisdictional note ) :**

BROWN, BUTLER, CLERMONT, HAMILTON, WARREN

When more than Sixteen (16) Journeymen are employed additional apprentices may be acquired at a ratio of one (1) apprentice to four (4) journeymen.

**Special Jurisdictional Note :**

**Details :**

Helpers shall be permitted to work on ONLY , Exterior Sewers, Concrete, Vitrified Clay or PVC Pipe and Digging and Backfilling for Piping Work. The ratio shall not exceed 2 helpers to 1 Journeymen when performing the scope of work listed above

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Sprinkler Fitter Local 669**

**Change # : LCN01-2021fbLoc669**

**Craft : Sprinkler Fitter Effective Date : 04/01/2021 Last Posted : 03/31/2021**

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
<b>Classification</b>												
Sprinkler Fitter	\$41.87		\$10.55	\$7.00	\$0.52	\$0.00	\$5.12	\$0.10	\$0.00	\$0.00	\$65.16	\$86.09
<b>Apprentice Indentured after April 1, 2013</b>	<b>Percent</b>											
CLASS 1	45.00	\$18.84	\$7.75	\$0.00	\$0.52	\$0.00	\$0.00	\$0.10	\$0.00	\$0.00	\$27.21	\$36.63
CLASS 2	50.00	\$20.93	\$7.75	\$0.00	\$0.52	\$0.00	\$0.00	\$0.10	\$0.00	\$0.00	\$29.30	\$39.77
CLASS 3	54.40	\$22.78	\$10.55	\$7.00	\$0.52	\$0.00	\$1.15	\$0.10	\$0.00	\$0.00	\$42.10	\$53.49
CLASS 4	59.40	\$24.87	\$10.55	\$7.00	\$0.52	\$0.00	\$1.15	\$0.10	\$0.00	\$0.00	\$44.19	\$56.63
CLASS 5	64.42	\$26.97	\$10.55	\$7.00	\$0.52	\$0.00	\$1.40	\$0.10	\$0.00	\$0.00	\$46.54	\$60.03
CLASS 6	69.40	\$29.06	\$10.55	\$7.00	\$0.52	\$0.00	\$1.40	\$0.10	\$0.00	\$0.00	\$48.63	\$63.16
CLASS 7	74.40	\$31.15	\$10.55	\$7.00	\$0.52	\$0.00	\$1.40	\$0.10	\$0.00	\$0.00	\$50.72	\$66.30
CLASS 8	79.42	\$33.25	\$10.55	\$7.00	\$0.52	\$0.00	\$1.40	\$0.10	\$0.00	\$0.00	\$52.82	\$69.45
CLASS 9	84.40	\$35.34	\$10.55	\$7.00	\$0.52	\$0.00	\$1.40	\$0.10	\$0.00	\$0.00	\$54.91	\$72.58
CLASS 10	89.40	\$37.43	\$10.55	\$7.00	\$0.52	\$0.00	\$1.40	\$0.10	\$0.00	\$0.00	\$57.00	\$75.72

**Special Calculation Note : \$0.10 for Other is National Fire Sprinkler Association**

**Ratio :**

1 Journeyman to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, ALLEN, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, DARKE, DEFIANCE, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LAWRENCE, LICKING, LOGAN, LUCAS, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW,

MUSKINGUM, NOBLE, OTTAWA, PAULDING,  
PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE,  
PUTNAM, RICHLAND, ROSS, SANDUSKY,  
SCIOTO, SENECA, SHELBY, STARK, SUMMIT,  
TRUMBULL, TUSCARAWAS, UNION, VAN WERT,  
VINTON, WARREN, WASHINGTON, WAYNE,  
WILLIAMS, WOOD, WYANDOT

### **Special Jurisdictional Note :**

#### **Details :**

Sprinkler Fitter work shall consist of the installation, dismantling, maintenance, repairs, adjustments, and corrections of all fire protection and fire control systems including the unloading, handling by hand, power equipment and installation of all piping or tubing, appurtenances and equipment pertaining thereto, including both overhead and underground water mains, fire hydrants and hydrant mains, standpipes and hose connections to sprinkler systems used in connection with sprinkler and alarm systems. Also all tanks and pumps connected thereto, also included shall be CO-2 and Cardox Systems, Dry Chemical Systems, Foam Systems and all other fire protection systems.

# Prevailing Wage Rate Skilled Crafts

Name of Union: Labor HevHwy 3

**Change # : LCN01-2021fbLocalHevHwy3**

**Craft : Laborer Group 1 Effective Date : 05/01/2021 Last Posted : 04/21/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Laborer Group 1	\$33.27		\$7.50	\$3.90	\$0.45	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$45.22	\$61.86
Group 2	\$33.44		\$7.50	\$3.90	\$0.45	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$45.39	\$62.11
Group 3	\$33.77		\$7.50	\$3.90	\$0.45	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$45.72	\$62.61
Group 4	\$34.22		\$7.50	\$3.90	\$0.45	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$46.17	\$63.28
Watch Person	\$26.00		\$7.50	\$3.90	\$0.45	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$37.95	\$50.95
Apprentice	Percent											
0-1000 hrs	60.00	\$19.96	\$7.50	\$3.90	\$0.45	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$31.91	\$41.89
1001-2000 hrs	70.00	\$23.29	\$7.50	\$3.90	\$0.45	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$35.24	\$46.88
2001-3000 hrs	80.00	\$26.62	\$7.50	\$3.90	\$0.45	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$38.57	\$51.87
3001-4000 hrs	90.00	\$29.94	\$7.50	\$3.90	\$0.45	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$41.89	\$56.86
More than 4000 hrs	100.00	\$33.27	\$7.50	\$3.90	\$0.45	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$45.22	\$61.86

**Special Calculation Note :** Watchmen have no Apprentices. Tunnel Laborer rate with air-pressurized add \$1.00 to the above wage rate.

**Ratio :**

1 Journeymen to 1 Apprentice  
3 Journeymen to 1 Apprentice thereafter

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, ALLEN, ASHLAND, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, DARKE, DEFIANCE, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, JACKSON, JEFFERSON, KNOX, LAWRENCE, LICKING, LOGAN, MADISON, MARION, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN,

MORROW, MUSKINGUM, NOBLE, PAULDING,  
 PERRY, PICKAWAY, PIKE, PREBLE, PUTNAM,  
 RICHLAND, ROSS, SCIOTO, SENECA, SHELBY,  
 TUSCARAWAS, UNION, VAN WERT, VINTON,  
 WARREN, WASHINGTON, WAYNE, WILLIAMS,  
 WYANDOT

**Special Jurisdictional Note :** Hod Carriers and Common Laborers - Heavy, Highway, Sewer, Waterworks, Utility, Airport, Railroad, Industrial and Building Site, Sewer Plant, Waste Water Treatment Facilities Construction

### Details :

#### Group 1

Laborer (Construction); Plant Laborer or Yardman, Right-of-way Laborer, Landscape Laborer, Highway Lighting Worker, Signalization Worker, (Swimming) Pool Construction Laborer, Utility Man, \*Bridge Man, Handyman, Joint Setter, Flagperson, Carpenter Helper, Waterproofing Laborer, Slurry Seal, Seal Coating, Surface Treatment or Road Mix Laborer, Riprap Laborer & Grouter, Asphalt Laborer, Dump Man (batch trucks), Guardrail & Fence Installer, Mesh Handler & Placer, Concrete Curing Applicator, Scaffold Erector, Sign Installer, Hazardous Waste (level D), Diver Helper, Zone Person and Traffic Control.

\*Bridge Man will perform work as per the October 31, 1949, memorandum on concrete forms, by and between the United Brotherhood of Carpenters and Joiners of America and the Laborers' International Union of North America, which states in; "the moving, cleaning, oiling and carrying to the next point of erection, and the stripping of forms which are not to be re-used, and forms on all flat arch work shall be done by members of the Laborers' International Union of North America."

#### Group 2

Asphalt Raker, Screwman or Paver, Concrete Puddler, Kettle Man (pipeline), All Machine-Driven Tools (Gas, Electric, Air), Mason Tender, Brick Paver, Mortar Mixer, Skid Steer, Sheeting & Shoring Person, Surface Grinder Person, Screedperson, Water Blast, Hand Held Wand, Power Buggy or Power Wheelbarrow, Paint Striper, Plastic fusing Machine Operator, Rodding Machine Operator, Pug Mill Operator, Operator of All Vacuum Devices Wet or Dry, Handling of all Pumps 4 inches and under (gas, air or electric), Diver, Form Setter, Bottom Person, Welder Helper (pipeline), Concrete Saw Person, Cutting with Burning Torch, Pipe Layer, Hand Spiker (railroad), Underground Person (working in sewer and waterline, cleaning, repairing and reconditioning). Tunnel Laborer (without air), Caisson, Cofferdam (below 25 feet deep), Air Track and Wagon Drill, Sandblaster Nozzle Person, Hazardous Waste (level B), \*\*\*Lead Abatement, Hazardous Waste (level C)

\*\*\*Includes the erecting of structures for the removal, including the encapsulation and containment of Lead abatement process.

#### Group 3

Blast and Powder Person, Muckers will be defined as shovel men working directly with the miners, Wrencher (mechanical joints & utility pipeline), Yarner, Top Lander, Hazardous Waste (level A), Concrete Specialist, Curb Setter and Cutter, Grade Checker, Concrete Crew in Tunnels. Utility pipeline Tappers, Waterline, Caulker, Signal Person will receive the rate equal to the rate paid the Laborer classification for which the Laborer is signaling.

#### Group 4

Miner, Welder, Gunitite Nozzle Person

A.) The Watchperson shall be responsible to patrol and maintain a safe traffic zone including but not limited to barrels, cones, signs, arrow boards, message boards etc.

The responsibility of a watchperson is to see that the equipment, job and office trailer etc. are secure.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Operating Engineers - HevHwy Zone II**

**Change # : LCN01-2021sksLoc18hevhwyl**

**Craft : Operating Engineer Effective Date : 08/13/2021 Last Posted : 08/13/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Operator Class A	\$39.14		\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$55.09	\$74.66
Operator Class B	\$39.02		\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$54.97	\$74.48
Operator Class C	\$37.98		\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$53.93	\$72.92
Operator Class D	\$36.80		\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$52.75	\$71.15
Operator Class E	\$31.34		\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$47.29	\$62.96
Master Mechanic	\$39.39		\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$55.34	\$75.03
<b>Apprentice</b>	<b>Percent</b>											
1st Year	50.00	\$19.57	\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$35.52	\$45.31
2nd Year	60.00	\$23.48	\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$39.43	\$51.18
3rd Year	70.00	\$27.40	\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$43.35	\$57.05
4th Year	80.00	\$31.31	\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$47.26	\$62.92
Field Mech Trainee Class 2												
1st year	50.00	\$19.57	\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$35.52	\$45.31
2nd year	60.00	\$23.48	\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$39.43	\$51.18
3rd year	70.00	\$27.40	\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$43.35	\$57.05
4th year	80.00	\$31.31	\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$47.26	\$62.92

**Special Calculation Note :** Other: Education & Safety Fund is \$0.09 per hour.

**Ratio :**

For every (3) Operating Engineer Journeymen employed by the company, there may be employed (1) Registered Apprentice or Trainee Engineer through the referral when they are available. An Apprentice, while employed as part of a crew per Article VIII, paragraph

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, ALLEN, ASHLAND, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COSHOCTON, CRAWFORD, DARKE, DEFIANCE, DELAWARE, FAIRFIELD, FAYETTE,



65 will not be subject to the apprenticeship ratios in this collective bargaining agreement

FRANKLIN, FULTON, GALLIA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LAWRENCE, LICKING, LOGAN, LUCAS, MADISON, MARION, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, TUSCARAWAS, UNION, VAN WERT, VINTON, WARREN, WASHINGTON, WAYNE, WILLIAMS, WOOD, WYANDOT

## Special Jurisdictional Note :

### Details :

\*\*Apprentices will receive a 10% increase on top of the percentages listed above provided they are operating mobile equipment. Mechanic Trainees will receive 10% increase if they are required to have CDL.

Class A - Air Compressors on Steel Erection; Asphalt Plant Engineers (Cleveland District Only); Barrier Moving Machine; Boiler Operators, Compressor Operators, or Generators, when mounted on a rig; Boom Trucks (all types); Cableways; Cherry Pickers; Combination- Concrete Mixers & Towers; Concrete Plants (over 4 yd capacity); Concrete Pumps; Cranes (all types); Compact Cranes track or rubber over 4,000 pounds capacity; Cranes self-erecting stationary, track or truck; Derricks (all types); Draglines; Dredges dipper, clam or suction; Elevating Graders or Euclid Loaders; Floating Equipment (all types); Gradalls; Helicopter Crew (Operator- hoist or winch); Hoes (all types); Hoisting Engines; Hoisting Engines, on shaft or tunnel work; Hydraulic Gantry (lifting system); Industrial-type Tractors; Jet Engine Dryer (D8 or D9) diesel Tractors; Locomotives (standard gauge); Maintenance Operators/Technicians (class A); Mixers, paving (single or double drum); Mucking Machines; Multiple Scrapers; Piledriving Machines (all types); Power Shovels, Prentice Loader; Quad 9 (double pusher); Rail Tamper (with automatic lifting and aligning device); Refrigerating Machines (freezer operation); Rotary Drills, on caisson work; Rough Terrain Fork Lift with winch/hoist; Side Booms; Slip Form Pavers; Survey Crew Party Chiefs; Tower Derricks; Tree Shredders; Trench Machines (over 24" wide); Truck Mounted Concrete Pumps; Tug Boats; Tunnel Machines and /or Mining Machines; Wheel Excavators.

Class B - Asphalt Pavers; Automatic Subgrade Machines, self-propelled (CMI-type); Bobcat-type and /or Skid Steer Loader with hoe attachment greater than 7000 lbs.; Boring Machine Operators (more than 48 inches); Bulldozers; Concrete Saws, Vermeer type; Endloaders; Horizontal Directional Drill (50,000 ft. lbs. thrust and over); Hydro Milling Machine; Kolman-type Loaders (production type-dirt); Lead Greasemen; Lighting and Traffic Signal Installation Equipment includes all groups or classifications; Maintenance Operators/Technicians, Class B; Material Transfer Equipment (shuttle buggy) Asphalt; Pettibone-Rail Equipment; Power Graders; Power Scrapers; Push Cats; Rotomills (all), Grinders and Planners of all types, Groovers (excluding walk-behinds); Trench Machines (24 inch wide and under).

Class C - A-Frames; Air Compressors, on tunnel work (low Pressure); Articulating/straight bed end dumps if assigned (minus \$4.00 per hour); Asphalt Plant Engineers (Portage and Summit Counties only); Bobcat-type and/or skid steer loader with or without attachments; Drones; Highway Drills (all types); HydroVac/Excavator (when a second person is needed, the rate of pay will be "Class E"); Locomotives (narrow gauge); Material Hoist/Elevators; Mixers, concrete (more than one bag capacity); Mixers, one bag capacity (side loader); Power Boilers (over 15 lbs. pressure); Pump Operators (installing or operating well Points); Pumps (4 inch and over discharge); Railroad Tie Inserter/Remover; Rollers, Asphalt; Rotovator (lime-soil Stabilizer); Switch & Tie Tampers (without lifting and aligning device); Utilities Operators, (small equipment); Welding Machines and Generators.

Class D – Backfillers and Tampers; Ballast Re-locator; Bar and Joint Installing Machines; Batch Plant Operators; Boring Machine Operators (48 inch or less); Bull Floats; Burlap and Curing Machines; Concrete Plants (capacity 4 yds. and under); Concrete Saws (multiple); Conveyors (highway); Crushers; Deckhands; Farm type tractors, with attachments (highway); Finishing Machines; Firemen, Floating Equipment (all types); Fork Lifts (highway), except masonry; Form Trenchers; Hydro Hammers; Hydro Seeders; Pavement Breakers (hydraulic or cable); Plant Mixers; Post Drivers; Post Hole Diggers; Power Brush Burners; Power Form Handling Equipment; Road Widening Trenchers; Rollers (brick, grade, macadam); Self-Propelled Power Spreaders; Self-Propelled Sub-Graders; Steam Firemen; Survey Instrument men; Tractors, pulling sheepsfoot rollers or graders; Vibratory Compactors, with integral power.

Class E - Compressors (portable, Sewer, Heavy and Highway); Cranes-Compact, track or rubber under 4,000 pound capacity; Drum Firemen (asphalt plant); Fueling and greasing (Primary Operator with Specialized CDL Endorsement Add \$3.00/hr); Generators; Inboard-Outboard Motor Boat Launches; Masonry Fork Lifts; Oil Heaters (asphalt plant); Oilers/Helpers; Power Driven Heaters (oil fired); Power Scrubbers; Power Sweepers; Pumps (under 4 inch discharge); Signalperson; Survey Rodmen or Chairmen; Tire Repairmen; VAC/ALLS. Master Mechanic - Master Mechanic

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Operating Engineers - Building Local 18 - Zone III**

**Change # : LCN01-2021sksLoc18zone3**

**Craft : Operating Engineer Effective Date : 08/13/2021 Last Posted : 08/13/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Operator Group A	\$39.14		\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$55.09	\$74.66
Operator Group B	\$39.02		\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$54.97	\$74.48
Operator Group C	\$37.98		\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$53.93	\$72.92
Operator Group D	\$36.80		\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$52.75	\$71.15
Operator Group E	\$31.34		\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$47.29	\$62.96
Master Mechanic	\$39.39		\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$55.34	\$75.03
Cranes 150'-180'	\$39.64		\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$55.59	\$75.41
Cranes 180'-249'	\$40.14		\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$56.09	\$76.16
Cranes 249' and over	\$40.39		\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$56.34	\$76.53
<b>Apprentice</b>	<b>Percent</b>											
1st Year	50.00	\$19.57	\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$35.52	\$45.31
2nd Year	60.00	\$23.48	\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$39.43	\$51.18
3rd Year	70.00	\$27.40	\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$43.35	\$57.05
4th Year	80.00	\$31.31	\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$47.26	\$62.92
Field Mechanic Trainee												
1st Year	50.00	\$19.57	\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$35.52	\$45.31
2nd Year	60.00	\$23.48	\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$39.43	\$51.18
3rd Year	70.00	\$27.40	\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$43.35	\$57.05
4th Year	80.00	\$31.31	\$8.76	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$47.26	\$62.92

**Special Calculation Note : Other: Education & Safety \$0.09**

**Ratio :**

**Jurisdiction ( \* denotes special jurisdictional**

For every (3) Operating Engineer Journeymen employed by the company there may be employed (1) Registered Apprentice or trainee Engineer through the referral when they are available. An apprentice, while employed as part of a crew per Article VIII, paragraph 78, will not be subject to the apprenticeship ratios in this collective bargaining agreement

**note ) :**

ADAMS, ALLEN, ASHLAND, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COSHOCTON, CRAWFORD, DARKE, DEFIANCE, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, JACKSON, JEFFERSON, KNOX, LAWRENCE, LICKING, LOGAN, MADISON, MARION, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, TUSCARAWAS, UNION, VAN WERT, VINTON, WARREN, WASHINGTON, WAYNE, WILLIAMS, WYANDOT

**Special Jurisdictional Note :**

**Details :**

Note: There will be a 10% increase for the apprentices on top of the percentages listed above provided they are operating mobile equipment. Mechanic Trainees will receive 10% increase if required to have CDL

Group A- Barrier Moving Machines; Boiler Operators or Compressor Operators, when compressor or boiler is mounted on crane (Piggyback Operation); Boom Trucks (all types); Cableways Cherry Pickers; Combination - Concrete Mixers & Towers; All Concrete Pumps with Booms; Cranes (all types); Compact Cranes, track or rubber over 4,000 pounds capacity; Cranes self-erecting, stationary, track or truck (all configurations); Derricks (all types); Draglines; Dredges (dipper, clam or suction) 3-man crew; Elevating Graders or Euclid Loaders; Floating Equipment; Forklift (rough terrain with winch/hoist); Gradalls; Helicopter Operators, hoisting building materials; Helicopter Winch Operators, Hoisting building materials; Hoes (All types); Hoists (with two or more drums in use); Horizontal Directional Drill; Hydraulic Gantry (lift system); Laser Finishing Machines; Laser Screed and like equipment; Lift Slab or Panel Jack Operators; Locomotives (all types); Maintenance Operator/Technician(Mechanic Operator/Technician and/or Welder); Mixers, paving (multiple drum); Mobile Concrete Pumps, with booms; Panelboards, (all types on site); Pile Drivers; Power Shovels; Prentice Loader; Rail Tamper (with automatic lifting and aligning device); Rotary Drills (all), used on caissons for foundations and sub-structure; Side Booms; Slip Form Pavers; Straddle Carriers (Building Construction on site); Trench Machines (over 24" wide); Tug Boats.

Group B - Articulating/end dumps (minus \$4.00/hour from Group B rate); Asphalt Pavers; Bobcat-type and/or skid steer loader with hoe attachment greater than 7000 lbs.; Bulldozers; CMI type Equipment; Concrete Saw, Vermeer-type; Endloaders; Hydro Milling Machine; Kolman-type Loaders (Dirt Loading); Lead Greasemen; Mucking Machines; Pettibone-Rail Equipment; Power Graders; Power Scoops; Power Scrapers; Push Cats;, Rotomills (all), grinders and planers of all types.

Group C - A-Frames; Air Compressors, Pressurizing Shafts or Tunnels; All Asphalt Rollers; Bobcat-type and/or Skid Steer Loader with or without attachments; Boilers (15 lbs. pressure and over); All Concrete Pumps (without booms with 5 inch system); Fork Lifts (except masonry); Highway Drills - all types (with integral power); Hoists (with one drum); House Elevators (except those automatic call button controlled), Buck Hoists, Transport Platforms, Construction Elevators; Hydro Vac/Excavator (when a second person is needed, the rate of pay will be "Class E"); Man Lifts; Material hoist/elevators; Mud Jacks; Pressure Grouting; Pump Operators (installing or operating Well Points or other types of Dewatering Systems); Pumps (4 inches and over discharge); Railroad Tie

(Insert/Remover); Rotovator (Lime-Soil Stabilizer); Submersible Pumps (4" and over discharge); Switch & Tie Tamers (without lifting and aligning device); Trench Machines (24" and under); Utility Operators.

Group D - Backfillers and Tamers; Ballast Re-locator; Batch Plant Operators; Bar and Joint Installing Machines; Bull Floats; Burlap and Curing Machines; Clefplanes; Compressors, on building construction; Concrete Mixers, more than one bag capacity; Concrete Mixers, one bag capacity (side loaders); All Concrete Pumps (without boom with 4" or smaller system); Concrete Spreader; Conveyors, used for handling building materials; Crushers; Deckhands; Drum Fireman (in asphalt plants); Farm type tractors pulling attachments; Finishing Machines; Form Trenchers; Generators; Guniting Machines; Hydro-seeders; Pavement Breakers (hydraulic or cable); Post Drivers; Post Hole Diggers; Pressure Pumps (over 1/2" discharge); Road Widening Trenchers; Rollers (except asphalt); Self-propelled sub-graders; Shotcrete Machines; Tire Repairmen; Tractors, pulling sheepsfoot post roller or grader; VAC/ALLS; Vibratory Compactors, with integral power; Welders.

Group E – Allen Screed Paver (concrete); Boilers (less than 15 lbs. pressure); Cranes-Compact, track or rubber (under 4,000 pounds capacity); Directional Drill "Locator"; Fueling and greasing +\$3.00; Inboard/outboard Motor Boat Launches; Light Plant Operators; Masonry Fork Lifts; Oilers/Helpers; Power Driven Heaters (oil fired); Power Scrubbers; Power Sweepers; Pumps (under 4 inch discharge); Signalperson, Submersible Pumps (under 4" discharge).

Master Mechanics - Master Mechanic

Cranes 150' – 180' - Boom & Jib 150 - 180 feet

Cranes 180' – 249' - Boom & Jib 180 - 249 feet

Cranes 250' and over - Boom & Jib 250-feet or over

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Electrical Local 212 Voice Data Video**

**Change # : LCN01-2021sksLoc212VDV**

**Craft : Voice Data Video Effective Date : 12/15/2021 Last Posted : 12/15/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
<b>Classification</b>												
Electrical Installer Technician A	\$25.95		\$6.30	\$3.18	\$0.49	\$0.00	\$2.00	\$0.30	\$0.00	\$0.00	\$38.22	\$51.19
Electrical-Installer Technician B	\$24.65		\$6.30	\$3.14	\$0.47	\$0.00	\$2.00	\$0.30	\$0.00	\$0.00	\$36.86	\$49.18
JW Installer Technician	\$23.36		\$6.30	\$3.10	\$0.44	\$0.00	\$2.00	\$0.30	\$0.00	\$0.00	\$35.50	\$47.18
NON BICSI Installer	\$16.87		\$3.00	\$1.51	\$0.32	\$0.00	\$1.40	\$0.00	\$0.00	\$0.00	\$23.10	\$31.53
Cable Puller	\$12.98		\$3.00	\$0.39	\$0.25	\$0.00	\$0.25	\$0.00	\$0.00	\$0.00	\$16.87	\$23.36
Apprentice Indentured After 12/31/2018												
55.00	\$14.27		\$3.00	\$0.43	\$0.27	\$0.00	\$0.25	\$0.00	\$0.00	\$0.00	\$18.22	\$25.35
55.00	\$14.27		\$3.00	\$0.43	\$0.27	\$0.00	\$0.25	\$0.00	\$0.00	\$0.00	\$18.22	\$25.35
65.00	\$16.87		\$6.30	\$2.91	\$0.32	\$0.00	\$2.00	\$0.20	\$0.00	\$0.00	\$28.60	\$37.04
65.00	\$16.87		\$6.30	\$2.91	\$0.32	\$0.00	\$2.00	\$0.20	\$0.00	\$0.00	\$28.60	\$37.04
75.00	\$19.46		\$6.30	\$2.98	\$0.37	\$0.00	\$2.00	\$0.23	\$0.00	\$0.00	\$31.34	\$41.07
75.00	\$19.46		\$6.30	\$2.98	\$0.37	\$0.00	\$2.00	\$0.23	\$0.00	\$0.00	\$31.34	\$41.07
80.00	\$20.76		\$6.30	\$3.02	\$0.39	\$0.00	\$2.00	\$0.24	\$0.00	\$0.00	\$32.71	\$43.09
80.00	\$20.76		\$6.30	\$3.02	\$0.39	\$0.00	\$2.00	\$0.24	\$0.00	\$0.00	\$32.71	\$43.09
<b>Apprentice Indentured Before 01/01/2018</b>	<b>Percent</b>											
1st 800 Hours	50.00	\$12.98	\$6.30	\$0.39	\$0.25	\$0.00	\$0.25	\$0.30	\$0.00	\$0.00	\$20.46	\$26.95

2nd 800 - 1600 hours	50.00	\$12.98	\$6.30	\$0.39	\$0.25	\$0.00	\$0.25	\$0.30	\$0.00	\$0.00	\$20.46	\$26.95
3rd 1600 - 2400 hours	60.00	\$15.57	\$6.30	\$2.87	\$0.30	\$0.00	\$2.00	\$0.30	\$0.00	\$0.00	\$27.34	\$35.12
4th 2400 - 3200 hours	65.00	\$16.87	\$6.30	\$2.91	\$0.32	\$0.00	\$2.00	\$0.30	\$0.00	\$0.00	\$28.70	\$37.13
5th 3200 - 4000 hours	70.03	\$18.17	\$6.30	\$2.95	\$0.35	\$0.00	\$2.00	\$0.30	\$0.00	\$0.00	\$30.07	\$39.16
6th 4000 - 4800 hours	75.00	\$19.46	\$6.30	\$2.98	\$0.37	\$0.00	\$2.00	\$0.30	\$0.00	\$0.00	\$31.41	\$41.14

**Special Calculation Note :** Other is Health Reimbursement Account.

**Ratio :**

- 3 Technician to 2 Apprentices
- 6 Technician to 4 Apprentices
- 9 Technician to 6 Apprentices

**Jurisdiction ( \* denotes special jurisdictional note ) :**

BROWN, CLERMONT, HAMILTON

**Special Jurisdictional Note :**

**Details :**

- The following work is excluded from the Teledata Technician Work Scope:  
The installation of computer systems in industrial applications such as assembly lines, robotics, computer controller manufacturing systems.
- The installation of conduit and /or raceways shall be installed by Inside Wireman. On sites where there is no Inside Wireman employed the Teledata Technician may install raceway, or conduit not greater than 10 feet.
- Fire Alarm work shall not be part of this agreement.
- All HVAC control work shall not be part of this agreement.
- A Journeyman Installer Technician A shall be an individual with five (5) years of experience and training, successfully completed classroom & OJT requirements of JATC apprentice program, passed and maintained BICSI Installer Level 1, BICSI Installer Level 2, and BICSI Technician Certificate.
- Installer Technician (B) shall be an individual with four (4) years experience & training, successfully completed classroom and OJT requirements of JATC administered apprentice program, pass and maintain BICSI Installer Level 1 and Installer Level 2.
- JW Installer Technician shall be an individual with three (3) years of experience and training successfully completed classroom and OTJ requirements of JATC administered apprentice program, pass and maintained BICSI Installer Level 1 and BICSI Installer Level 2 or has passed and maintained BICSI Installer Level 2.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Carpenter Millwright Local 1090 SW Zone I**

**Change # : LCN01-2021sksLoc1066**

**Craft : Carpenter Effective Date : 09/22/2021 Last Posted : 09/22/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
<b>Classification</b>												
Carpenter Millwright	\$31.68		\$7.93	\$6.95	\$0.49	\$0.00	\$6.94	\$0.16	\$0.00	\$0.00	\$54.15	\$69.99
<b>Apprentice</b>	<b>Percent</b>											
1st 6 months	60.00	\$19.01	\$7.93	\$4.27	\$0.49	\$0.00	\$4.16	\$0.16	\$0.00	\$0.00	\$36.02	\$45.52
2nd 6 months	65.00	\$20.59	\$7.93	\$4.61	\$0.49	\$0.00	\$4.51	\$0.16	\$0.00	\$0.00	\$38.29	\$48.59
3rd 6 months	70.00	\$22.18	\$7.93	\$4.94	\$0.49	\$0.00	\$4.86	\$0.16	\$0.00	\$0.00	\$40.56	\$51.64
4th 6 months	75.00	\$23.76	\$7.93	\$5.28	\$0.49	\$0.00	\$5.21	\$0.16	\$0.00	\$0.00	\$42.83	\$54.71
5th 6 months	80.00	\$25.34	\$7.93	\$5.61	\$0.49	\$0.00	\$5.55	\$0.16	\$0.00	\$0.00	\$45.08	\$57.76
6th 6 months	85.00	\$26.93	\$7.93	\$5.95	\$0.49	\$0.00	\$5.90	\$0.16	\$0.00	\$0.00	\$47.36	\$60.82
7th 6 months	90.00	\$28.51	\$7.93	\$6.28	\$0.49	\$0.00	\$6.25	\$0.16	\$0.00	\$0.00	\$49.62	\$63.88
8th 6 months	95.00	\$30.10	\$7.93	\$6.62	\$0.49	\$0.00	\$6.59	\$0.16	\$0.00	\$0.00	\$51.89	\$66.93

**Special Calculation Note :** Other (\$0.16) \$0.11 National Fund and National Millwright Fund \$0.05

**Ratio :**

3 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

BROWN, BUTLER, CLERMONT, CLINTON, HAMILTON, WARREN

**Special Jurisdictional Note :**

**Details :**



# Prevailing Wage Rate Skilled Crafts

**Name of Union: Carpenter Floorlayer SW District G**

**Change # : LCN01-2021sksLocSWDayton**

**Craft : Carpenter Effective Date : 10/06/2021 Last Posted : 10/06/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
<b>Classification</b>												
Carpenter Floorlayer	\$27.12		\$7.93	\$6.95	\$0.43	\$0.00	\$1.95	\$0.13	\$0.00	\$0.00	\$44.51	\$58.07
<b>Apprentice</b>	<b>Percent</b>											
1st 3 months	65.00	\$17.63	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$17.63	\$26.44
2nd 3 months	65.00	\$17.63	\$7.93	\$0.00	\$0.43	\$0.00	\$1.95	\$0.13	\$0.00	\$0.00	\$28.07	\$36.88
2nd 6 months	65.00	\$17.63	\$7.93	\$0.00	\$0.43	\$0.00	\$1.95	\$0.13	\$0.00	\$0.00	\$28.07	\$36.88
3rd 6 months	70.00	\$18.98	\$7.93	\$0.00	\$0.43	\$0.00	\$1.95	\$0.13	\$0.00	\$0.00	\$29.42	\$38.92
4th 6 months	75.00	\$20.34	\$7.93	\$0.00	\$0.43	\$0.00	\$1.95	\$0.13	\$0.00	\$0.00	\$30.78	\$40.95
5th 6 months	80.00	\$21.70	\$7.93	\$6.95	\$0.43	\$0.00	\$1.95	\$0.13	\$0.00	\$0.00	\$39.09	\$49.93
6th 6 months	85.00	\$23.05	\$7.93	\$6.95	\$0.43	\$0.00	\$1.95	\$0.13	\$0.00	\$0.00	\$40.44	\$51.97
7th 6 months	90.00	\$24.41	\$7.93	\$6.95	\$0.43	\$0.00	\$1.95	\$0.13	\$0.00	\$0.00	\$41.80	\$54.00
8th 6 months	95.00	\$25.76	\$7.93	\$6.95	\$0.43	\$0.00	\$1.95	\$0.13	\$0.00	\$0.00	\$43.15	\$56.04

**Special Calculation Note :** Other fs for UBC National Fund and Install

**Ratio :**

1 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

BROWN, BUTLER, CHAMPAIGN, CLARK, CLERMONT, CLINTON, DARKE, GREENE, HAMILTON, LOGAN, MIAMI, MONTGOMERY, PREBLE, SHELBY, WARREN

**Special Jurisdictional Note :**

**Details :**

Scope of work shall include, but not be limited to: receiving,unloading,handling,distribution and installation of all carpeting materials,carpet padding or matting materials and all resilient materials whether for use on walls,

floors, counter, sink, table and all preparation work necessary in connection therewith, including sanding work. the installation of nonstructural under-layment and the work of removing, cleaning waxing of any of the above. Carpeting shall include any floor covering composed of either natural or synthetic fibers that are made in breadths to be sewed, fastened or directly glued to floors or over cushioning sound-proofing materials. Resilient Floors shall consist of and include the laying of all special designs of wood, wood block, wood composition, cork, linoleum, asphalt, mastic, plastic, rubber tile, whether nailed or glued.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Boilermaker Local 105**

**Change # : LCN02-2013fbLoc 105**

**Craft : Boilermaker Effective Date : 10/01/2013 Last Posted : 09/25/2013**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
<b>Classification</b>												
Boilermaker	\$35.26		\$7.07	\$13.28	\$0.89	\$0.00	\$3.00	\$0.55	\$0.00	\$0.00	\$60.05	\$77.68
<b>Apprentice</b>	<b>Percent</b>											
1st 6 months	70.03	\$24.69	\$7.07	\$11.30	\$0.89	\$0.00	\$2.10	\$0.55	\$0.00	\$0.00	\$46.60	\$58.95
2nd 6 months	75.02	\$26.45	\$7.07	\$11.30	\$0.89	\$0.00	\$2.25	\$0.55	\$0.00	\$0.00	\$48.51	\$61.74
3rd 6 months	80.00	\$28.21	\$7.07	\$11.30	\$0.89	\$0.00	\$2.40	\$0.55	\$0.00	\$0.00	\$50.42	\$64.52
4th 6 months	85.02	\$29.98	\$7.07	\$11.30	\$0.89	\$0.00	\$2.55	\$0.55	\$0.00	\$0.00	\$52.34	\$67.33
5th 6 months	87.52	\$30.86	\$7.07	\$13.28	\$0.89	\$0.00	\$2.63	\$0.55	\$0.00	\$0.00	\$55.28	\$70.71
6th 6 months	90.03	\$31.74	\$7.07	\$13.28	\$0.89	\$0.00	\$2.70	\$0.55	\$0.00	\$0.00	\$56.23	\$72.11
7th 6 months	92.50	\$32.62	\$7.07	\$13.28	\$0.89	\$0.00	\$2.78	\$0.55	\$0.00	\$0.00	\$57.19	\$73.49
8th 6 months	95.00	\$33.50	\$7.07	\$13.28	\$0.89	\$0.00	\$2.85	\$0.55	\$0.00	\$0.00	\$58.14	\$74.89

**Special Calculation Note :** Other is Supplemental Health and Welfare

**Ratio :**

5 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, ATHENS, BROWN, BUTLER, CHAMPAIGN, CLARK, CLERMONT, CLINTON, FAIRFIELD, FAYETTE, FRANKLIN, GALLIA, GREENE, GUERNSEY, HAMILTON, HIGHLAND, HOCKING, JACKSON, LAWRENCE, LICKING, MADISON, MEIGS, MIAMI, MONTGOMERY, MORGAN, MUSKINGUM, NOBLE, PERRY, PICKAWAY, PIKE, PREBLE, ROSS, SCIOTO, VINTON, WARREN

**Special Jurisdictional Note :**

**Details :**



# Prevailing Wage Rate Skilled Crafts

**Name of Union: Plasterer Local 132 (Cincinnati)**

**Change # : LCN02-2021fbLoc132**

**Craft : Plasterer Effective Date : 07/14/2021 Last Posted : 07/14/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Plasterer	\$26.65		\$5.80	\$8.25	\$0.70	\$0.00	\$1.00	\$0.00	\$0.00	\$0.00	\$42.40	\$55.72
Apprentice	Percent											
1st 900 hours	70.00	\$18.65	\$5.80	\$0.00	\$0.70	\$0.00	\$1.00	\$0.00	\$0.00	\$0.00	\$26.15	\$35.48
2nd 900 hours	74.00	\$19.72	\$5.80	\$0.00	\$0.70	\$0.00	\$1.00	\$0.00	\$0.00	\$0.00	\$27.22	\$37.08
3rd 900 hours	78.00	\$20.79	\$5.80	\$7.25	\$0.70	\$0.00	\$1.00	\$0.00	\$0.00	\$0.00	\$35.54	\$45.93
4th 900 hours	82.00	\$21.85	\$5.80	\$7.25	\$0.70	\$0.00	\$1.00	\$0.00	\$0.00	\$0.00	\$36.60	\$47.53
5th 900 hours	86.00	\$22.92	\$5.80	\$7.25	\$0.70	\$0.00	\$1.00	\$0.00	\$0.00	\$0.00	\$37.67	\$49.13
6th 900 hours	90.00	\$23.98	\$5.80	\$7.25	\$0.70	\$0.00	\$1.00	\$0.00	\$0.00	\$0.00	\$38.74	\$50.73
7th 900 hours	94.00	\$25.05	\$5.80	\$7.25	\$0.70	\$0.00	\$1.00	\$0.00	\$0.00	\$0.00	\$39.80	\$52.33
8th 900 hours	98.00	\$26.12	\$5.80	\$7.25	\$0.70	\$0.00	\$1.00	\$0.00	\$0.00	\$0.00	\$40.87	\$53.93

**Special Calculation Note :** No special calculations for this skilled craft wage rate are required at this time.

**Ratio :**

- 1 Journeyman to 1 Apprentice
- 4 Journeyman to 2 Apprentice
- 7 Journeyman to 3 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

BROWN, BUTLER, CLERMONT, HAMILTON, HIGHLAND, WARREN

**Special Jurisdictional Note :**

**Details :**

Apprentice and Shop Hand Pension are \$1.00 less than Journeyman.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Painter Local 639**

**Change # : LCNO1-2015fbLoc639**

**Craft : Painter Effective Date : 06/10/2015 Last Posted : 06/10/2015**

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
<b>Classification</b>											
Painter Metal Finisher/Helpers											
Top Helper Class A	\$19.09	\$3.65	\$0.00	\$0.00	\$0.66	\$0.00	\$0.00	\$0.00	\$0.00	\$23.40	\$32.94
Top Helper Class B	\$19.09	\$3.65	\$0.65	\$0.00	\$1.03	\$0.00	\$0.37	\$0.00	\$0.00	\$24.79	\$34.33
Top Helper Class C	\$19.09	\$3.65	\$1.00	\$0.00	\$1.76	\$0.00	\$0.37	\$0.00	\$0.00	\$25.87	\$35.41
Helper Class A	\$14.69	\$3.65	\$0.00	\$0.00	\$0.51	\$0.00	\$0.00	\$0.00	\$0.00	\$18.85	\$26.19
Helper Class B	\$14.69	\$3.65	\$0.65	\$0.00	\$0.79	\$0.00	\$0.28	\$0.00	\$0.00	\$20.06	\$27.40
Helper Class C	\$14.69	\$3.65	\$1.00	\$0.00	\$1.64	\$0.00	\$0.28	\$0.00	\$0.00	\$21.26	\$28.60
New Hire 90 Days	\$11.00	\$3.65	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$14.65	\$20.15

**Special Calculation Note : Other is Sick and Personal Time**

**Ratio :**

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, ALLEN, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, CUYAHOGA, DARKE, DEFIANCE, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GEAUGA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LAKE, LAWRENCE, LICKING, LOGAN, LORAIN, LUCAS, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY,

SCIOTO, SENECA, SHELBY, STARK, SUMMIT,  
TRUMBULL, TUSCARAWAS, UNION, VAN WERT,  
VINTON, WARREN, WASHINGTON, WAYNE,  
WILLIAMS, WOOD, WYANDOT

### **Special Jurisdictional Note :**

#### **Details :**

Top Helper: Shall perform the responsibilities of a Helper and be responsible for the setup, break down, safety and quality of the company's product.

Helper : Shall be responsible for performing tasks in refinishing, compliance with safety procedures, setting up and breaking down job sites, scaffolding and swing stages and preparing surfaces for refinishing including but not limited to, masking and stripping and cleaning, oxidizing, polishing and scratch removal on various surfaces

Class A Workers: Less than 1 Year of Service.

Class B Workers: More than 1 and less than 8 Years of Service.

Class C Workers: More than 8 Years of Service.

Metal Polisher Scope of Work: Polishing, buffing, stripping, coloring, lacquering, spraying, cleaning and maintenance of ornamental and architectural metals, iron, bronze, nickel, aluminum and stainless steel and in mental specialty work, various stone finishes, stone specialty work and any other work pertaining to the finishing of metal, stones, woods, and any window washing/cleaning done in conjunction with this work, using chemicals, solvents, coatings and hand applied lacquer thinner, removing scratches from mirror finished metals, burnishing of bronze, statuary finishes on exterior and interior surfaces and the use of all tools required to perform such work, including but not limited to polishes, spray equipment and scaffolding.

Swing State Rate: All work on scaffold 4 sections or higher, including any boom lifts and swing stage scaffolds including the rigging and derigging of hanging/suspended swing stage systems and rappelling/bolson chair work, ADD \$1.50 per hour.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Ironworker Local 44**

**Change # : LCNO1-2021fbLoc44**

**Craft : Ironworker Effective Date : 06/24/2021 Last Posted : 06/24/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
<b>Classification</b>												
Ironworker Reinforcing	\$31.82		\$8.50	\$9.50	\$0.60	\$0.00	\$3.00	\$0.20	\$0.00	\$0.00	\$53.62	\$69.53
Structural	\$31.32		\$8.50	\$9.50	\$0.60	\$0.00	\$3.00	\$0.20	\$0.00	\$0.00	\$53.12	\$68.78
Ornamental	\$31.32		\$8.50	\$9.50	\$0.60	\$0.00	\$3.00	\$0.20	\$0.00	\$0.00	\$53.12	\$68.78
Machine Mover/Rigger	\$31.32		\$8.50	\$9.50	\$0.60	\$0.00	\$3.00	\$0.20	\$0.00	\$0.00	\$53.12	\$68.78
Conveyer Mechanic	\$31.32		\$8.50	\$9.50	\$0.60	\$0.00	\$3.00	\$0.20	\$0.00	\$0.00	\$53.12	\$68.78
Maintenance/Heavy Hwy	\$31.32		\$8.50	\$9.50	\$0.60	\$0.00	\$3.00	\$0.20	\$0.00	\$0.00	\$53.12	\$68.78
Welder A	\$31.57		\$8.50	\$9.50	\$0.60	\$0.00	\$3.00	\$0.20	\$0.00	\$0.00	\$53.37	\$69.15
Welder B	\$31.82		\$8.50	\$9.50	\$0.60	\$0.00	\$3.00	\$0.20	\$0.00	\$0.00	\$53.62	\$69.53
Sheeter	\$31.32		\$8.50	\$9.50	\$0.60	\$0.00	\$3.00	\$0.20	\$0.00	\$0.00	\$53.12	\$68.78
Fence Erector	\$29.75		\$8.50	\$9.50	\$0.60	\$0.00	\$3.00	\$0.20	\$0.00	\$0.00	\$51.55	\$66.42
Ironworker	\$31.32		\$8.50	\$9.50	\$0.60	\$0.00	\$3.00	\$0.20	\$0.00	\$0.00	\$53.12	\$68.78
<b>Apprentice</b>		<b>Percent</b>										
Apprentice												
1st yr A	60.00	\$19.09	\$8.50	\$9.50	\$0.60	\$0.00	\$0.75	\$0.20	\$0.00	\$0.00	\$38.64	\$48.19
1st yr B	65.00	\$20.68	\$8.50	\$9.50	\$0.60	\$0.00	\$0.75	\$0.20	\$0.00	\$0.00	\$40.23	\$50.57
2nd yr A	70.00	\$22.27	\$8.50	\$9.50	\$0.60	\$0.00	\$0.75	\$0.20	\$0.00	\$0.00	\$41.82	\$52.96
2nd yr B	75.00	\$23.87	\$8.50	\$9.50	\$0.60	\$0.00	\$0.75	\$0.20	\$0.00	\$0.00	\$43.42	\$55.35
3rd yr A	80.00	\$25.46	\$8.50	\$9.50	\$0.60	\$0.00	\$1.50	\$0.20	\$0.00	\$0.00	\$45.76	\$58.48
3rd yr B	85.00	\$27.05	\$8.50	\$9.50	\$0.60	\$0.00	\$1.50	\$0.20	\$0.00	\$0.00	\$47.35	\$60.87
4th yr A	90.00	\$28.64	\$8.50	\$9.50	\$0.60	\$0.00	\$2.25	\$0.20	\$0.00	\$0.00	\$49.69	\$64.01
4th yr B	95.00	\$30.23	\$8.50	\$9.50	\$0.60	\$0.00	\$2.25	\$0.20	\$0.00	\$0.00	\$51.28	\$66.39
4th yr C	100.00	\$31.82	\$8.50	\$9.50	\$0.60	\$0.00	\$2.25	\$0.20	\$0.00	\$0.00	\$52.87	\$68.78

**Special Calculation Note : Other is Impact Fund Training**

**Ratio :**

1 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS\*, BROWN, BUTLER\*, CLERMONT,



2 Journeymen to 2 Apprentice  
10 Journeymen to 4 Apprentices

CLINTON\*, HAMILTON, HIGHLAND\*, WARREN\*

**Special Jurisdictional Note :** Adams County Twps included: Bratton, Scott, Winchester, Wayne. Butler County Twps included: Oxford, St. Clair, Fairfield, Morgan, Liberty, Union, Ross, Reily, Hanover, West Chester. In Clinton County, Manchester and South West Borrow. Highland County Twps included: Dotson, Salem, Clay, White Oak, Hamer, New Market, Concord, Jackson, Washington. Warren County Twps included: Harlan, Deerfield, Hamilton.

**Details :**

Structural Iron Work but not limited to:field fabrication, all loading to and including the erecting,rigging,assembly,dismantling, placing, temporary and permanent securing by any means of all structural iron,steel,ornamental lead,bronze,brass,copper,aluminum,glass all ferrous and non ferrous metal and composite material, precast prestressed and post-stressed concrete structures. Bridges and bridge rails,bridge viaducts,bucks bulkheads,bumper and bumper post,canopies and unistrut canopies,corrugated ferrous and non ferrous sheets when attached to steel frames,columns,beams,bar-joists,trusses,grinders,roof decking,electrical supports,elevator cars,elevator fronts and enclosures,erection of steel towers,flag poles, gymnasium equipment,stadium and arena seating,jail cell work,jail cell beds,benches,bunks,chairs,tables,mirrors,jail cell access doors,rigging and installation of machinery and equipment(erection,aligning,anchoring and dismantling, erection and dismantling of tower cranes,derrick monorail systems, Chicago booms,overhead cranes,gantries,material and personnel hoists,tanks,hoppers and conveyors. All pre-engineered metal buildings and their entirety including siding,roofing, gutters, downspouts and erection of all.

Ornamental Iron Work but not limited to:all work in connection with field fabrication,handling including loading/off loading,sorting,cutting,fastening,anchoring,bending,hoisting,placing,burning,welding,and tying,dismantling of all materials used in miscellaneous iron or steel, for stairs,hand railings,rolling doors, rolling gates,rolling shutters,fence,windows,curtain wall,erection and welding of all metal, sash,architectural and ornamental treatments, but not necessarily limited to all sizes and types of ornamental,steel iron,lead,bronze,brass,copper,aluminum,all ferrous and non ferrous metals and composite materials

Fence Erector Iron Worker but not limited to: All work in connection with the field fabrication and erection of chain link fence,which includes but not limited to the loading and of the fence fabric and posts also the installation of the above.

# Prevailing Wage Rate Skilled Crafts

Name of Union: **Roofer Local 42**

**Change # : LCNO1-2021sksLoc42**

**Craft : Roofer Effective Date : 12/15/2021 Last Posted : 12/15/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
<b>Classification</b>												
Roofer	\$28.85		\$8.02	\$7.95	\$0.32	\$0.00	\$1.25	\$0.06	\$0.00	\$0.00	\$46.45	\$60.88
Tradesmen	\$23.08		\$8.02	\$6.36	\$0.00	\$0.00	\$1.25	\$0.03	\$0.00	\$0.00	\$38.74	\$50.28
<b>Apprentice Percent</b>												
1st period	60.00	\$17.31	\$8.02	\$4.77	\$0.03	\$0.00	\$1.25	\$0.00	\$0.00	\$0.00	\$31.38	\$40.03
2nd period	70.00	\$20.19	\$8.02	\$5.56	\$0.03	\$0.00	\$1.25	\$0.00	\$0.00	\$0.00	\$35.06	\$45.15
3rd period	80.00	\$23.08	\$8.02	\$6.36	\$0.03	\$0.00	\$1.25	\$0.00	\$0.00	\$0.00	\$38.74	\$50.28

**Special Calculation Note :** Other is for Training Fund

**Ratio :**

Employer may employ 1 apprentice for every 2 journeymen in his employment.

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, BROWN, BUTLER, CLERMONT, HAMILTON, HIGHLAND, WARREN

**Special Jurisdictional Note :**

**Details :**

Any Tradesman Worker completing 2,000 hours in (2) years may move to Journeyman status by utilizing the Training Yard to improve their skills. Tradesman Workers will be tested at these yards to determine their competency for Journeyman status. Tradesman Workers must schedule and successfully complete the industry test battery in order to gain journeyman status.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Electrical Local 71 Voice Data Video Outside**

**Change # : LCR01-2017fbLoc71VDV**

**Craft : Voice Data Video Effective Date : 10/18/2017 Last Posted : 10/18/2017**

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Electrical Installer Technician I	\$23.46	\$5.50	\$0.70	\$0.00	\$0.00	\$0.30	\$0.00	\$0.00	\$0.00	\$29.96	\$41.69
Installer Technician II	\$22.37	\$5.50	\$0.67	\$0.00	\$0.00	\$0.30	\$0.00	\$0.00	\$0.00	\$28.84	\$40.03
Equipment Operator I	\$22.37	\$5.50	\$0.67	\$0.00	\$0.00	\$0.30	\$0.00	\$0.00	\$0.00	\$28.84	\$40.03
Equipment Operator II	\$18.43	\$5.50	\$0.55	\$0.00	\$0.00	\$0.30	\$0.00	\$0.00	\$0.00	\$24.78	\$33.99
Installer/Repair Outside	\$22.37	\$5.50	\$0.67	\$0.00	\$0.00	\$0.30	\$0.00	\$0.00	\$0.00	\$28.84	\$40.03
Ground Driver W/CDL	\$15.83	\$5.50	\$0.47	\$0.00	\$0.00	\$0.30	\$0.00	\$0.00	\$0.00	\$22.10	\$30.01
Groundman	\$13.24	\$5.50	\$0.40	\$0.00	\$0.00	\$0.30	\$0.00	\$0.00	\$0.00	\$19.44	\$26.06
Cable Splicer	\$23.46	\$5.50	\$0.70	\$0.00	\$0.00	\$0.30	\$0.00	\$0.00	\$0.00	\$29.96	\$41.69

**Special Calculation Note :**

**Ratio :**

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, CUYAHOGA, DARKE, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, GALLIA, GEAUGA, GREENE, GUERNSEY, HAMILTON, HARRISON, HIGHLAND, HOCKING, HOLMES, JACKSON, JEFFERSON, KNOX, LAKE, LAWRENCE, LICKING, LOGAN, LORAIN, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE,

MONTGOMERY, MORGAN, MORROW,  
MUSKINGUM, NOBLE, PERRY, PICKAWAY, PIKE,  
PORTAGE, PREBLE, RICHLAND, ROSS, SCIOTO,  
SHELBY, STARK, SUMMIT, TRUMBULL,  
TUSCARAWAS, UNION, VINTON, WARREN,  
WASHINGTON, WAYNE

## **Special Jurisdictional Note :**

### **Details :**

**Cable Splicer:** Inspect and test lines or cables, analyze results, and evaluate transmission characteristics. Cover conductors with insulation or seal splices with moisture-proof covering. Install, splice, test, and repair cables using tools or mechanical equipment. This will include the splicing of fiber.

**Journeyman Technician I:** Must know all aspects of telephone and cable work. This is to include aerial, underground, and manhole work. Must know how to climb and run bucket. Must have all the tools required to perform these tasks. Must be able to be responsible for the safety of the crew at all times. Must also have CDL license and have at least 5 years experience.

**Installer/Repairman:** Perform tasks of repairing, installing, and testing phone and CATV services.

**Technician II:** Have at least three years of telephone and CATV experience. Must have the knowledge of underground, aerial, and manhole work. Must be able to climb and operate bucket. Must have CDL. Must have all tools needed to perform these tasks.

**Equipment Operator I:** Able to operate a digger derrick or bucket truck. Have at least 5 years of experience and must have a valid CDL license.

**Equipment Operator II:** Able to operate a digger derrick or bucket truck. Have at least 3 years of experience and must have a valid CDL license.

**Groundman W/CDL:** Must have a valid CDL license and be able to perform tasks such as: climbing poles, pulling downguys, making up material, and getting appropriate tools for the job. Must have at least 5 year's experience.

**Groundman:** Perform tasks such as: climbing poles, pulling downguys, making up material, and getting appropriate tools for the job. Experience 0-5 years.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Painter Locals 123 & 238  
Commercial & Industrial**

**Change # : LCR01-2021fbLoc123**

**Craft : Painter Effective Date : 05/01/2021 Last Posted : 04/21/2021**

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Painter Brush Roll	\$25.89	\$5.79	\$5.86	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$37.85	\$50.80
Paper Hanger	\$25.89	\$5.79	\$5.86	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$37.85	\$50.80
Spray Painter	\$26.39	\$5.79	\$5.86	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$38.35	\$51.55
Sand Blaster Water Blaster	\$26.64	\$5.79	\$5.86	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$38.60	\$51.92
Elevated Tanks	\$26.89	\$5.79	\$5.86	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$38.85	\$52.30
Apprentice											
1st Year	\$14.82	\$5.79	\$2.30	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.22	\$30.63
2nd Year	\$17.63	\$5.79	\$2.30	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$26.03	\$34.85
3rd Year	\$20.43	\$5.79	\$2.30	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.83	\$39.05
4th Year	\$21.84	\$5.79	\$2.30	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$30.24	\$41.16

**Special Calculation Note :** Apprentices shall be paid the proper % of the classification above.

**Ratio :**

(1) Journeymen to (1) Apprentice per jobsite

**Jurisdiction ( \* denotes special jurisdictional note ) :**

BROWN, BUTLER, CLERMONT, CLINTON, HAMILTON, WARREN

**Special Jurisdictional Note :**

**Details :**

Industrial Work paid as commercial work above for each class which includes, Industrial Plants, repair garages, processing plants, storage tanks, warehouses, skeletons structures, bridges unless highest point of clearance is 60 feet or more whether new or old construction offices and office buildings in industrial sites are at industrial rates. Heavy & Highway Bridges-Guard Rails- Light Poles. A hazardous steeplejack rate shall apply on radio towers, stacks, light towers, water towers, steeples, skeleton steel, and exterior industrial conveyors over 25 feet, where such items require steeplejack methods and the rate of pay shall be a \$1.00 per hour above the

industrial rate. Steeplejack rate to apply to bridges where highest point of clearance is 60 feet.

# Prevailing Wage Rate Skilled Crafts

Name of Union: Painter Local 123 & 238 Hvy Hwy

Change # : LCR01-2021fbLoc123

Craft : Painter Effective Date : 05/01/2021 Last Posted : 04/21/2021

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Painter Bridge Class 1	\$36.28	\$5.79	\$5.86	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$48.24	\$66.38
Bridge Painter, Rigger, Containment Builder, Spot Blaster Class 2	\$29.28	\$5.79	\$5.86	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$41.24	\$55.88
Equipment Operator/Field Mechanic, Grit Reclamation, Paint Mixer, Traffic Control, Boat Person Class 3	\$29.28	\$5.79	\$5.86	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$41.24	\$55.88
Concrete Sealing, Concrete Blasting/Power Washing, Etc. Class 4	\$29.28	\$5.79	\$5.86	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$41.24	\$55.88
Quality Control/Quality Assurance, Traffic Safety, Competent Person Class 5	\$29.28	\$5.79	\$5.86	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$41.24	\$55.88
Apprentice											
1st Year	\$20.58	\$5.79	\$2.30	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.98	\$39.27
2nd Year	\$24.21	\$5.79	\$2.30	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$32.61	\$44.71
3rd Year	\$27.84	\$5.79	\$2.30	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$36.24	\$50.16
4th Year	\$29.65	\$5.79	\$2.30	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$38.05	\$52.87

**Special Calculation Note :** Apprentices shall be paid proper % of the classification above..

**Ratio :**

**Jurisdiction ( \* denotes special jurisdictional note ) :**

1 Journeyman to 1 Apprentice

BROWN, BUTLER, CLERMONT, CLINTON,  
HAMILTON, WARREN

### **Special Jurisdictional Note :**

#### **Details :**

Industrial Work paid as commercial work above for each class which includes, Industrial Plants, repair garages, processing plants, storage tanks, warehouses, skeletons structures, bridges unless highest point of clearance is 60 feet or more whether new or old construction offices and office buildings in industrial sites are at industrial rates. Heavy & Highway Bridges-Guard Rails- Light Poles. A hazardous steeplejack rate shall apply on radio towers, stacks, light towers, water towers, steeples, skeleton steel, and exterior industrial conveyors over 25 feet, where such items require steeplejack methods and the rate of pay shall be a \$1.00 per hour above the industrial rate. Steeplejack rate to apply to bridges where highest point of clearance is 60 feet.

Class 1 – Abrasive blasting of any kind.

Class 2 – Bridge painting, coating application of any kind. All steel surface preparation other than abrasive blasting. All necessary rigging and containment building. All remedial/ spot blasting.

Class 3 – Tend to all equipment including but not limited to abrasive blasting, power washing, spray painting, forklifts, hoists, trucks, etc. Load and unload trucks, handle materials, man safety boats, handle traffic control, clean up/ vacuum abrasive blast materials and related tasks.

Class 4 – All aspects of concrete coating/ sealing including but not limited to preparation, containment, etc.

Class 5 – Verify and record that all work is completed according to job specifications. Assure that all health and safety standards are adhered to. Assure all traffic is safely handled.



# Prevailing Wage Rate Skilled Crafts

**Name of Union: Painter Locals 123 & 238**

**Change # : LCR01-2021fbLoc123-238**

**Craft : Drywall Finisher Effective Date : 05/01/2021 Last Posted : 04/21/2021**

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Painter Drywall Finisher	\$25.89	\$5.79	\$5.86	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$37.85	\$50.80
Tapers and Finishers	\$25.89	\$5.79	\$5.86	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$37.85	\$50.80
Apprentice											
1st Year	\$14.83	\$5.79	\$2.30	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.23	\$30.64
2nd Year	\$17.63	\$5.79	\$2.30	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$26.03	\$34.85
3rd Year	\$20.43	\$5.79	\$2.30	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.83	\$39.05
4th Year	\$21.84	\$5.79	\$2.30	\$0.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$30.24	\$41.16

**Special Calculation Note :** Apprentices shall be paid the proper % of the classification above.

**Ratio :**

1 Journeyman to 1 Apprentice per job

**Jurisdiction ( \* denotes special jurisdictional note ) :**

BROWN, BUTLER, CLERMONT, CLINTON, HAMILTON, WARREN

**Special Jurisdictional Note :**

**Details :**

Industrial Work paid as commercial work above for each class which includes, Industrial Plants, repair garages, processing plants, storage tanks, warehouses, skeletons structures, bridges unless highest point of clearance is 60 feet or more whether new or old construction offices and office buildings in industrial sites are at industrial rates. Heavy & Highway Bridges-Guard Rails- Light Poles. A hazardous steeplejack rate shall apply on radio towers, stacks, light towers, water towers, steeples, skeleton steel, and exterior industrial conveyors over 25 feet, where such items require steeplejack methods and the rate of pay shall be a \$1.00 per hour above the industrial rate. Steeplejack rate to apply to bridges where highest point of clearance is 60 feet.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Labor Local 265A Mason Tender**

**Change # : LCR01-2021fbc265A**

**Craft : Laborer Effective Date : 06/29/2021 Last Posted : 06/29/2021**

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Laborer Mason Tender/ Scaffolding/ Forklift Operator	\$22.65	\$7.50	\$9.20	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$39.85	\$51.17
Apprentice											
0 - 1000 Hours	\$13.59	\$7.50	\$9.20	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$30.79	\$37.58
1001 - 2000 Hours	\$15.86	\$7.50	\$9.20	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$33.06	\$40.99
2001 - 3000 Hours	\$18.12	\$7.50	\$9.20	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$35.32	\$44.38
3001 - 4000 Hours	\$20.39	\$7.50	\$9.20	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$37.59	\$47.78
More than 4000 Hours	\$22.65	\$7.50	\$9.20	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$39.85	\$51.17

**Special Calculation Note :**

**Ratio :**

1 Journeymen to 1 Apprentice  
3 Journeymen to 1 Apprentice  
thereafter per project

**Jurisdiction ( \* denotes special jurisdictional note ) :**

BROWN, CLERMONT, CLINTON, HAMILTON

**Special Jurisdictional Note :**

**Details :**

TENDERS: The tending of Masons and mixing, handling and conveying of all materials used by Brick or Stone Masons, whether done by hand or by any other procedure including but not limited to, all forklifts or other mechanical means, all heating and drying off all materials used by Brick or Stone Masons and cleaning and clearing of all debris.

SCAFFOLDING: The building and dismantling of scaffolding and staging for Masons shall be the work of the

# Mason Tenders.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Truck Driver Bldg & HevHwy Class 2  
Locals 20,40,92,92b,100,175,284,438,377,637,908,957**

**Change # : LCRO1-2021fbBldgHevHwy**

**Craft : Truck Driver Effective Date : 05/21/2021 Last Posted : 05/21/2021**

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
<b>Classification</b>												
Truck Driver CLASS 2 Tractor Trailer-Semi Tractor Trucks-Pole Trailers-Ready Mix Trucks-Fuel Trucks- Asphalt-Oil Spray bar men- 5 Axle & Over - Belly Dumps-End Dumps-Articulated Dump Trucks- Low boys-Heavy duty Equipment(irrespective of load carried) when used exclusively for transportation-Truck Mechanics (when needed)	\$29.66		\$7.50	\$8.50	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45.86	\$60.69
<b>Apprentice</b>		<b>Percent</b>										
First 6 months	80.00	\$23.73	\$7.50	\$8.50	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$39.93	\$51.79
7-12 months	85.00	\$25.21	\$7.50	\$8.50	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$41.41	\$54.02
13-18 months	90.00	\$26.69	\$7.50	\$8.50	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$42.89	\$56.24
19-24 months	95.00	\$28.18	\$7.50	\$8.50	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$44.38	\$58.47
25-30 months	100.00	\$29.66	\$7.50	\$8.50	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45.86	\$60.69

**Special Calculation Note :** No special calculations for this skilled craft wage rate are required at this time.

**Ratio :**

3 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, ALLEN, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, DARKE, DEFIANCE, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GREENE,

GUERNSEY, HAMILTON, HANCOCK, HARDIN,  
HARRISON, HENRY, HIGHLAND, HOCKING,  
HOLMES, HURON, JACKSON, JEFFERSON,  
KNOX, LAWRENCE, LICKING, LOGAN, LORAIN,  
LUCAS, MADISON, MAHONING, MARION,  
MEDINA, MEIGS, MERCER, MIAMI, MONROE,  
MONTGOMERY, MORGAN, MORROW,  
MUSKINGUM, NOBLE, OTTAWA, PAULDING,  
PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE,  
PUTNAM, RICHLAND, ROSS, SANDUSKY,  
SCIOTO, SENECA, SHELBY, STARK, SUMMIT,  
TRUMBULL, TUSCARAWAS, UNION, VAN WERT,  
VINTON, WARREN, WASHINGTON, WAYNE,  
WILLIAMS, WOOD, WYANDOT

**Special Jurisdictional Note :**

**Details :**

\*\* Asphalt - Oil spray bar man when operating from cab shall receive \$0.20 cents per hour above their Basic Hourly Rate.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Truck Driver Bldg & HevHwy Class 1  
Locals 20,40,92,92b,100,175,284,438,377,637,908,957**

**Change # : LCRO1-2021fbBldgHevHwy**

**Craft : Truck Driver Effective Date : 05/21/2021 Last Posted : 05/21/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Truck Driver CLASS 1 4 wheel service, dump, and batch trucks, Oil Distributor - Asphalt Distributor-Tandems	\$29.24		\$7.50	\$8.50	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45.44	\$60.06
Apprentice	Percent											
First 6 months	80.00	\$23.39	\$7.50	\$8.50	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$39.59	\$51.29
7-12 months	85.00	\$24.85	\$7.50	\$8.50	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$41.05	\$53.48
13-18 months	90.00	\$26.32	\$7.50	\$8.50	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$42.52	\$55.67
19-24 months	95.00	\$27.78	\$7.50	\$8.50	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$43.98	\$57.87
25-30 months	100.00	\$29.24	\$7.50	\$8.50	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45.44	\$60.06

**Special Calculation Note :** No special calculations for this skilled craft wage rate are required at this time.

**Ratio :**

3 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ADAMS, ALLEN, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, DARKE, DEFIANCE, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GREENE,

GUERNSEY, HAMILTON, HANCOCK, HARDIN,  
HARRISON, HENRY, HIGHLAND, HOCKING,  
HOLMES, HURON, JACKSON, JEFFERSON,  
KNOX, LAWRENCE, LICKING, LOGAN, LORAIN,  
LUCAS, MADISON, MAHONING, MARION,  
MEDINA, MEIGS, MERCER, MIAMI, MONROE,  
MONTGOMERY, MORGAN, MORROW,  
MUSKINGUM, NOBLE, OTTAWA, PAULDING,  
PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE,  
PUTNAM, RICHLAND, ROSS, SANDUSKY,  
SCIOTO, SENECA, SHELBY, STARK, SUMMIT,  
TRUMBULL, TUSCARAWAS, UNION, VAN WERT,  
VINTON, WARREN, WASHINGTON, WAYNE,  
WILLIAMS, WOOD, WYANDOT

**Special Jurisdictional Note :**

**Details :**

\*\* Asphalt - Oil spray bar man when operating from cab shall receive \$0.20 cents per hour above their Basic Hourly Rate.

# Prevailing Wage Rate Skilled Crafts

**Name of Union: Cement Mason Statewide HevHwy Exhibit B District II**

**Change # : OCN01-2021fbCementHevHwy**

**Craft : Cement Mason Effective Date : 05/01/2021 Last Posted : 04/23/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
<b>Classification</b>												
Cement Mason	\$32.02		\$8.25	\$7.35	\$0.65	\$0.00	\$2.25	\$0.07	\$0.00	\$0.00	\$50.59	\$66.60
<b>Apprentice</b>	<b>Percent</b>											
1st Year	70.00	\$22.41	\$8.25	\$7.35	\$0.65	\$0.00	\$2.25	\$0.07	\$0.00	\$0.00	\$40.98	\$52.19
2nd Year	80.00	\$25.62	\$8.25	\$7.35	\$0.65	\$0.00	\$2.25	\$0.07	\$0.00	\$0.00	\$44.19	\$56.99
3rd Year	90.00	\$28.82	\$8.25	\$7.35	\$0.65	\$0.00	\$2.25	\$0.07	\$0.00	\$0.00	\$47.39	\$61.80

**Special Calculation Note :** Other \$0.07 is for International Training Fund.

**Ratio :**

1 Journeymen to 1 Apprentice  
2 to 1 thereafter

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ALLEN, AUGLAIZE, BROWN, BUTLER, CARROLL, CLERMONT, COLUMBIANA, DEFIANCE, ERIE, HAMILTON, HARDIN, HIGHLAND, HOLMES, HURON, LOGAN, LORAIN, MAHONING, MEDINA, MERCER, OTTAWA, PAULDING, PORTAGE, SANDUSKY, SENECA, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, VAN WERT, WARREN, WAYNE, WILLIAMS

**Special Jurisdictional Note :** (B) Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work ,Pollution Control,Sewer Plant, Waste Plant, & Water Treatment Facilities, Construction.

**Details :**



# Prevailing Wage Rate Skilled Crafts

**Name of Union: Cement Mason Statewide HevHwy Exhibit A District II**

**Change # : OCN01-2021fbCementHevHwy**

**Craft : Cement Mason Effective Date : 05/01/2021 Last Posted : 04/23/2021**

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
<b>Classification</b>												
Cement Mason	\$31.15		\$8.25	\$7.35	\$0.65	\$0.00	\$2.25	\$0.07	\$0.00	\$0.00	\$49.72	\$65.29
<b>Apprentice</b>	<b>Percent</b>											
1st Year	70.00	\$21.80	\$8.25	\$7.35	\$0.65	\$0.00	\$2.25	\$0.07	\$0.00	\$0.00	\$40.37	\$51.28
2nd Year	80.00	\$24.92	\$8.25	\$7.35	\$0.65	\$0.00	\$2.25	\$0.07	\$0.00	\$0.00	\$43.49	\$55.95
3rd Year	90.00	\$28.03	\$8.25	\$7.35	\$0.65	\$0.00	\$2.25	\$0.07	\$0.00	\$0.00	\$46.60	\$60.62

**Special Calculation Note :** Other \$0.07 is for International Training Fund

**Ratio :**

1 Journeymen to 1 Apprentice  
2 to 1 thereafter

**Jurisdiction ( \* denotes special jurisdictional note ) :**

ALLEN, AUGLAIZE, BROWN, BUTLER, CARROLL, CLERMONT, COLUMBIANA, DEFIANCE, ERIE, HAMILTON, HARDIN, HIGHLAND, HOLMES, HURON, LOGAN, LORAIN, MAHONING, MEDINA, MERCER, OTTAWA, PAULDING, PORTAGE, SANDUSKY, SENECA, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, VAN WERT, WARREN, WAYNE, WILLIAMS

**Special Jurisdictional Note :** (A) Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site, Heavy Construction, Airport Construction Or Railroad Construction Work.

**Details :**

SECTION 003200

GEOTECHNICAL DATA

PART 1 GENERAL

1.1 REPORT OF GEOTECHNICAL INVESTIGATION

- A. A report of geotechnical investigations has been prepared by Terracon Consultants Inc. The report is made available and is attached herein for the convenience of the Bidder; it is not guaranteed to represent conditions that may be encountered, ***nor is it part of the Contract Documents.***
  - 1. “Geotechnical Engineering Report - The Banks, Lot 28 - Cincinnati, Ohio”, by Terracon Consultants, Inc., dated September 10, 2021.
- B. Refer to Section 310000 – Earthwork for additional information and disclaimer notes regarding geotechnical information.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION



# Geotechnical Engineering Report

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**The Banks Lot 28  
Cincinnati, Hamilton County, Ohio**

September 10, 2021

Terracon Project No. N1205102

**Prepared for:**

Hamilton County Department of Administration Services  
Cincinnati, Ohio

**Prepared by:**

Terracon Consultants, Inc.  
Cincinnati, Ohio



September 10, 2021

Hamilton County Department of Administration Services  
138 East Court Street, Room 607  
Cincinnati, Ohio 45202



Attn: Mr. Phil Beck, AIA  
P: (513) 946 4434  
E: Phil.Beck@hamilton-co.org

Re: Geotechnical Engineering Report  
The Banks Lot 28  
W. Mehring Way & Elm Street  
Cincinnati, Hamilton County, Ohio  
Terracon Project No. N1205102

Dear Mr. Beck:

We have completed the Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. PN1205102 dated August 12, 2021, and authorized on August 13, 2021. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,  
**Terracon Consultants, Inc.**

S. Taylor Taluskie, P.E.  
Project Engineer

Jeffrey D. Dunlap, P.E.  
Senior Engineer/Group Manager

## REPORT TOPICS

INTRODUCTION.....	1
SITE CONDITIONS.....	1
PROJECT DESCRIPTION.....	2
GEOTECHNICAL CHARACTERIZATION.....	3
GEOTECHNICAL OVERVIEW.....	4
EARTHWORK.....	5
SHALLOW FOUNDATIONS.....	9
SEISMIC CONSIDERATIONS.....	11
LATERAL EARTH PRESSURES.....	11
GENERAL COMMENTS.....	13
ATTACHMENTS.....	15

**Note:** This report was originally delivered in a web-based format. For more interactive features, please view your project online at [client.terracon.com](http://client.terracon.com).

## ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES  
SITE LOCATION AND EXPLORATION PLANS  
EXPLORATION RESULTS  
SUPPORTING INFORMATION

**Note:** Refer to each individual Attachment for a listing of contents.

# Geotechnical Engineering Report

## The Banks Lot 28

### W. Mehring Way & Elm Street

### Cincinnati, Hamilton County, Ohio

Terracon Project No. N1205102

September 10, 2021

## INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed Walk of Fame to be located at W. Mehring Way & Elm Street in Cincinnati, Hamilton County, Ohio. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Site preparation and earthwork
- Shallow foundations
- Lateral earth pressures
- Existing deep foundations
- Seismic site classification per IBC

The geotechnical engineering Scope of Services for this project included the advancement of 3 CPT soundings to depths ranging from approximately 28 to 43 feet below existing site grades.

Maps showing the site and exploration locations are shown in the **Site Location** and **Exploration Plan** sections, respectively. The results of the exploration are included on the boring and CPT logs in the **Exploration Results** section.

## SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
<b>Parcel Information</b>	The project is generally bordered by Elm Street on the west, W. Mehring Way on the south, and The Banks Lots 27 and 23 on the north and east in Cincinnati, Hamilton County, Ohio. Approximate Latitude/Longitude: 39.0948° N, 84.5136° W (See <b>Site Location</b> )
<b>Existing Improvements</b>	Existing Elm Street and Mehring Way to the west and south. Existing plaza area with buildings to the north and east. Existing underground utilities.

Item	Description
<b>Current Ground Cover</b>	Exposed gravel in the proposed project area, with some areas of existing pavement beneath the exposed gravel.
<b>Existing Topography</b> (from Google Earth Pro™)	Existing grades within the proposed project area generally range from about El. 487 to 489 feet. The site grades typically gradually slope downward from north to southwest.
<b>Geology</b>	The soils at the site typically consist of a mantle of man-placed fill underlain by interbedded layers of fine-grained and granular alluvium which are underlain by granular outwash with some layers of cohesive lakebed soils. According to USGS, the site is underlain by the Point Pleasant Formation, which is comprised of interbedded limestone (60%) and shale (40%). Shale and limestone bedrock was encountered around 90 feet below existing grades in archive test borings performed outside the project area.

## PROJECT DESCRIPTION

Our initial understanding of the project was provided in our proposal and our final understanding of the project conditions is as follows:

Item	Description
<b>Information Provided</b>	Information was provided during our meeting with THP Ltd. on March 4, 2020. THP Limited provided the following pdf drawings and other grading information via email on August 25, 2021. <ul style="list-style-type: none"> <li>■ 1906.01_Bngls.Lt28_A101 - LOWER LEVEL FLOOR PLAN</li> <li>■ 1906.01_Bngls.Lt28_A102 - UPPER LEVEL FLOOR PLAN</li> <li>■ S101 PH3 - Lower Level Foundation Plan-S101A</li> </ul>
<b>Project Description</b>	The project will consist of ramps and steps to the proposed Music Venue site (Lot 27) from the corner of Mehring Way and Elm Street. The project is referred to as the Walk of Fame.
<b>Proposed Structures</b>	Retaining walls to support proposed fill materials and steps will surround the site. The north wall will also support the plaza level for the Music Venue located immediately north of the site.
<b>Construction</b>	Perimeter site retaining walls are anticipated to consist of cast-in-place reinforced concrete supported on augercast piles that have already been installed at the site as part of The Banks Phase 3B project. Support of the retaining walls will likely require the construction of several deep-section grade beams spanning between existing piles. Interior retaining walls for steps and ramps will consist of concrete, cantilevered retaining walls supported on the proposed structural fill materials. These interior retaining walls are anticipated to have a maximum height of about 3 to 4 feet. Ramps, steps, and sidewalks are anticipated to consist of concrete and pavers.

Item	Description
<b>Grading/Slopes</b>	The proposed grades at the site are anticipated to range from about Elevation 487 feet at the southwest corner of the site to about Elevation 503 feet near the northeast corner of the site. As a result, up to about 14 feet of new fill is proposed near the northeast corner of the site. The proposed grades gradually slope upward from southwest to northeast. The new fill will be placed over some existing underground sewers that have inverts about 12 feet below existing site grades.

## GEOTECHNICAL CHARACTERIZATION

We have developed a general characterization of the subsurface soil and groundwater conditions based upon our review of the data and our understanding of the geologic setting and planned construction. The following table provides our geotechnical characterization.

The geotechnical characterization forms the basis of our geotechnical calculations and evaluation of site preparation. As noted in **General Comments**, the characterization is based upon widely spaced exploration points across the site, and variations are likely.

Stratum	Approximate Depth to Bottom of Stratum (feet)	Material Description	Consistency/Density
Surface	6 to 10 inches	Gravel	N/A
1	4.5	Uncontrolled Fill consisting of clay soil with varying amounts of sand and gravel, sand with varying amounts of fines and gravel, cinders, and slag	Variable
2	21 to 28	Alluvial silts and clays with interbedded sand seams	Medium stiff to stiff
3	All CPT soundings terminated in this stratum	Sand and gravel	Medium dense to dense

The CPT sounding/boring locations are shown in the **Exploration Plan** section attached to this report. Conditions encountered at each exploration location are indicated on the individual boring and CPT logs shown in the **Exploration Results** section and are attached to this report. Stratification boundaries on the boring logs represent the approximate location of changes in native soil types; in situ, the transition between materials may be gradual. The material behavior types on the CPT logs are based on correlations of the CPT tip resistance, sleeve resistance, friction ratio and pore pressure, and no soil samples were collected in the CPT soundings.



## **Groundwater Conditions**

Groundwater was observed at depths of about 37 feet below the existing grade at exploration point 202. Groundwater was not encountered at the remaining exploration points. This does not necessarily mean the exploration terminated above groundwater or that the water levels above represent long-term groundwater table levels. Due to the low permeability of the soils encountered in the borings, a relatively long period may be necessary for a groundwater level to develop and stabilize in a borehole. Long-term observations in piezometers or observation wells sealed from the influence of surface water are often required to define groundwater levels in materials of this type.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction or at other times in the life of the roadway structure may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project. Data from USGS indicates that the Ohio River was at about Elevation 456 during the time of the subsurface exploration

## **GEOTECHNICAL OVERVIEW**

Exploration for this project encountered a surficial layer of gravel underlain by uncontrolled fill with rubble to a depth of about 4.5 feet below the existing grade. We used SPT soil sampling methods to sample and penetrate the rubble fill and then began pushing the CPT soundings. The CPT soundings encountered alluvial silts and clays with interbedded sand seams. Below the silts/clays, the soundings terminated in sand and gravel soils.

Based on our settlement analyses, we estimate about 1½ inches or less of foundation soil settlement for the proposed maximum 14.5 feet of new fill. At the edge, adjacent to the existing music hall/plaza, we expect maximum foundation soil settlement will be about ¾ inches or less. We estimate less than 1 inch of foundation soil settlement to occur at or below the existing sewer pipe invert elevations.

Within the new fill, we estimate about 1/8 inches of settlement for each 12 inches of new fill placed. We estimated that about 50% of the settlement within the new fill will occur as the fill is being placed and the remaining settlement of the new fill will occur within about 15 days of being placed. We recommend that the construction schedule allow time for the fill-induced settlement to slow to a rate of less than ¼ inches over a 10-day period. We anticipate that 50% of consolidation will occur in about 10 to 15 days and that 90% of consolidation will occur in about 30 to 45 days. We recommend that settlement be monitored with settlement plates and settlement hubs.

Existing augercast piles, installed previously, are planned to be used for support of the site perimeter retaining walls. The piles were originally designed for a capacity of 125 tons. The

estimated down drag load on the existing piles along the existing plaza level is 35 kips, or about 14% of allowable pile capacity. Based on an email from THP Limited, only about 70% of the existing pile capacity will be needed for support of the proposed retaining walls.

Interior retaining walls with maximum anticipated heights of 3 to 4 feet can be supported on spread footings bearing on at least 3 feet of new structural fill. This will require partial undercut and replacement of undocumented existing fill and rubble fill with new structural fill where less than about 5 to 6 feet of new structural fill is proposed. The majority of the foundation soil settlement due to new fill placement should be allowed to occur prior to constructing interior retaining walls, ramps and steps.

Support of footings, ramps and steps, on or above existing fill soils, is discussed in this report. However, even with the recommended construction procedures, there is inherent risk for the owner that compressible fill or unsuitable material, within or buried by the fill will, not be discovered. This risk of unforeseen conditions cannot be eliminated without completely removing the existing fill, but can be reduced by following the recommendations contained in this report.

The **General Comments** section provides an understanding of the report limitations.

## **EARTHWORK**

Earthwork is anticipated to include clearing and grubbing, excavations, and fill placement. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria, as necessary, to render the site in the state considered in our geotechnical engineering evaluation for foundations and retaining walls.

### **Site Preparation**

Prior to placing fill, existing vegetation and root mat should be removed. Complete stripping of the surficial gravel should be performed across the site. The gravel can be stockpiled for later use if the stockpiled material meets the parameters of this report.

The subgrade should be proof-rolled with an adequately loaded vehicle such as a fully-loaded tandem-axle dump truck. The proof-rolling should be performed under the direction of the Geotechnical Engineer. Areas excessively deflecting under the proof-roll should be delineated and subsequently addressed by the Geotechnical Engineer. Such areas should either be removed and replaced with engineered fill. Excessively wet or dry material should either be removed or moisture conditioned and recompacted.

### **Existing Fill**

As noted in **Geotechnical Characterization**, all recent exploration points encountered existing fill to depths of at least 4.5 to 5 feet. The fill appears to have been placed with some compactive

## Geotechnical Engineering Report

The Banks Lot 28 ■ Cincinnati, Hamilton County, Ohio  
September 10, 2021 ■ Terracon Project No. N1205102



effort, but we have no records to indicate the degree of control. Support of footings, ramps and steps, on or above existing fill soils, is discussed in this report. However, even with the recommended construction procedures, there is inherent risk for the owner that compressible fill or unsuitable material, within or buried by the fill will, not be discovered. This risk of unforeseen conditions cannot be eliminated without completely removing the existing fill, but can be reduced by following the recommendations contained in this report.

If the owner elects to construct the interior retaining wall footings, ramp slabs and steps on or above the existing fill, the following protocol should be followed. Once the planned grading has been completed, the area should be undercut at least 3 feet beyond the plan area of the structures such that at least 3 feet of new structural fill is present below the design footing bearing elevation or below the design subgrade elevation of the ramp slabs and steps. Once materials have been removed, the entire area should be proofrolled with heavy, rubber tire construction equipment, to aid in delineating areas of soft or otherwise unsuitable soil. Once unsuitable materials have been remediated, and the subgrade has passed the proofroll test, the existing and undocumented fill that was removed can be evaluated for reuse as structural fill.

### Fill Material Types

Our settlement analyses consider that all fill material will have an *in situ* total unit weight of 120 pounds per square foot (pcf) maximum. Earthen materials used for structural fill should meet the following material property requirements:

Soil Type <sup>1</sup>	USCS Classification	Acceptable Parameters (for Structural Fill)
Low Plasticity Cohesive	CL, CL-ML ML, SM, SC	Liquid Limit less than 40 Plasticity index less than 25 Less than 25% retained on No. 200 sieve
High Plasticity Cohesive	CH, MH	Not recommended for this project
Granular	GW, GP, GM, GC, SW, SP, SM, SC	Less than 15% Passing No. 200 sieve

1. Structural fill should consist of approved materials free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted to the Geotechnical Engineer for evaluation prior to use on this site.

### Fill Compaction Requirements

Structural fill should meet the following compaction requirements.

Item	Structural Fill
<b>Maximum Lift Thickness</b>	8 inches or less in loose thickness when heavy, self-propelled compaction equipment is used 4 to 6 inches in loose thickness when hand-guided equipment (i.e. jumping jack or plate compactor) is used
<b>Minimum Compaction Requirements</b> <sup>1, 2</sup>	95% of maximum dry density
<b>Water Content Range</b> <sup>1</sup>	Low plasticity cohesive: -2% to +3% of optimum Granular: -3% to +3% of optimum

<sup>1.</sup> Maximum density and optimum water content as determined by the standard Proctor test (ASTM D 698).  
<sup>2.</sup> If the granular material is a coarse sand or gravel, or of a uniform size, or has a low fines content, compaction comparison to relative density may be more appropriate. In this case, granular materials should be compacted to at least 70% relative density (ASTM D 4253 and D 4254).

## Grading and Drainage

All grades must provide effective drainage away from the proposed structures during and after construction and should be maintained throughout the life of the structure. Water retained next to the retaining walls, ramp slabs and steps can result in soil movements greater than those discussed in this report. Greater movements can result in unacceptable differential slab and/or foundation movements, cracked slabs and retaining walls. Collected stormwater should daylight into existing storm sewer structures.

Exposed ground should be sloped and maintained at a minimum 5% away from the building for at least 10 feet beyond the perimeter of the building. Locally, flatter grades may be necessary to transition ADA access requirements for flatwork. After building construction and landscaping have been completed, final grades should be verified to document effective drainage has been achieved. Grades around the structure should also be periodically inspected and adjusted, as necessary, as part of the structure’s maintenance program. Where paving or flatwork abuts structures, a maintenance program should be established to effectively seal and maintain joints and prevent surface water infiltration.

## Earthwork Construction Considerations

Shallow excavations for the proposed structure are anticipated to be accomplished with conventional construction equipment. Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of walkway pavements. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over or adjacent to construction areas should be removed. If the subgrade freezes, desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted prior to floor slab construction.

## Geotechnical Engineering Report

The Banks Lot 28 ■ Cincinnati, Hamilton County, Ohio  
September 10, 2021 ■ Terracon Project No. N1205102



As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, "Excavations" and its appendices, and in accordance with any applicable local, and/or state regulations.

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety, or the contractor's activities; such responsibility shall neither be implied nor inferred.

### Construction Observation and Testing

The earthwork efforts should be monitored under the direction of the Geotechnical Engineer. Monitoring should include documentation of adequate removal of vegetation and topsoil, proof-rolling, and mitigation of areas delineated by the proof-roll to require mitigation.

Each lift of compacted fill should be tested, evaluated, and reworked, as necessary, until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building areas and 5,000 square feet in pavement areas.

In areas of wall foundation excavations, the bearing subgrade should be evaluated under the direction of the Geotechnical Engineer. If unanticipated conditions are encountered, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

### Fill-Induced Settlement

Up to 14.5 feet of fill is planned in some areas of the project site. Some degree of fill-induced foundation soil settlement should be anticipated. Based on our settlement analyses, we estimate about 1½ inches or less of foundation soil settlement for the proposed maximum 14.5 feet of new fill. At the edge, adjacent to the existing music hall/plaza, we expect maximum foundation soil settlement will be about ¾ inches or less. We estimate less than 1 inch of foundation soil settlement to occur at or below the existing sewer pipe invert elevations.

We estimated that about 50% of the settlement within the new fill will occur as the fill is being placed and the remaining settlement of the new fill will occur within about 15 days of being placed. We recommend that the construction schedule allow time for the fill-induced settlement to slow to a rate of less than ¼ inches over a 10-day period. We anticipate that 50% of consolidation will

occur in about 10 to 15 days and that 90% of consolidation will occur in about 30 to 45 days. We recommend that settlement be monitored with settlement plates and settlement hubs.

In addition, our experience indicates settlement within the structural fill itself could be on the general order of approximately 1/8-inch per foot of new fill placed, in addition to the anticipated foundation soil settlement. While most of the settlement within the new structural fill and some foundation soil settlement will occur during fill placement, some movements will likely occur after completion of placement. It is our recommendation to monitor fill mass settlements in the fill placement area by means of settlement plates installed before placing fill and driven hubs into the finished subgrade. The installed points can be monitored using conventional level survey measurements. Settlement plates should be monitored on a weekly basis while placing fill. Measurements on the driven hubs should be taken immediately after topping out the fill. After fill placement is complete, all points (hubs and plate attachments) should be measured at least once or twice per week until no more than a 1/4-inch of settlement is measured over a 10-day period. At that time, the construction of ramps, retaining walls, steps or other structures over the fill can take place.

Due to the estimated fill-induced foundation soil settlement, settlement will occur in the soils in contact with the existing augercast piles. This settlement in the soils along the existing piles will result in down drag loads applied to the existing piles. The estimated down drag loads of the piles is 35 kips, where the maximum 14.5 feet of new fill is planned.

## SHALLOW FOUNDATIONS

If the site has been prepared in accordance with the requirements noted in **Earthwork**, the following design parameters are applicable for shallow foundations of interior retaining walls with heights less than 4 feet. Since undocumented existing fill will remain below the retaining wall footings, construction joints need to be incorporated into the retaining wall design to allow potential for unanticipated total and differential settlement of the retaining wall footings bearing above the existing undocumented fill soils. Perimeter site retaining walls should be supported on grade beams spanning between the existing pile foundations.

### Design Parameters – Compressive Loads

Item	Description
<b>Maximum Net Allowable Bearing pressure</b> <sup>1, 2</sup>	2,000 psf (foundations bearing within structural fill – minimum 3 feet of new fill beneath bearing elevation)
<b>Required Bearing Stratum</b> <sup>3</sup>	At least 3 feet of new structural fill should be present below the design bearing elevation.
<b>Minimum Foundation Dimensions</b>	Continuous: 24 inches

Item	Description
<b>Ultimate Passive Resistance</b> <sup>4</sup> <b>(equivalent fluid pressures)</b>	295 pcf (cohesive backfill) 390 pcf (granular backfill)
<b>Ultimate Coefficient of Sliding Friction</b> <sup>5</sup>	0.3 (structural fill -clay) 0.4 (structural fill - granular material)
<b>Minimum Embedment below Finished Grade</b> <sup>6</sup>	Exterior footings in unheated areas: 30 inches
<b>Estimated Total Settlement from Structural Loads</b> <sup>2</sup>	Less than about 1 inch
<b>Estimated Differential Settlement</b> <sup>2, 7</sup>	About ½ to 2/3 of total settlement

1. The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. An appropriate factor of safety has been applied. Values assume that exterior grades are no steeper than 20% within 10 feet of structure.
2. Values provided are for maximum loads noted in **Project Description**.
3. Unsuitable or soft soils should be over-excavated and replaced per the recommendations presented in the **Earthwork**.
4. Use of passive earth pressures require the sides of the excavation for the spread footing foundation to be nearly vertical and the concrete placed neat against these vertical faces or that the footing forms be removed and compacted structural fill be placed against the vertical footing face. If passive pressure is used to resist lateral loads on the footings, sliding resistance should not be used to resist lateral loads on the footings.
5. Can be used to compute sliding resistance where foundations are placed on suitable soil/materials. Should be neglected for foundations subject to net uplift conditions. If sliding resistance is used to resist lateral loads on the footings, passive earth pressure should not be used to resist lateral loads applied to the footings.
6. Embedment necessary to minimize the effects of frost and/or seasonal water content variations. For sloping ground, maintain depth below the lowest adjacent exterior grade within 5 horizontal feet of the structure.
7. Differential settlements are as measured over a span of 50 feet.

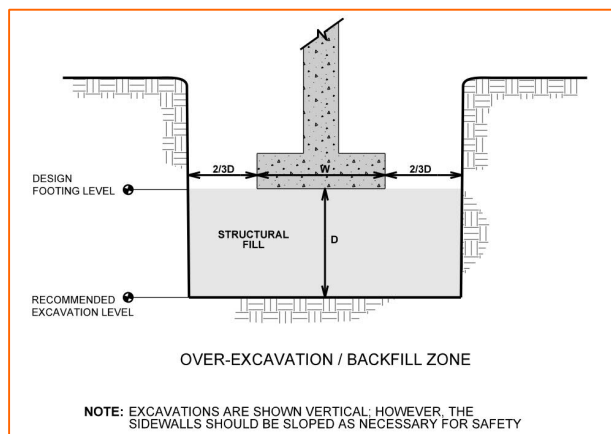
## Foundation Construction Considerations

As noted in **Earthwork**, the footing excavations should be evaluated under the direction of the Geotechnical Engineer. The base of all foundation excavations should be free of water and loose soil, prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively wet or dry material or any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed.

Over-excavation for structural fill placement below footings (required where existing fill will be present within 3 feet of the design bearing elevation) should be conducted as shown below. The over-excavation should be backfilled up to the footing base elevation, with lean clay or granular material with at least 15% fines placed, as recommended in the **Earthwork** section.

## Geotechnical Engineering Report

The Banks Lot 28 ■ Cincinnati, Hamilton County, Ohio  
September 10, 2021 ■ Terracon Project No. N1205102



## SEISMIC CONSIDERATIONS

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7 and the International Building Code (IBC). Based on the soil properties encountered at the site and as described on the exploration logs and results, it is our professional opinion that the **Seismic Site Classification is D**. Subsurface explorations at this site were extended to a maximum depth of 43 feet. The site properties below the boring depth to 100 feet were estimated based on our experience at the Banks Project and knowledge of geologic conditions of the general area. Additional deeper borings or geophysical testing could be performed to confirm the conditions below the current boring depth.

## LATERAL EARTH PRESSURES

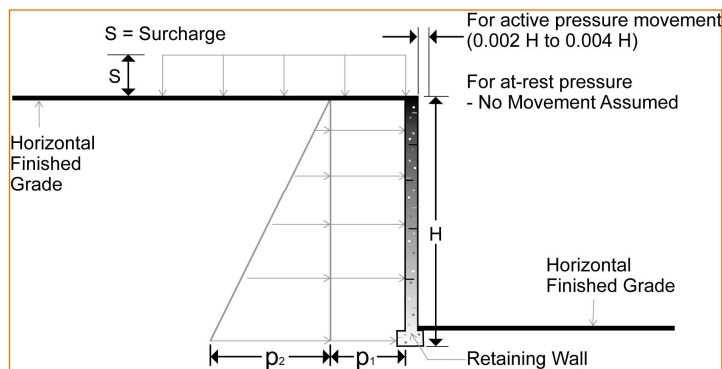
### Design Parameters

Structures with unbalanced backfill levels on opposite sides should be designed for earth pressures at least equal to values indicated in the following table. Earth pressures will be influenced by structural design of the walls, conditions of wall restraint, methods of construction and/or compaction and the strength of the materials being restrained. Two wall restraint conditions are shown in the diagram below. Active earth pressure is commonly used for design of free-standing cantilever retaining walls and assumes wall movement. The “at-rest” condition assumes no wall movement and is commonly used for basement walls, loading dock walls, or other walls restrained at the top. The recommended design lateral earth pressures do not include a factor of safety and do not provide for possible hydrostatic pressure on the walls (unless stated).



## Geotechnical Engineering Report

The Banks Lot 28 ■ Cincinnati, Hamilton County, Ohio  
September 10, 2021 ■ Terracon Project No. N1205102



We have not been provided specific details of the proposed retaining walls. We respectfully request the opportunity to review the retaining wall drawings before they are finalized.

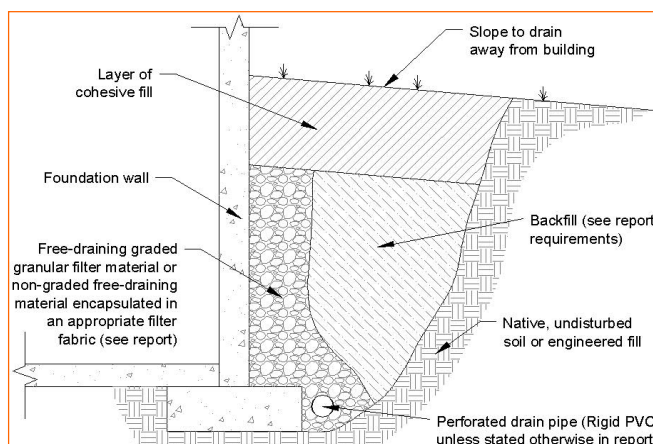
Lateral Earth Pressure Design Parameters				
Earth Pressure Condition <sup>1</sup>	Coefficient for Backfill Type <sup>2</sup>	Surcharge Pressure <sup>3, 4, 5</sup> $p_1$ (psf)	Effective Fluid Pressures (psf) <sup>2, 4, 5</sup>	
			Unsaturated <sup>6</sup>	Submerged <sup>6</sup>
Active ( $K_a$ )	Granular - 0.31	$(0.31)S$	$(38)H$	$(80)H$
	Fine Grained - 0.41	$(0.41)S$	$(50)H$	$(85)H$
At-Rest ( $K_o$ )	Granular - 0.47	$(0.47)S$	$(56)H$	$(90)H$
	Fine Grained - 0.58	$(0.58)S$	$(70)H$	$(95)H$
Passive ( $K_p$ )	Granular - 3.25	---	$(390)H$	$(250)H$
	Fine Grained - 2.46	---	$(295)H$	$(205)H$

1. For active earth pressure, wall must rotate about base, with top lateral movements 0.002 H to 0.004 H, where H is wall height. For passive earth pressure, wall must move horizontally to mobilize resistance.
2. Uniform, horizontal backfill, compacted to at least 95% of the ASTM D 698 maximum dry density, rendering a maximum unit weight of 120 pcf.
3. Uniform surcharge, where S is surcharge pressure.
4. Loading from heavy compaction equipment is not included.
5. No safety factor is included in these values.
6. To achieve "Unsaturated" conditions, follow guidelines in **Subsurface Drainage for Below-Grade Walls** below. "Submerged" conditions are recommended when drainage behind walls is not incorporated into the design.

Backfill placed against structures should consist of granular soils or low plasticity cohesive soils. For the granular values to be valid, the granular backfill must extend out and up from the base of the wall at an angle of at least 45 and 60 degrees from vertical for the active and passive cases, respectively. Lightweight compaction equipment should only be used within 5 feet of retaining walls having heights less than 10 feet and within 10 feet for retaining walls having heights of 10 feet or more to limit compaction stresses on the retaining walls.

## Subsurface Drainage for Below-Grade Walls

A perforated rigid plastic drain line installed behind the base of walls and extends below adjacent grade is recommended to prevent hydrostatic loading on the walls. The invert of a drain line around a below-grade building area or exterior retaining wall should be placed near foundation bearing level. The drain line should be sloped to provide positive gravity drainage to daylight or to a sump pit and pump. The drain line should be surrounded by clean, free-draining granular material having less than 5% passing the No. 200 sieve, such as No. 57 aggregate. The free-draining aggregate should be encapsulated in a filter fabric. The granular fill should extend to the final grade, where it should be capped with pavement or at least 18 inches of compacted lean clay soil to reduce infiltration of surface water into the drain system. The layer of cohesive fill in the drawing below is not necessary for areas capped with concrete.



As an alternative to free-draining granular fill, a pre-fabricated drainage structure may be used. A pre-fabricated drainage structure is a plastic drainage core or mesh which is covered with filter fabric to prevent soil intrusion, and is fastened to the wall prior to placing backfill

## GENERAL COMMENTS

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

## Geotechnical Engineering Report

The Banks Lot 28 ■ Cincinnati, Hamilton County, Ohio  
September 10, 2021 ■ Terracon Project No. N1205102



Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client, and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

## ATTACHMENTS

## EXPLORATION AND TESTING PROCEDURES

### Field Exploration

Number of Exploration Points	Depth (feet)	Planned Location
3	28 to 43	Project area

**Layout and Elevations:** Terracon personnel provided the field exploration layout. Coordinates were obtained with a handheld GPS unit (estimated horizontal accuracy of about  $\pm 1$  foot) and approximate elevations were also measured. If elevations and a more precise exploration layout are desired, we recommend borings be surveyed following completion of fieldwork.

**Subsurface Exploration Procedures:** We advanced the Cone Penetration Test (CPT) soundings with a track-mounted drill rig. The upper 4 to 5 feet required augering to avoid damage to the CPT equipment and was advanced using hollow-stem augers. Soil sampling was performed using split-barrel sampling procedures in the upper 4 to 5 feet of the explorations. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon is driven into the ground by a 140-pound automatic hammer falling a height of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the SPT resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. The samples were placed in appropriate containers, taken to our soil laboratory for testing, and classified by a geotechnical engineer or geologist.

Beginning at 4 to 5 feet below grade, Cone Penetration Test (CPT) soundings were performed in general accordance with industry-standard procedures (ASTM D5778) with continuous data collection. CPT soundings were performed with a penetrometer device consisting of a cone-shaped sounding tip attached to steel rods with flush joint couplings. The cone tip contains load cells to measure cone tip penetration resistance, sleeve friction resistance, and pore-pressure transducers. The tilt angle of the penetrometer was also measured by an inclinometer located within the sounding tip. The CPT was logged electronically in the field. The data collected from the CPT was reduced and is presented graphically, including the tip resistance, sleeve resistance, a ratio of sleeve to tip resistance, pore pressure, and interpreted soil classifications (based upon published correlations) with depth. We also collected pore pressure dissipation test data at CPT soundings 202 and 203.

The sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs and CPT

SECTION 003200

GEOTECHNICAL DATA

PART 1 GENERAL

1.1 REPORT OF GEOTECHNICAL INVESTIGATION

- A. A report of geotechnical investigations has been prepared by Terracon Consultants Inc. The report is made available and is attached herein for the convenience of the Bidder; it is not guaranteed to represent conditions that may be encountered, ***nor is it part of the Contract Documents.***
  - 1. “Geotechnical Engineering Report - The Banks, Lot 28 - Cincinnati, Ohio”, by Terracon Consultants, Inc., dated September 10, 2021.
- B. Refer to Section 310000 – Earthwork for additional information and disclaimer notes regarding geotechnical information.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

## **Geotechnical Engineering Report**

The Banks Lot 28 ■ Cincinnati, Hamilton County, Ohio  
September 10, 2021 ■ Terracon Project No. N1205102



sounding logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

### **Laboratory Testing**

Due to the exploration methods used on this project, limited soil samples were collected and no laboratory testing was performed.

## **SITE LOCATION AND EXPLORATION PLANS**

### **Contents:**

Site Location Plan

Exploration Plan

Note: All attachments are one page unless noted above.



**SITE LOCATION**

The Banks Lot 28 ■ Cincinnati, Hamilton County, Ohio  
September 10, 2021 ■ Terracon Project No. N1205102

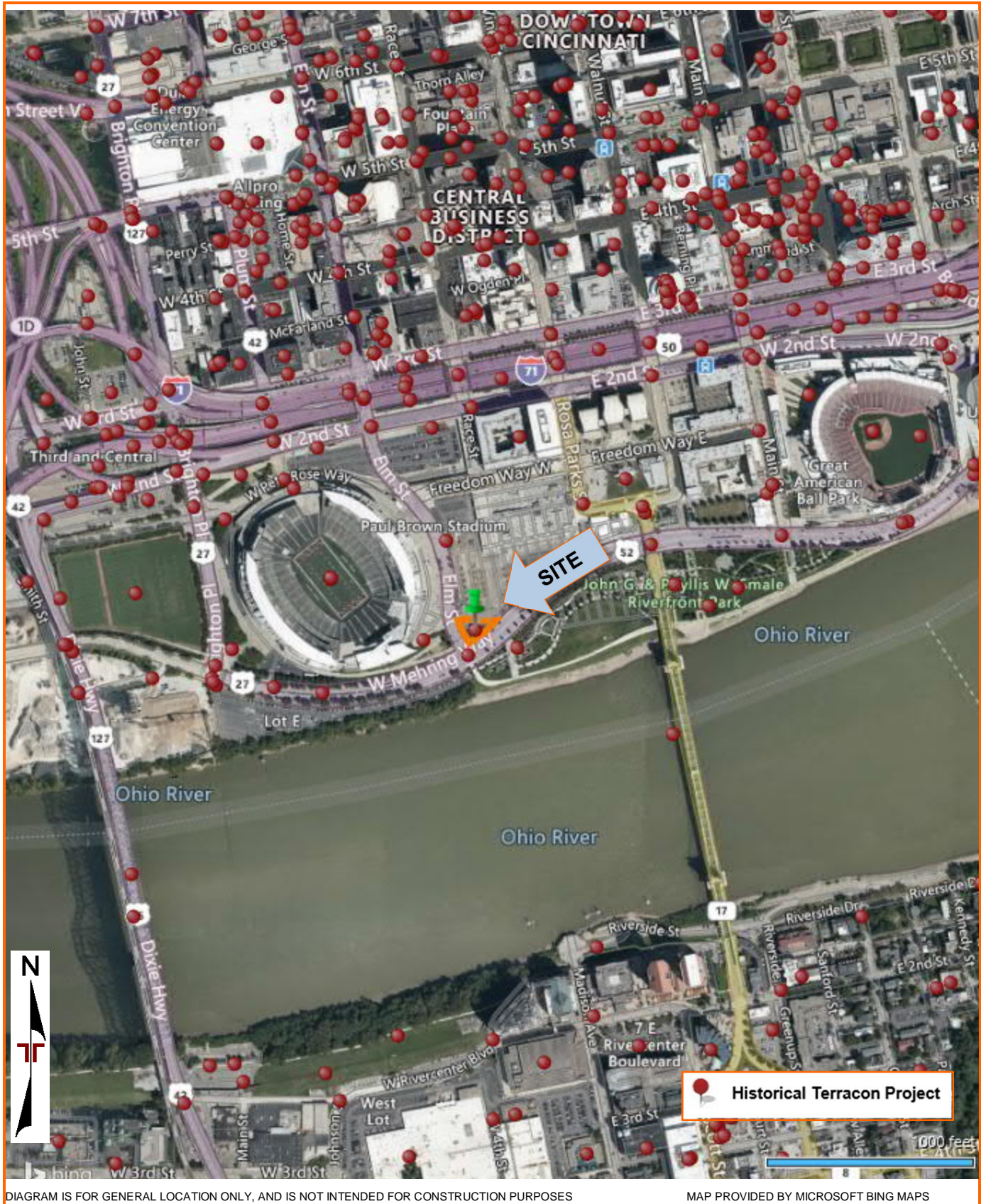


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

**EXPLORATION PLAN**

The Banks Lot 28 ■ Cincinnati, Hamilton County, Ohio  
September 10, 2021 ■ Terracon Project No. N1205102



DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

## **EXPLORATION RESULTS**

### **Contents:**

Boring Logs (201A through 203A)

CPT Logs (201 to 203)

Note: All attachments are one page unless noted above.

# BORING LOG NO. 201A

**PROJECT:** The Banks Lot 28 Evaluation

**CLIENT:** Hamilton County OH  
Cincinnati, OH

**SITE:** Elm Street and Mehring Way  
Cincinnati, OH

GRAPHIC LOG	LOCATION See <a href="#">Exploration Plan</a> Latitude: 39.094804° Longitude: -84.513401°  Approximate Surface Elev.: 488.79 (Ft.) +/-	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
	ELEVATION (Ft.)				
0.8	<b>FILL - GRAVEL (10-INCHES)</b>	488+/-		X	13-18-20 N=38
	<b>FILL - SANDY LEAN CLAY WITH GRAVEL</b> , with brick fragments, gray and brown			X	13-9-18 N=27
3.0	<b>FILL - SLAG FILL WITH SAND</b> , brown and gray	486+/-		X	34-36-14 N=50
4.5	<b>Boring Terminated at 4.5 Feet</b>	484.5+/-			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
3.25-inch diameter hollow stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:  
See CPT log 201 for exploration at depths greater than 4.5 feet.

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

Elevations measured using Leica Zeno GPS

**WATER LEVEL OBSERVATIONS**

*No groundwater observed*



611 Lunken Park Dr  
Cincinnati, OH

Boring Started: 08-23-2021

Boring Completed: 08-23-2021

Drill Rig: CME 55X

Driller: AR/KH

Project No.: N1205102

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_N1205102 THE BANKS LOT 28.GPJ TERRACON\_DATATEMPLATE.GDT 9/10/21

# BORING LOG NO. 202A

**PROJECT:** The Banks Lot 28 Evaluation

**CLIENT:** Hamilton County OH  
Cincinnati, OH

**SITE:** Elm Street and Mehring Way  
Cincinnati, OH

GRAPHIC LOG	LOCATION See <a href="#">Exploration Plan</a> Latitude: 39.094732° Longitude: -84.513708°  Approximate Surface Elev.: 488.40 (Ft.) +/-	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
	ELEVATION (Ft.)				
0.5	<b>FILL - GRAVEL (6-INCHES)</b>	488+/-		X	12-23-22 N=45
1.5	<b>FILL - SANDY LEAN CLAY WITH GRAVEL</b> , gray with brown	487+/-		X	13-13-40 N=53
3.0	<b>FILL - SANDY LEAN CLAY WITH GRAVEL</b> , with brick fragments, dark brown to black	485.5+/-		X	22-36-14 N=50
4.5	<b>FILL - ASPHALT CINDERS</b> , black	484+/-		X	
	<b>Boring Terminated at 4.5 Feet</b>				

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
3.25-inch diameter hollow stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:  
See CPT log 202 for exploration at depths greater than 4.5 feet.

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

Elevations measured using Leica Zeno GPS

**WATER LEVEL OBSERVATIONS**

Water observed on CPT sounding at about 37 feet



611 Lunken Park Dr  
Cincinnati, OH

Boring Started: 08-23-2021

Boring Completed: 08-23-2021

Drill Rig: CME 55X

Driller: AR/KH

Project No.: N1205102

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_N1205102 THE BANKS LOT 28.GPJ TERRACON\_DATATEMPLATE.GDT 9/10/21

# BORING LOG NO. 203A

**PROJECT:** The Banks Lot 28 Evaluation

**CLIENT:** Hamilton County OH  
Cincinnati, OH

**SITE:** Elm Street and Mehring Way  
Cincinnati, OH

GRAPHIC LOG	LOCATION See <a href="#">Exploration Plan</a> Latitude: 39.094914° Longitude: -84.513598°  Approximate Surface Elev.: 488.33 (Ft.) +/-	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
	ELEVATION (Ft.)				
0.5	<b>FILL - GRAVEL (6-INCHES)</b>	488+/-		X	46-57-24 N=81
1.5	<b>FILL - POORLY GRADED SAND WITH CLAY AND GRAVEL</b> , light brown to dark brown	487+/-		X	16-43-42 N=85
4.5	<b>FILL - SANDY LEAN CLAY WITH GRAVEL</b> , with limestone fragments, dark brown	484+/-		X	16-9-9 N=18
<b>Boring Terminated at 4.5 Feet</b>					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
3.25-inch diameter hollow stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:  
See CPT log 203 for exploration at depths greater than 4.5 feet.

Abandonment Method:  
Boring backfilled with auger cuttings upon completion.

See [Supporting Information](#) for explanation of symbols and abbreviations.

Elevations measured using Leica Zeno GPS

**WATER LEVEL OBSERVATIONS**

Water observed on CPT 202 sounding at about 37 feet



611 Lunken Park Dr  
Cincinnati, OH

Boring Started: 08-23-2021

Boring Completed: 08-23-2021

Drill Rig: CME 55X

Driller: AR/KH

Project No.: N1205102

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_N1205102 THE BANKS LOT 28.GPJ TERRACON\_DATATEMPLATE.GDT 9/10/21

# CPT LOG NO. 201

**PROJECT:** The Banks Lot 28 Evaluation

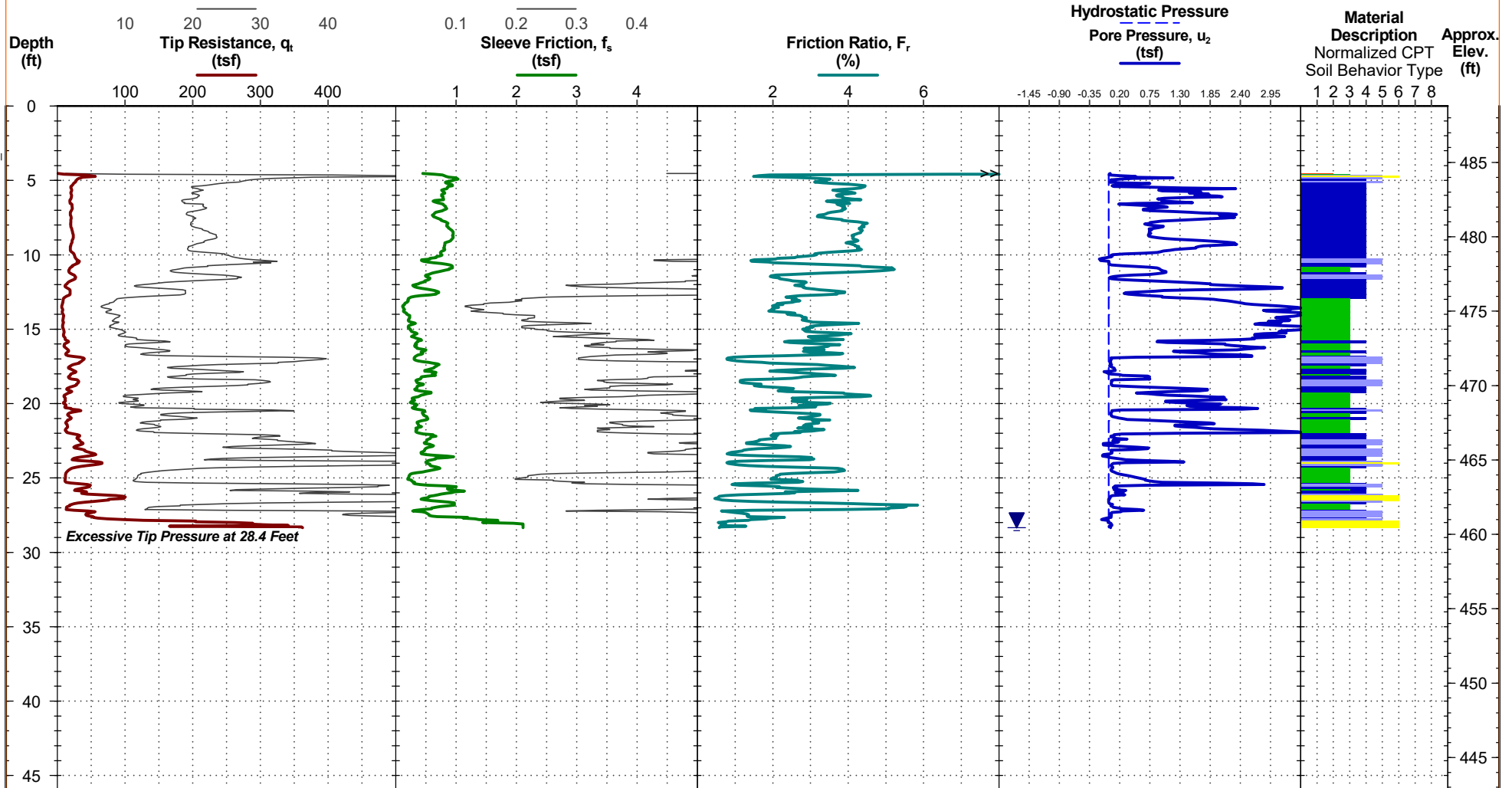
**CLIENT:** Hamilton County OH  
Cincinnati, OH

**TEST LOCATION:** See [Exploration Plan](#)

**SITE:** Elm Street and Mehring Way  
Cincinnati, OH

Approx. Surface Elev: 488.79 ft +/-  
Latitude: 39.09480434°  
Longitude: -84.51340104°

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT: CPT REPORT N1205102 THE BANKS LOT 28.GPJ TERRACON\_DATA\TEMPLATE.GDT 8/24/21



SPT Sampled to 4.5 feet, see CPT-201A Log

Hand advancement from 4.5 to 6.5 feet and 28 to 28.35 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Elevations measured using Leica Zeno GPS

CPT sensor calibration reports available upon request.

Note: Water level assumed at bottom of sounding

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

**WATER LEVEL OBSERVATION**

▼ 28.35 ft estimated water depth  
(used in normalizations and correlations;  
See [Supporting Information](#))

Probe no. 4342 with net area ratio of .84  
U2 pore pressure transducer location  
Manufactured by Geotech A.B.; calibrated 8/3/2020  
Tip and sleeve areas of 10 cm<sup>2</sup> and 150 cm<sup>2</sup>  
Ring friction reducer with O.D. of 1.875 in



CPT Started: 8/23/2021

Rig: CME 55X

Project No.: N1205102

CPT Completed: 8/23/2021

Operator: AR/KH

# CPT LOG NO. 202

**PROJECT:** The Banks Lot 28 Evaluation

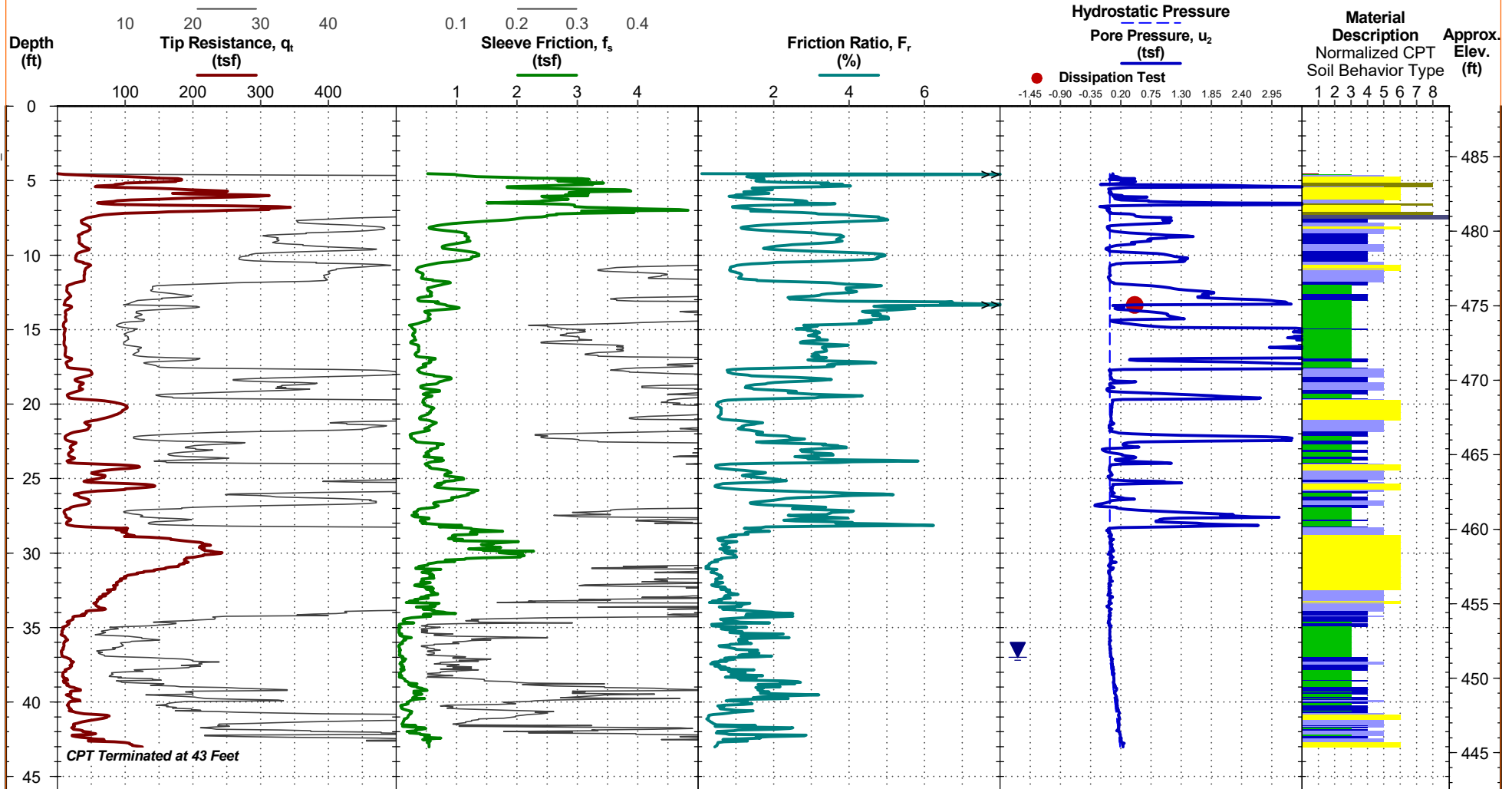
**CLIENT:** Hamilton County OH  
Cincinnati, OH

**TEST LOCATION:** See [Exploration Plan](#)

**SITE:** Elm Street and Mehring Way  
Cincinnati, OH

Approx. Surface Elev: 488.40 ft +/-  
Latitude: 39.09473208°  
Longitude: -84.51370756°

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT N1205102 THE BANKS LOT 28 .GPJ TERRACON\_DATA\TEMPLATE.GDT 8/24/21



SPT Sampled to 4.5 feet, see CPT-202A Log

Hand advancement from 4.5 to 10 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Elevations measured using Leica Zeno GPS

CPT sensor calibration reports available upon request.

Note: Water level based on water noted on drill rods

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

**WATER LEVEL OBSERVATION**

▼ 37 ft estimated water depth  
(used in normalizations and correlations;  
See [Supporting Information](#))

Probe no. 4342 with net area ratio of .84  
U2 pore pressure transducer location  
Manufactured by Geotech A.B.; calibrated 8/3/2020  
Tip and sleeve areas of 10 cm<sup>2</sup> and 150 cm<sup>2</sup>  
Ring friction reducer with O.D. of 1.875 in



CPT Started: 8/23/2021

Rig: CME 55X

Project No.: N1205102

CPT Completed: 8/23/2021

Operator: AR/KH



# CPT LOG NO. 203

**PROJECT:** The Banks Lot 28 Evaluation

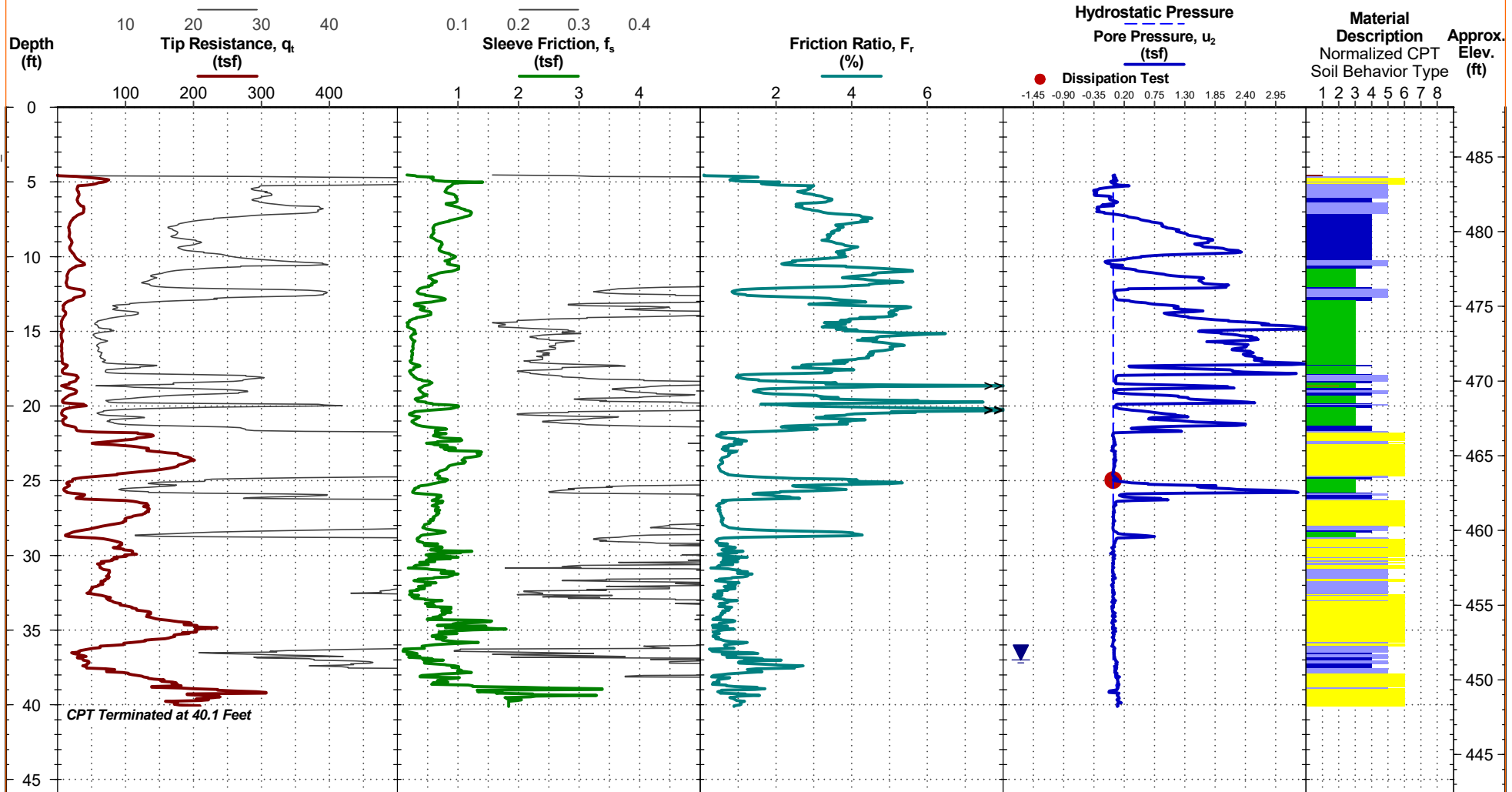
**CLIENT:** Hamilton County OH  
Cincinnati, OH

**TEST LOCATION:** See [Exploration Plan](#)

Approx. Surface Elev: 488.33 ft +/-  
Latitude: 39.09491393°  
Longitude: -84.51359824°

**SITE:** Elm Street and Mehring Way  
Cincinnati, OH

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT N1205102 THE BANKS LOT 28 .GPJ TERRACON\_DATA\TEMPLATE.GDT 8/24/21



SPT Sampled to 4.5 feet, see CPT-203A Log  
Hand advancement from 4.5 to 6 feet  
See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).  
Elevations measured using Leica Zeno GPS

CPT sensor calibration reports available upon request.  
Note: Water level based on water noted on CPT-202 drill rods

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

**WATER LEVEL OBSERVATION**  
▼ 37 ft estimated water depth  
(used in normalizations and correlations;  
See [Supporting Information](#))

Probe no. 4342 with net area ratio of .84  
U2 pore pressure transducer location  
Manufactured by Geotech A.B.; calibrated 8/3/2020  
Tip and sleeve areas of 10 cm<sup>2</sup> and 150 cm<sup>2</sup>  
Ring friction reducer with O.D. of 1.875 in



CPT Started: 8/23/2021  
Rig: CME 55X  
Project No.: N1205102

CPT Completed: 8/23/2021  
Operator: AR/KH

## **SUPPORTING INFORMATION**

### **Contents:**

General Notes






Unified Soil Classification System

Note: All attachments are one page unless noted above.

# GENERAL NOTES

## DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

The Banks Lot 28 Evaluation ■ Cincinnati, OH  
Terracon Project No. N1205102

SAMPLING	WATER LEVEL	FIELD TESTS
 Standard Penetration Test	 Water Initially Encountered	<b>N</b> Standard Penetration Test Resistance (Blows/Ft.)
	 Water Level After a Specified Period of Time	<b>(HP)</b> Hand Penetrometer
	 Water Level After a Specified Period of Time	<b>(T)</b> Torvane
	 Cave In Encountered	<b>(DCP)</b> Dynamic Cone Penetrometer
	Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	<b>UC</b> Unconfined Compressive Strength
		<b>(PID)</b> Photo-Ionization Detector
	<b>(OVA)</b> Organic Vapor Analyzer	

DESCRIPTIVE SOIL CLASSIFICATION
Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

LOCATION AND ELEVATION NOTES
Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See <a href="#">Exploration and Testing Procedures</a> in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS				
RELATIVE DENSITY OF COARSE-GRAINED SOILS <small>(More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance</small>		CONSISTENCY OF FINE-GRAINED SOILS <small>(50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance</small>		
Descriptive Term (Density)	Standard Penetration or N-Value Blows/Ft.	Descriptive Term (Consistency)	Unconfined Compressive Strength Qu, (tsf)	Standard Penetration or N-Value Blows/Ft.
Very Loose	0 - 3	Very Soft	less than 0.25	0 - 1
Loose	4 - 9	Soft	0.25 to 0.50	2 - 4
Medium Dense	10 - 29	Medium Stiff	0.50 to 1.00	4 - 8
Dense	30 - 50	Stiff	1.00 to 2.00	8 - 15
Very Dense	> 50	Very Stiff	2.00 to 4.00	15 - 30
		Hard	> 4.00	> 30

RELEVANCE OF SOIL BORING LOG
The soil boring logs contained within this document are intended for application to the project as described in this document. Use of these soil boring logs for any other purpose may not be appropriate.

# CPT GENERAL NOTES

## DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

The Banks Lot 28 Evaluation ■ Cincinnati, OH

Terracon Project No. N1205102

## DESCRIPTION OF GEOTECHNICAL CORRELATIO

### DESCRIPTION OF MEASUREMENTS AND CALIBRATIONS

To be reported per ASTM D5778:

Uncorrected Tip Resistance,  $q_c$   
Measured force acting on the cone divided by the cone's projected area

Corrected Tip Resistance,  $q_t$   
Cone resistance corrected for porewater and net area ratio effects  
 $q_t = q_c + u_2(1 - a)$

Where  $a$  is the net area ratio, a lab calibration of the cone typically between 0.70 and 0.85

Pore Pressure,  $u$   
Pore pressure measured during penetration  
 $u_1$  - sensor on the face of the cone  
 $u_2$  - sensor on the shoulder (more common)

Sleeve Friction,  $f_s$   
Frictional force acting on the sleeve divided by its surface area

Normalized Friction Ratio,  $F_r$   
The ratio as a percentage of  $f_s$  to  $q_t$ , accounting for overburden pressure

To be reported per ASTM D7400, if collected:

Shear Wave Velocity,  $V_s$   
Measured in a Seismic CPT and provides direct measure of soil stiffness

Normalized Tip Resistance,  $Q_{tn}$   
 $Q_{tn} = ((q_t - \sigma_{v0})/P_a)(P_a/\sigma'_{v0})^n$   
 $n = 0.381(I_c) + 0.05(\sigma'_{v0}/P_a) - 0.15$

Over Consolidation Ratio, OCR  
OCR (1) =  $0.25(Q_{tn})^{0.25}$   
OCR (2) =  $0.33(Q_{tn})$

Undrained Shear Strength,  $S_u$   
 $S_u = Q_{tn} \times \sigma'_{v0}/N_{kt}$   
 $N_{kt}$  is a soil-specific factor (shown on  $S_u$  plot)

Sensitivity,  $S_t$   
 $S_t = (q_t - \sigma_{v0}/N_{kt}) \times (1/f_s)$

Effective Friction Angle,  $\phi'$   
 $\phi' (1) = \tan^{-1}(0.373[\log(q_t/\sigma'_{v0}) + 0.29])$   
 $\phi' (2) = 17.6 + 11[\log(Q_{tn})]$

Unit Weight,  $\gamma$   
 $\gamma = (0.27[\log(F_r)] + 0.36[\log(q_t/\text{atm})] + 1.236) \times \gamma_{water}$   
 $\sigma_{v0}$  is taken as the incremental sum of the unit weights

Small Strain Shear Modulus,  $G_0$   
 $G_0 (1) = \rho V_s^2$   
 $G_0 (2) = 0.015 \times 10^{(0.55I_c + 1.68)}(q_t - \sigma_{v0})$

Soil Behavior Type Index,  $I_c$   
 $I_c = [(3.47 - \log(Q_{tn}))^2 + (\log(F_r) + 1.22)^2]^{0.5}$

SPT  $N_{60}$   
 $N_{60} = (q_t/\text{atm}) / 10^{(1.1268 - 0.2817I_c)}$

Elastic Modulus,  $E_s$  (assumes  $q_t/q_{ultimate} \sim 0.3$ , i.e. FS = 3)  
 $E_s (1) = 2.6\psi G_0$  where  $\psi = 0.56 - 0.33\log Q_{tn, \text{clean sand}}$   
 $E_s (2) = G_0$   
 $E_s (3) = 0.015 \times 10^{(0.55I_c + 1.68)}(q_t - \sigma_{v0})$   
 $E_s (4) = 2.5q_t$

Constrained Modulus,  $M$   
 $M = \alpha_M(q_t - \sigma_{v0})$   
For  $I_c > 2.2$  (fine-grained soils)  
 $\alpha_M = Q_{tn}$  with maximum of 14  
For  $I_c < 2.2$  (coarse-grained soils)  
 $\alpha_M = 0.0188 \times 10^{(0.55I_c + 1.68)}$

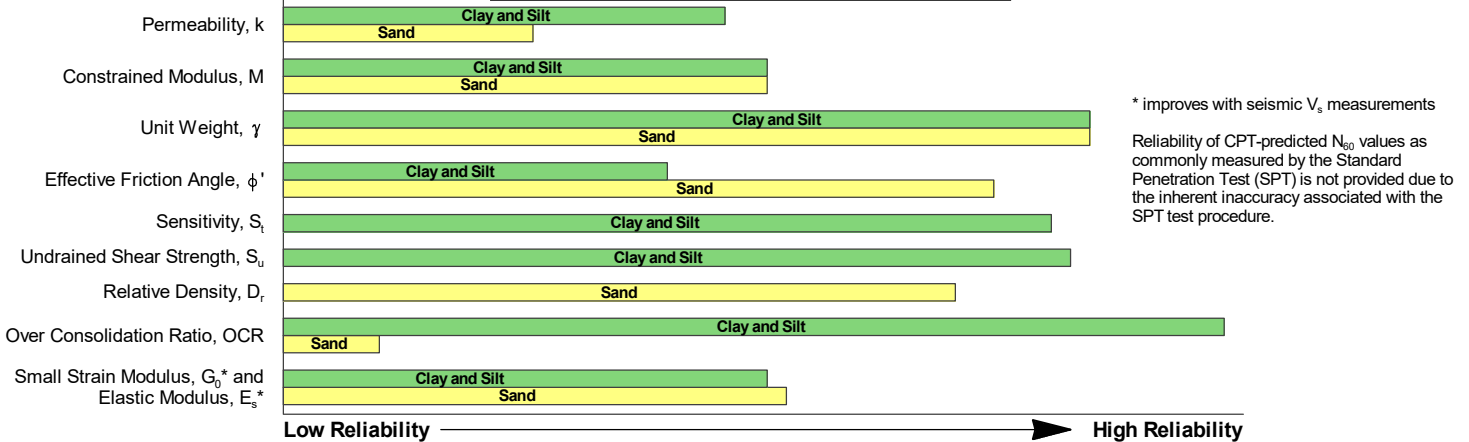
Hydraulic Conductivity,  $k$   
For  $1.0 < I_c < 3.27$   $k = 10^{(0.952 - 3.04I_c)}$   
For  $3.27 < I_c < 4.0$   $k = 10^{(-4.52 - 1.37I_c)}$

Relative Density,  $D_r$   
 $D_r = (Q_{tn} / 350)^{0.5} \times 100$

### REPORTED PARAMETERS

CPT logs as provided, at a minimum, report the data as required by ASTM D5778 and ASTM D7400 (if applicable). This minimum data include  $q_t$ ,  $f_s$ , and  $u$ . Other correlated parameters may also be provided. These other correlated parameters are interpretations of the measured data based upon published and reliable references, but they do not necessarily represent the actual values that would be derived from direct testing to determine the various parameters. To this end, more than one correlation to a given parameter may be provided. The following chart illustrates estimates of reliability associated with correlated parameters based upon the literature referenced below.

### RELATIVE RELIABILITY OF CPT CORRELATIONS



### WATER LEVEL

The groundwater level at the CPT location is used to normalize the measurements for vertical overburden pressures and as a result influences the normalized soil behavior type classification and correlated soil parameters. The water level may either be "measured" or "estimated:"

*Measured* - Depth to water directly measured in the field

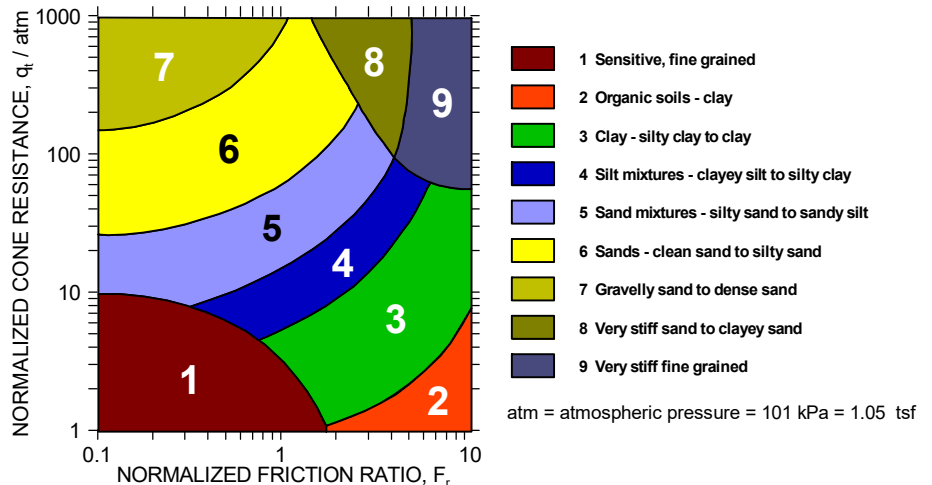
*Estimated* - Depth to water interpolated by the practitioner using pore pressure measurements in coarse grained soils and known site conditions

While groundwater levels displayed as "measured" more accurately represent site conditions at the time of testing than those "estimated," in either case the groundwater should be further defined prior to construction as groundwater level variations will occur over time.

### CONE PENETRATION SOIL BEHAVIOR TYPE

The estimated stratigraphic profiles included in the CPT logs are based on relationships between corrected tip resistance ( $q_t$ ), friction resistance ( $f_s$ ), and porewater pressure ( $u_2$ ). The normalized friction ratio ( $F_r$ ) is used to classify the soil behavior type.

Typically, silts and clays have high  $F_r$  values and generate large excess penetration porewater pressures; sands have lower  $F_r$ 's and do not generate excess penetration porewater pressures. The adjacent graph (Robertson *et al.*) presents the soil behavior type correlation used for the logs. This normalized SBT chart, generally considered the most reliable, does not use pore pressure to determine SBT due to its lack of repeatability in onshore CPTs.



### REFERENCES

Kulhawy, F.H., Mayne, P.W., (1997). "Manual on Estimating Soil Properties for Foundation Design," Electric Power Research Institute, Palo Alto, CA.  
 Mayne, P.W., (2013). "Geotechnical Site Exploration in the Year 2013," Georgia Institute of Technology, Atlanta, GA.  
 Robertson, P.K., Cabal, K.L., (2012). "Guide to Cone Penetration Testing for Geotechnical Engineering," Signal Hill, CA.  
 Schmertmann, J.H., (1970). "Static Cone to Compute Static Settlement over Sand," *Journal of the Soil Mechanics and Foundations Division*, 96(SM3), 1011-1043.

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests <sup>A</sup>				Soil Classification		
				Group Symbol	Group Name <sup>B</sup>	
<b>Coarse-Grained Soils:</b> More than 50% retained on No. 200 sieve	<b>Gravels:</b> More than 50% of coarse fraction retained on No. 4 sieve	<b>Clean Gravels:</b> Less than 5% fines <sup>C</sup>	$Cu \geq 4$ and $1 \leq Cc \leq 3$ <sup>E</sup>	GW	Well-graded gravel <sup>F</sup>	
			$Cu < 4$ and/or $[Cc < 1 \text{ or } Cc > 3.0]$ <sup>E</sup>	GP	Poorly graded gravel <sup>F</sup>	
		<b>Gravels with Fines:</b> More than 12% fines <sup>C</sup>	Fines classify as ML or MH	GM	Silty gravel <sup>F, G, H</sup>	
			Fines classify as CL or CH	GC	Clayey gravel <sup>F, G, H</sup>	
	<b>Sands:</b> 50% or more of coarse fraction passes No. 4 sieve	<b>Clean Sands:</b> Less than 5% fines <sup>D</sup>	$Cu \geq 6$ and $1 \leq Cc \leq 3$ <sup>E</sup>	SW	Well-graded sand <sup>I</sup>	
			$Cu < 6$ and/or $[Cc < 1 \text{ or } Cc > 3.0]$ <sup>E</sup>	SP	Poorly graded sand <sup>I</sup>	
		<b>Sands with Fines:</b> More than 12% fines <sup>D</sup>	Fines classify as ML or MH	SM	Silty sand <sup>G, H, I</sup>	
			Fines classify as CL or CH	SC	Clayey sand <sup>G, H, I</sup>	
<b>Fine-Grained Soils:</b> 50% or more passes the No. 200 sieve	<b>Silts and Clays:</b> Liquid limit less than 50	<b>Inorganic:</b>	$PI > 7$ and plots on or above "A" line	CL	Lean clay <sup>K, L, M</sup>	
			$PI < 4$ or plots below "A" line <sup>J</sup>	ML	Silt <sup>K, L, M</sup>	
		<b>Organic:</b>	Liquid limit - oven dried	< 0.75	OL	Organic clay <sup>K, L, M, N</sup>
			Liquid limit - not dried			Organic silt <sup>K, L, M, O</sup>
	<b>Silts and Clays:</b> Liquid limit 50 or more	<b>Inorganic:</b>	$PI$ plots on or above "A" line	CH	Fat clay <sup>K, L, M</sup>	
			$PI$ plots below "A" line	MH	Elastic Silt <sup>K, L, M</sup>	
		<b>Organic:</b>	Liquid limit - oven dried	< 0.75	OH	Organic clay <sup>K, L, M, P</sup>
			Liquid limit - not dried			Organic silt <sup>K, L, M, Q</sup>
	<b>Highly organic soils:</b>	Primarily organic matter, dark in color, and organic odor			PT	Peat

<sup>A</sup> Based on the material passing the 3-inch (75-mm) sieve.

<sup>B</sup> If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

<sup>C</sup> Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

<sup>D</sup> Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

$$Cu = D_{60}/D_{10} \quad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

<sup>F</sup> If soil contains  $\geq 15\%$  sand, add "with sand" to group name.

<sup>G</sup> If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

<sup>H</sup> If fines are organic, add "with organic fines" to group name.

<sup>I</sup> If soil contains  $\geq 15\%$  gravel, add "with gravel" to group name.

<sup>J</sup> If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

<sup>K</sup> If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

<sup>L</sup> If soil contains  $\geq 30\%$  plus No. 200 predominantly sand, add "sandy" to group name.

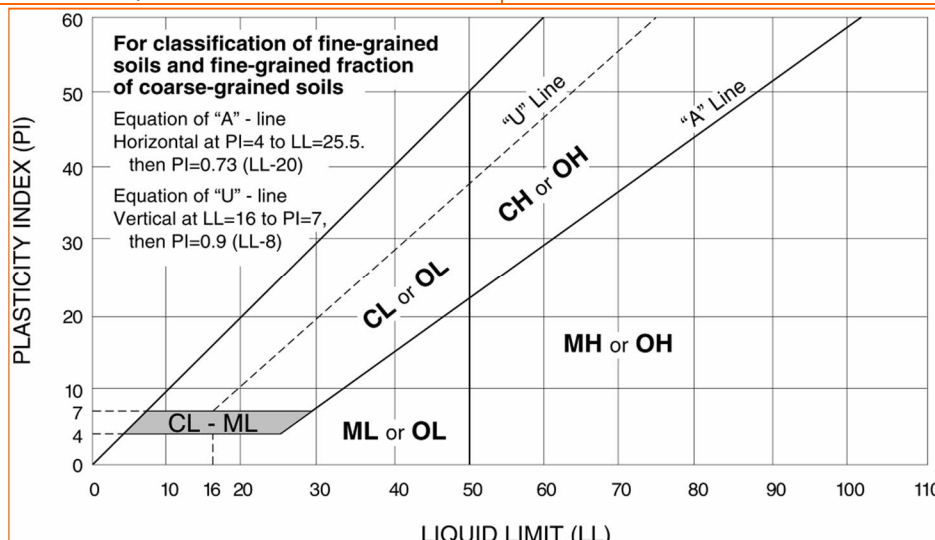
<sup>M</sup> If soil contains  $\geq 30\%$  plus No. 200, predominantly gravel, add "gravelly" to group name.

<sup>N</sup>  $PI \geq 4$  and plots on or above "A" line.

<sup>O</sup>  $PI < 4$  or plots below "A" line.

<sup>P</sup>  $PI$  plots on or above "A" line.

<sup>Q</sup>  $PI$  plots below "A" line.



SECTION 005000

AGREEMENT FORM

1. The Contract Form for this project will be AIA A132-2009 (modified).

END OF SECTION

# DRAFT AIA<sup>®</sup> Document A132<sup>™</sup> - 2019

## Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition

**AGREEMENT** made as of the «    » day of December in the year 2021  
(In words, indicate day, month, and year.)

**BETWEEN** the Owner:  
(Name, legal status, address, and other information)

Board of County Commissioners, Hamilton County, Ohio  
603 County Administration Building  
138 East Court Street  
Cincinnati, Ohio 45202

and the Contractor:  
(Name, legal status, address, and other information)

for the following Project:  
(Name, location, and detailed description)

The Banks - Phase 3C  
Lot 28 of the Banks Subdivision  
Garage and Park  
BP#2

The Construction Manager:  
(Name, legal status, address, and other information)

Messer Construction Co.  
«643 W. Court Street  
Cincinnati, Ohio 45203

The Architect:  
(Name, legal status, address, and other information)

THP Limited, Inc.  
100 E. 8<sup>th</sup> Street, Floor 3  
Cincinnati, Ohio 45202

The Owner and Contractor agree as follows.

**ADDITIONS AND DELETIONS:** The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Documents A232<sup>™</sup>-2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition; B132<sup>™</sup>-2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132<sup>™</sup>-2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser. AIA Document A232<sup>™</sup>-2019 is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

**ELECTRONIC COPYING** of any portion of this AIA<sup>®</sup> Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

## TABLE OF ARTICLES

1	THE CONTRACT DOCUMENTS
2	THE WORK OF THIS CONTRACT
3	DATE OF COMMENCEMENT AND DATES OF SUBSTANTIAL COMPLETION
4	CONTRACT SUM
5	PAYMENTS
6	DISPUTE RESOLUTION
7	TERMINATION OR SUSPENSION
8	MISCELLANEOUS PROVISIONS
9	ENUMERATION OF CONTRACT DOCUMENTS
10	INSURANCE AND BONDS
11	NOTICE PROVISIONS

### ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than Modifications, appears in Article 9.

### ARTICLE 2 THE WORK OF THIS CONTRACT

§ 2.1 The Contractor shall fully execute the TC-01 Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

§ 2.2 The Contractor represents to the Owner that all of the Work shall be performed for the Contract Sum set forth in Article 4 hereof, unless a change in the Work is required. A change in the Work is not warranted if the applicable portion of the Work was reasonably inferable from or contemplated by, or a prudent contractor should have realized that same was necessary or appropriate under the Contract Documents in existence as of the date of this Agreement. During performance of the Work, the Contractor agrees to use its best efforts, exercising its best and prudent judgment, to accomplish the Work in conformance with, and as required by or described by, or referred to in, the Contract Documents.

### ARTICLE 3 DATE OF COMMENCEMENT AND DATES OF SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be a date set forth in a notice to proceed issued by the Owner which is anticipated to be December 17, 2021

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

#### § 3.3 Substantial Completion of the Project or Portions Thereof

« § 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the date of Substantial Completion of the Work of all of the Contractors for the Project will be \_\_\_\_\_.



§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work of all of the Contractors for the Project are to be completed prior to Substantial Completion of the entire Work of all of the Contractors for the Project, the Contractors shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date

§ 3.4 When the Work of this Contract, or any Portion Thereof, is Substantially Complete

§ 3.4.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall substantially complete the entire Work of this Contract by \_\_\_\_\_.

§ 3.4.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work of this Contract are to be substantially complete prior to when the entire Work of this Contract shall be substantially complete, the Contractor shall substantially complete such portions by the following dates:

Portion of Work	Date to be substantially complete

§ 3.4.3 Time is of the essence with respect to the Contract Documents and all obligations thereunder. If the Contractor fails to substantially complete the Work of this Contract, or portions thereof, as provided in this Section 3.4, liquidated damages, if any, shall be assessed as set forth in the Contract Documents.

**ARTICLE 4 CONTRACT SUM**

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be as set forth in Section 4.2 below.

§ 4.2 Stipulated Sum

§ 4.2.1 The Contract Sum shall be << >> (\$ << >>), subject to additions and deductions as provided in the Contract Documents.

§ 4.2.2 Alternates

§ 4.2.2.1 Alternates, if any, included in the Contract Sum:

Item	Price
N/A	

§ 4.2.3 Allowances, if any, included in the Contract Sum:  
(Identify each allowance.)

Item	Price

The Allowance shall be used as directed by the Owner. The unused portion of the Allowance shall be credited to the Owner via a Deduct Change Order at Project completion.

§ 4.2.4 Unit prices, if any:

(Identify the item and state the unit price, and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)

§ 4.3 Other:

§ 4.3.1 Where the Work involved is covered by unit prices contained in the Contract Documents, the value of any Work covered by a Change Order or Claim for an adjustment in the Contract Sum will be determined by application of such unit prices to the actual quantities of each scheduled item.

§ 4.3.2 The Construction Manager will determine the actual quantities and classifications of Unit Price Work performed by the Contractor. The Construction Manager will review with Contractor the Construction Manager's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). The Construction Manager's written decision thereon will be final and binding (except as modified by the Construction Manager to reflect changed factual conditions or more accurate data) upon Owner and Contractor.

§ 4.3.3 Each unit price will be deemed to include an amount considered by the Contractor to be adequate to cover the Contractor's overhead and profit for each separately identified item.

**ARTICLE 5 PAYMENTS**

**§ 5.1 Progress Payments**

§ 5.1.1 Based upon Applications for Payment submitted to the Construction Manager by the Contractor, and Certificates for Payment issued by the Construction Manager and Architect, the Owner shall make progress payments on account of the Contract Sum, to the Contractor, as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

« »

§ 5.1.3 Provided that an Application for Payment is received by the Construction Manager not later than the «25th » day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the « 30th » day of the «following» month. If an Application for Payment is received by the Construction Manager after the application date fixed above, payment of the amount certified shall be made by the Owner not later than «sixty » ( « 60 » ) days after the Construction Manager receives the Application for Payment.

**§ 5.1.4 Progress Payments Where the Contract Sum is Based on a Stipulated Sum**

§ 5.1.4.1 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Construction Manager and Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.4.2 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.4.3 In accordance with AIA Document A232™–2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.4.3.1 The amount of each progress payment shall first include:

- .1 That portion of the Contract Sum properly allocable to completed Work;
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- .3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.4.3.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A232–2009;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A232–2009; and
- .5 Retainage withheld pursuant to Section 5.1.5.

## § 5.1.5 Retainage

### § 5.1.5.1 Progress payments made to Contractor shall be subject to the following:

(1) for labor performed prior to Substantial Completion of the Work, the progress payment shall be reduced by eight percent (8%) and made at the rate of ninety-two percent (92%) of the Schedule of Values prepared by the Contractor and approved by the Architect; and

(2) provided the materials have been inspected and found to meet the specifications, the progress payment for materials delivered to and suitably stored at the Project site shall be reduced by eight percent (8%) and made at the rate of ninety-two percent (92%) of the Schedule of Values prepared by the Contractor and approved by the Architect. The retained balance shall be paid when such material is incorporated into and becomes a part of the Project.

§ 5.1.5.2 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.5.3 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.1.6 Except as set forth in this Section 5.1.6, when the Work of this Contract is substantially complete, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to Section 5.1.5. The Application for Payment submitted when the Work of this Contract is substantially complete shall not include retainage as follows:

*(Insert any other conditions for release of retainage when the Work of this Contract is substantially complete, or upon Substantial Completion of the Work of all Contractors on the Project or portions thereof.)*

<< >>

## § 5.2 Final Payment

### § 5.2.1 Final Payment Where the Contract Sum is Based on a Stipulated Sum

§ 5.2.1.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A232–2009, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect.

§ 5.2.1.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the final Certificate for Payment or Project Certificate for Payment, or as follows:

<< >>

## ARTICLE 6 DISPUTE RESOLUTION

### § 6.1 Initial Decision Maker

The Architect will serve as Initial Decision Maker pursuant to Article 15 of AIA Document A232–2009, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.

## § 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A232–2019, the method of binding dispute resolution shall litigation in the Court of Common Pleas of Hamilton County, Ohio

## ARTICLE 7 TERMINATION OR SUSPENSION

### § 7.1 Where the Contract Sum is a Stipulated Sum

§ 7.1.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232–2009.

§ 7.1.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232–2009.

## ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A232–2009 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner’s representative:

*(Name, address, email address, and other information)*

Phil Beck  
Construction Project Executive – The Banks  
138 E. Court Street  
Suite 603  
Cincinnati, Ohio 45202

§ 8.3 The Contractor’s representative:

*(Name, address, email address, and other information)*

§ 8.4 Neither the Owner’s nor the Contractor’s representative shall be changed without ten days’ prior notice to the other Party.

§ 8.5 Other provisions:

§ 8.5.1 The Contractor must verify all materials, equipment and labor entering into the Work for conformance with the Contract Documents and must keep such full and detailed accounts as may be necessary for proper financial management under the Contract. The system and method of accounting is subject to Architect’s approval. Architect and Owner, and their agents and employees, will be afforded access to all the Contractor’s records, books, correspondence, instructions, receipts, vouchers, memoranda, and similar data relating to the Contract, and the Contractor must preserve all such records and provide such access for a period of three (3) years after the date of Substantial Completion.

§ 8.5.2 All references throughout the Contract Document to the term “Architect” are hereby replaced by the term “Engineer”.»

## ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition
- .2 AIA Document A232™–2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as amended  
« »
- .3 Drawings

All Drawings set forth in the Banks Phase 3C Project Manual, ITB # \_\_\_\_\_ dated December \_\_\_\_\_, 2021, as amended.

**.4 Specifications**

All Specifications as set forth in Banks Phase 3C Project Manual, ITB # \_\_\_\_\_ dated December \_\_\_\_\_, 2021, as amended.

**.5 Addenda, if any:**

Number	Date	Pages

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

**.6 Additional documents, if any, forming part of the Contract Documents are:**

**.1** The following documents executed and submitted by the Contractor for the Project shall be deemed a part of the Contract Documents:

Document Number	Title	Pages
001000.4	Bid Form	6
001000.5	Contract Bond	3
001000.6	Certificate of Compliance	1
001000.7	Non-Collusion Affidavit of Contractor	1
001000.8	Bidder's Certification Concerning Equal Employment Opportunity Requirements	1
001000.9	Personal Property Tax Statements	1
001000.10	Subcontractor and Material Supplier List	1
001000.12	SBE Subcontractor Utilization Plan	1
001000.13	Statement of Good Faith	1
001000.14	SBE Outreach & Good Faith Efforts Summary Sheet	1
001000.17	Responsible Bidder Certification	3
001000.22	Registration Form	1

**.2** The following documents contained in the Project Manual dated November 5, 2021 shall be deemed a part of the Contract Documents:

Document Number	Title	Pages
00101	Cover Page	1
00110	Project Manual Index	3
00115	Drawing Index	2
00125	Project Directory	1
001000.1	Advertisement for Bids (Legal Notice)	3
001000.2	Instructions to Bidders	9
001000.3	Additional Bid Conditions	1
001000.11	Small Business Enterprise Program Summary	2
001000.18	Tax Exempt Statement Sheet	1
001000.23	Prevailing Wage Rates (Including Appendix A)	76
006150	Escrow Agreement	2
008100	Project Safety Program	36
008260	Joint Policy for Small Business Enterprise, Economic Inclusion and Workforce Development	

008270	(including Subcontractor Monthly Business Utilization Report Form 2005 & Subcontractor Substitution Form 2006) Responsible Bidder Requirements Applicable to Public Contracts	26 3
009000	Contract Construction Management Forms (including Change Order Form AIA G701/CMa as amended and modified. Application and Certificate for Payment Form AIA G702/CMa as amended and modified. Continuation Sheet AIA G703/CMa as amended and modified, Certificate of Substantial Completion Form AIA G704/CMa as amended and modified, Contractor's Affidavit of Payment of Debts and Claims Form AIA G706/CMa as amended and modified, Contractor's Affidavit of Release of Liens Form AIA G706A/CMa as amended and modified, Consent of Surety to Final Payment Form AIA G707 as amended and modified, Contractor's Affidavit, Sub-Contractor Affidavit and Waiver of Lien, Construction Change directive Form AIA G714/CMa as amended and modified.	14

**ARTICLE 10 INSURANCE AND BONDS**

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A232-2009 and as set forth in Exhibit A to A232 and this Agreement. (State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A232-2009.)

Type of Insurance or Bond	Limit of Liability or Bond Amount (\$0.00)

**ARTICLE 11 NOTICE**

§ 11.1 Whenever it shall be necessary or desirable to give notice of any kind it shall be in writing. Either party may, by notice of the other, designate a different address to which notices shall be sent or change authorized personnel hereafter designated. On behalf of the Construction Manager, the County and the Contractor, only the following personnel are authorized to sign and receive notices and any and all other documents.

If to Construction Manager: Kyle Buchhalter  
Messer Construction Co.  
643 W. Court Street  
Cincinnati, Ohio 45202

If to Owner: Phil Beck  
Construction Project Executive-The Banks  
Hamilton County  
603 Administration Building  
138 E. Court Street  
Cincinnati, Ohio 45202

With Copies to: Roger E. Friedmann  
Assistant Prosecuting Attorney  
230 E. Ninth Street, Eighth Floor  
Cincinnati, Ohio 45202

If to Contractor:



This Agreement is entered into as of the day and year first written above.

Board of County Commissioners, Hamilton County, Ohio

\_\_\_\_\_  
**OWNER** *(Signature)*

Jeff Aluotto, County Administrator  
*(Printed name and title)*

\_\_\_\_\_  
**CONTRACTOR** *(Signature)*

\_\_\_\_\_  
*(Printed name and title)*

Approved as to Form:

\_\_\_\_\_  
Assistant Prosecuting Attorney



SECTION 006100  
CONTRACT BOND  
(Section 153.57 Ohio Revised Code)

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned \_\_\_\_\_

\_\_\_\_\_  
(Here insert full name and address or legal title of Contractor)

as Principal and \_\_\_\_\_

(Here insert full name or legal title of Surety)

as Surety, are hereby held and firmly bound unto The Board of County Commissioners Hamilton County, and Messer Construction Co., hereinafter called the Obligee, in the penal sum of

\_\_\_\_\_ dollars (\$ \_\_\_\_\_),

for the payment of which well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that whereas the above Principal did on the

\_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, file with the Obligee, a proposal for the erection and completion of:

\_\_\_\_\_.

NOW, THEREFORE, after awarding of the said contract in accordance with the proposal, plans, details, specifications and bills of material, which said proposal faithfully perform each and every condition of such contract and indemnify the Obligee against all damage suffered by failure to perform such contract according to the provisions thereof and in accordance with the plans, details, specifications and bills of material therefor; and pay all lawful claims of subcontractors, materialmen and laborers, for labor performed or material furnished in carrying forward, performing or completing of said contract, we agreeing and assenting that this undertaking shall be for the benefit of any subcontractor, materialmen or laborer having a just claim, as well as for the Obligee herein; then this obligation shall be void; otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

THE SAID Surety hereby stipulates and agrees that no modifications, omissions or additions



in or to the terms of said contract or in or to the plans and specifications therefor shall in any wise affect the obligations of said Surety on this bond, and does hereby waive notice of any modifications, omissions or additions to the terms of the contract or to the work or to the specifications.

SIGNED AND SEALED This \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

\_\_\_\_\_  
Principal

By:\_\_\_\_\_

Title:\_\_\_\_\_

\_\_\_\_\_  
Surety

By:\_\_\_\_\_

*Attorney-in-Fact*

\_\_\_\_\_  
*Surety company address*

\_\_\_\_\_  
*Surety Agent's name and address*

\_\_\_\_\_

\_\_\_\_\_

SECTION 006150  
ESCROW AGREEMENT

Agreement made on \_\_\_\_\_, \_\_\_\_\_, between The Board of County Commissioners, Hamilton County, Ohio, hereinafter called County, and \_\_\_\_\_, hereinafter called escrow agent.

WHEREAS, the County and \_\_\_\_\_, hereinafter called contractor, have entered into a contract identified as \_\_\_\_\_; and,

WHEREAS, Section 153.12, et. seq., Ohio Revised Code, requires the County to retain certain funds due to the Contractor in order to assure completion of the project which is the subject of the above mentioned contract; and,

WHEREAS, Section 153.63, Ohio Revised Code, provides for the placement of funds retained by the County in an escrow account;

NOW, therefore, it is agreed that:

1. County and Contractor agree to employ \_\_\_\_\_, to act as escrow agent in connection with funds retained by the County pursuant to the provisions of the contract identified as \_\_\_\_\_.
2. The escrow account shall be opened on or before \_\_\_\_\_, \_\_\_\_\_, with the deposit by the County with the escrow agent, the sum of \_\_\_\_\_ dollars. The escrow agent shall deposit such funds with the \_\_\_\_\_ (Bank) (Savings & loan) in an interest earning savings account.
3. The escrow agent shall hold the escrowed principal and income until receipt of notice from the County and the Contractor, or until receipt of an arbitration order specifying the amount of the escrowed principal to be released and the person to whom it is to be released. Upon receipt of the notice or order, the agent shall promptly pay such amount of principal and a proportionate amount of the escrowed income to the person indicated.
4. The escrow agent may commingle the escrowed funds with funds held pursuant to other escrowed agreements.
5. The escrow agent shall be paid nothing, for its services.

IN WITNESS WHEREOF, the parties have executed this agreement at \_\_\_\_\_

on the \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

The Banks – Lot 28 BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

The Board of County Commissioners, Hamilton County, Ohio

By: \_\_\_\_\_  
County Administrator

\_\_\_\_\_  
Witness

\_\_\_\_\_  
Witness

By: \_\_\_\_\_  
Contractor

\_\_\_\_\_  
Witness

\_\_\_\_\_  
Witness

\_\_\_\_\_ hereby accepts employment as  
escrow and hereby agrees to meet the obligations and perform the duties of escrow agent as set forth  
in the foregoing agreement.

Date: \_\_\_\_\_

\_\_\_\_\_  
Escrow Agent

**SECTION 007200**

**GENERALCONDITIONS**

1. General Conditions AIA A232-2009 amended is included and attached.

**END OF SECTION**

# DRAFT AIA® Document A232™ – 2009

## *General Conditions of the Contract for Construction, Construction Manager as Adviser Edition*

### for the following PROJECT:

*(Name, and location or address)*

« The Banks-Phase 3C  
«Lot 28, The Banks Subdivision  
Garage and Park  
Bid Package #2  
»  
« »

### THE CONSTRUCTION MANAGER:

*(Name, legal status and address)*

« Messer Construction Co.  
643 W. Court Street»« »  
«Cincinnati, Ohio 45203 »« »  
« »

### THE OWNER:

*(Name, legal status and address)*

« Board of County Commissioners, Hamilton County,  
Ohio »« »  
«603 County Administration Building  
138 East Court Street  
Cincinnati, Ohio 45202 »« »  
« »

### THE ENGINEER:

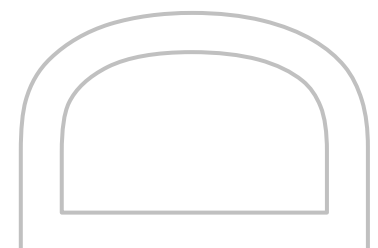
*(Name, legal status and address)*

« THP Limited, Inc.  
100 East Eighth Street »« »  
«Cincinnati, Ohio 45202 »« »  
« »

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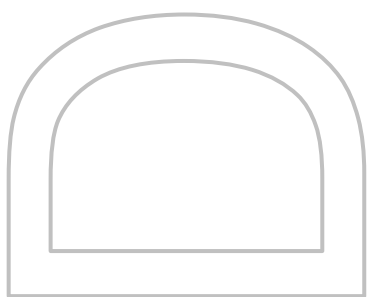
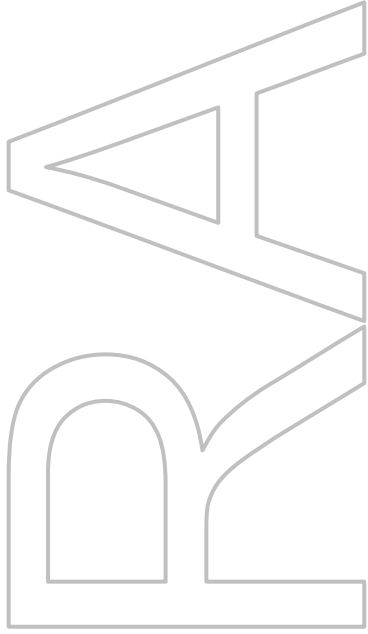
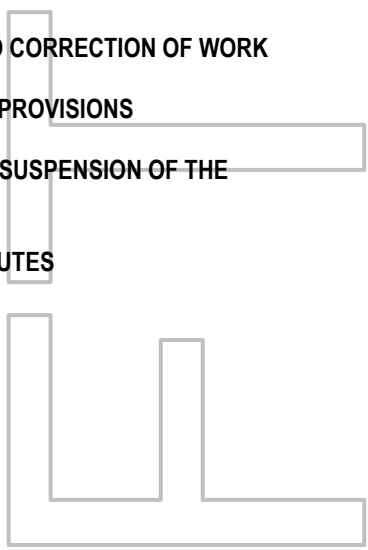
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TABLE OF ARTICLES

1	GENERAL PROVISIONS	9	PAYMENTS AND COMPLETION
2	OWNER	10	PROTECTION OF PERSONS AND PROPERTY
3	CONTRACTOR	11	INSURANCE AND BONDS
4	ENGINEER AND CONSTRUCTION MANAGER	12	UNCOVERING AND CORRECTION OF WORK
5	SUBCONTRACTORS	13	MISCELLANEOUS PROVISIONS
6	CONSTRUCTION BY OWNER OR BY OTHER CONTRACTORS	14	TERMINATION OR SUSPENSION OF THE CONTRACT
7	CHANGES IN THE WORK	15	CLAIMS AND DISPUTES
8	TIME		



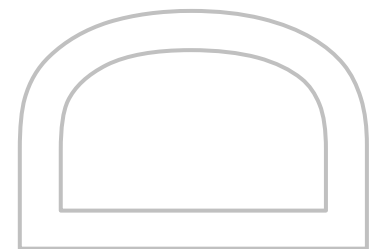
# DRAFT AIA® Document A232™ – 2009

## *General Conditions of the Contract for Construction, Construction Manager as Adviser Edition*

**ADDITIONS AND DELETIONS:** The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Documents A132™-2009, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; B132™-2009, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™-2009, Standard Form of Agreement Between Owner and Construction Manager as Adviser.



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## ARTICLE 1 GENERAL PROVISIONS

### § 1.1 Basic Definitions

**§ 1.1.1 The Contract Documents.** The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement), and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Engineer. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of addenda relating to bidding requirements).

**§ 1.1.2 The Contract.** The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Engineer or the Engineer's consultants, (2) between the Owner and the Construction Manager or the Construction Manager's consultants, (3) between the Owner and the Engineer or the Engineer's consultants, (4) between the Contractor and the Construction Manager or the Construction Manager's consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Engineer, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Engineer shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their duties.

**§ 1.1.3 The Work.** The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

**§ 1.1.4 The Project.** The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by other Multiple Prime Contractors and by the Owner's own forces, including persons or entities under separate contracts not administered by the Construction Manager.

**§ 1.1.5 The Drawings.** The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

**§ 1.1.6 The Specifications.** The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

**§ 1.1.7 Instruments of Service.** Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Engineer and the Engineer's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

**§ 1.1.8 Initial Decision Maker.** The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

### § 1.2 Correlation and Intent of the Contract Documents

**§ 1.2.1** The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

**§ 1.2.2** Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.



§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

### § 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Engineers.

### § 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as “all” and “any” and articles such as “the” and “an,” but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

### § 1.5 Ownership and Use of Drawings, Specifications and Other Instruments of Service

§ 1.5.1 The Engineer and the Engineer’s consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Engineer, or Engineer’s consultants’ reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Engineer and the Engineer’s consultants.

### § 1.6 Transmission of Data in Digital Form

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

## ARTICLE 2 OWNER

### § 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner’s approval or authorization. Except as otherwise provided in Article 4, the Construction Manager and the Engineer do not have such authority. The term “Owner” means the Owner or the Owner’s authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic’s lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner’s interest therein.

### § 2.2 Information and Services Required of the Owner

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner’s obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner’s ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements,

assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities. Unless otherwise provided under the Contract Documents, the Owner, through the Construction Manager, shall secure and pay for the building permit.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.2.6 The Owner shall endeavor to forward all communications to the Contractor through the Construction Manager and shall contemporaneously provide the same communications to the Engineer about matters arising out of or relating to the Contract Documents.

### § 2.3 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

### § 2.4 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Construction Manager's and Engineer's and their respective consultants' additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Engineer, after consultation with the Construction Manager. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

## ARTICLE 3 CONTRACTOR

### § 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The plural term "Multiple Prime Contractors" refers to persons or entities who perform construction under contracts with the Owner that are administered by the Construction Manager. The term does not include the Owner's own forces, including persons or entities under separate contracts not administered by the Construction Manager.

§ 3.1.3 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.4 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Construction Manager or Engineer in their administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

## § 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Construction Manager and Engineer any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and Engineer may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Construction Manager and Engineer any nonconformity discovered by or made known to the Contractor as a request for information submitted to Construction Manager in such form as the Construction Manager and Engineer may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Engineer issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Engineer for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

## § 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instruction concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner, the Construction Manager, and the Engineer and shall not proceed with that portion of the Work without further written instructions from the Engineer, through the Construction Manager. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of the Project already performed to determine that such portions are in proper condition to receive subsequent Work.

### § 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Engineer in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Engineer, in consultation with the Construction Manager, and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

### § 3.5 Warranties and Obligations of Contractor

#### § 3.5.1 CONTRACTOR'S WARRANTIES

§ 3.5.1.1 The Contractor hereby represents and warrants to the Owner that subject to the provisions of the Contract Documents, (a) the Work will be fully and finally completed in accordance with the terms of the Contract Documents at a cost not to exceed the Contract Sum, (b) all material and equipment incorporated into the Work will be new and free from any and all claims, liens, and security interest of any third parties, (c) the Project will be free from defects (whether latent or patent) in workmanship and materials furnished or installed by the Contractor, (d) the Contractor possesses a high level of expertise in the administration, construction, management and superintendence of projects of the type, nature, and general locality of the Project, and will perform the Work with the care, skill and diligence of such a contractor, (e) the Contractor and its Subcontractors are financially solvent, able to pay debts as they mature, and the financial statements and information furnished to the Owner by Contractor present fairly the Contractor's and, if applicable, Subcontractors' respective financial conditions, and they are possessed of sufficient working capital to complete the Contract, (f) the Contractor is able to furnish the plant, tools, labor, materials, and equipment necessary to complete the Work, and (g) the Contractor and its Subcontractors are qualified to perform the Work, authorized to transact business in the jurisdiction in which the Project is located, and possesses or have obtained and shall possess all necessary licenses, permits, and approvals required to perform the Work. The Contractor will promptly notify the Owner of the occurrence of any event or circumstances which renders the foregoing representations or warranties materially untrue. The foregoing warranties are in addition to, and not in lieu of, any and all other liability imposed upon the Contractor by law with respect to Contractor's duties, obligations and performance hereunder. The Contractor's liability hereunder shall survive the Owner's final acceptance of and payment for the Work. All representations and warranties set forth in the Contract Documents shall survive the final completion of the Work or the earlier termination of the Contract. If the Owner finds the materials furnished, Work performed, or the finished product are not in reasonably close conformity with the Contract Documents and have resulted in an unacceptable finished product, the affected Work or materials shall be removed and replaced or otherwise corrected by and at the expense of the Contractor in accordance with the Owner's written orders. The term "reasonably close conformity" shall not be construed as waiving the Contractor's responsibility to complete the Work in accordance with the Contract Documents, plans, and specifications. For the purpose of this Article, the term "reasonably close conformity" is intended to allow the Owner to use good engineering judgment in its determinations as to acceptance of Work that is not in strict conformity but will provide a finished product equal to or better than that intended by the requirements of the Contract Documents.

§ 3.5.2 The Contractor shall not be relieved of its general warranty obligation by specification of particular products or procedures unless it gives written notice of objection to specified requirements before purchase of such products and a written recommendation of alternative materials or procedures.

§ 3.5.3 The Contractor shall guarantee workmanship and materials for a period of one year from the date of issuance of the Certificate of Substantial Completion and shall leave the Work in perfect order at completion. Should defects develop within the guarantee period, the Contractor shall, upon written notice of the same, remedy the defects and reimburse the Owner for all damage to the Work whether caused by the defects or correction of same. The Contractor shall procure and deliver to the Construction Manager, no later than the date certified by Engineer and Construction Manager as the date of Substantial Completion, all special warranties required by the Contract Documents. Delivery by the Contractor shall constitute the Contractor's guarantee to the Owner that the warranty will be performed in accordance

with its terms and conditions. The Contractor shall assign to the Owner, before Final Payment is due, all manufacturers or other third-party warranties not written in the name, or for the benefit, of Owner relating to equipment, materials and labor used in the Work. Guarantees, if any, extending beyond said one year period shall be specifically provided for in the Contract and may be fulfilled by written warranty of the manufacturer.

**§ 3.5.4** The Owner may occupy a portion of the Work prior to completion of the Work. Acceptance of any portion of the Work by the Owner shall be accomplished by the issuance of a Substantial Completion Certificate on the form AIA G704/CMA – 1992, as provided in Section 009000 of the Project Manual. From the date of the issuance of such certificate, the Contractor shall not be relieved of obligation to correct any “punchlist” items then uncorrected. The Contractor shall continue to be responsible for all latent defects covered by the guarantee described in Paragraph 3.5.3 above, and shall continue to carry insurance to protect both the Owner and Contractors for workers engaged on punchlist items.

**§ 3.5.5** Contractor's obligation to perform and complete the Work in a good and workmanlike manner in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

- .1 evaluations by the Construction Manager and/or the Engineer;
- .2 recommendation of any progress or final payment by Construction Manager;
- .3 the issuance of a Certificate of Substantial Completion in accordance with Article 9 hereof or any payment to Contractor under the Contract Documents;
- .4 use or occupancy of the Work or any part thereof by Owner;
- .5 any acceptance by Owner or any failure to do so;
- .6 any review of a Shop Drawing or sample submittal;
- .7 any inspection, test or approval by third parties; or
- .8 any correction of defective Work by Owner.

**§ 3.5.6** If necessary to protect the Owner's interests, the Contractor agrees to assign to the Owner any and all third party warranties relating to materials and labor used in the Work and further agrees to perform the Work in such manner so as to preserve any and all such manufacturer's warranties.

### **§ 3.5.7 OBLIGATIONS OF CONTRACTOR**

**§ 3.5.7.1** The Contractor shall promptly correct or cause to be corrected promptly any defect in the Work. The Contractor shall and does hereby assign to the Owner the benefits of any warranties of all Subcontractors, materialmen and suppliers, but such assignment shall not relieve the Contractor of its warranty obligations to the Owner under the Contract Documents. No payment made by the Owner to the Contractor, nor any acceptance, use or occupancy of the Work by the Owner or any other person, shall constitute acceptance of any defective Work or any Work not in compliance with the Contract Documents. Nothing contained herein shall be construed to define or limit any rights or remedies provided the Owner by the Contract Documents, at law, equity, or otherwise in the event any defect in the Work occurs.

**§ 3.5.7.2** The Contractor and its Subcontractors, and their respective employees shall not make any public disclosure, press release or public presentation containing any information relating to the Project without the prior written consent of the Owner.

**§ 3.5.7.3** No signage shall be placed on the Project Site without the Owner's prior written consent. Construction Manager shall coordinate Project signage size, style, content and location, if any, with Owner.

### § 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

### § 3.7 Permits, Fees, Notices, and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Owner, through the Construction Manager, shall secure and pay for the building permit. The Contractor shall secure and pay for other permits, fees, licenses and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by laws, ordinances, rules and regulations and lawful orders of public authorities bearing on performance of the Work. Contractor warrants that it possesses, and will keep current, any contractor licenses that may be required due to the nature or location of the Work under this Contract. Without limiting Contractor's other obligations under this Section, Contractor acknowledges the domestic steel requirements of Section 153.011, Ohio Revised Code, in connection with certain Ohio construction projects supported by State funds. The following notice is provided in compliance with that statute:

**DOMESTIC STEEL USE REQUIREMENTS AS SPECIFIED IN SECTION 153.011 OF THE REVISED CODE APPLY TO THIS PROJECT. COPIES OF SECTION 153.011 OF THE REVISED CODE CAN BE OBTAINED FROM ANY OF THE OFFICES OF THE STATE OF OHIO DEPARTMENT OF ADMINISTRATIVE SERVICES.**

Contractor shall defend and indemnify Owner, , Engineer and Construction Manager against any claim or liability, including but not limited to civil penalties under Section 153.99(B) of the Ohio Revised Code, related to actual or alleged violation by Contractor (or any lower tier under Contractor) of Section 153.011 of the Ohio Revised Code.

The Contractor shall procure and obtain all bonds required of the Owner or the Contractor by the municipality in which the Project is located or by any other public or private body with jurisdiction over the Project. In connection with such bonds, the Contractor shall prepare all applications, supply all necessary back-up material and furnish the surety with any required personal undertakings

§ 3.7.3 It is not the Contractor's responsibility to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations. However, if the Contractor observes that portions of the Contract Documents are at variance therewith, the Contractor shall promptly notify the Construction Manager, Engineer and Owner in writing, and necessary changes shall be accomplished by appropriate Modification.

§ 3.7.5 Where Contract Documents, by stating performance or design requirements or other stipulations, require the Contractor to design components or portions of the Work, such design shall conform to the applicable laws, statutes, ordinances, building codes, and rules and regulations, and the Contractor shall furnish drawings, engineering calculations, specifications, and other documentation as needed to secure any required permits or approvals for those components or portions of the Work. The Contractor shall employ an engineer to provide such design services, which engineer shall be a licensed engineer experienced in the design of such items and registered in the State of Ohio and shall meet the insurance requirements set forth herein. Documentation prepared by such engineer shall bear the engineer's stamp and seal and such information as is required by authorities having jurisdiction over engineer. Notwithstanding submittal of such documentation to the Engineer or Owner and subsequent action by the Engineer or Owner, the Contractor shall bear sole responsibility for the design of components or portions of the Work required to be designed by the Contractor.

- .1 The Contractor agrees to indemnify and hold harmless the Owner, the , the Construction Manager, and the Engineer from and against any and all liability, claims, loss, cost, expense, damage, or injury, including legal fees, incurred because of Contractor's design work.
- .2 The Contractor agrees to assume on behalf of the Owner, the , the Construction Manager and the Engineer the defense of any action at law or in equity which may be brought against the Owner, the , the Construction Manager, and the Engineer from claims resulting from Contractor's design work and

to pay on behalf of the Owner, the , the Construction Manager, and the Engineer, upon demand, the amount of any judgment that may be entered against them in any action arising therefrom or relating thereto.

§ 3.7.6 Maintaining clean water, air and earth shall be regarded as of prime importance. Contractor shall plan and execute its operations in compliance with all applicable federal, state and local laws and regulations concerning control and abatement of pollution.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 **Concealed or Unknown Conditions.** If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner, Construction Manager, and the Engineer before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Engineer and Construction Manager will promptly investigate such conditions and, if the Engineer, in consultation with the Construction Manager, determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Engineer, in consultation with the Construction Manager, determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Engineer shall promptly notify the Owner, Construction Manager, and Contractor in writing, stating the reasons. If the Owner or Contractor disputes the Engineer's determination or recommendation, either party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner, Construction Manager, and Engineer. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

### § 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents:

- .1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

### § 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner and Engineer through the Construction Manager, the name and qualifications of a proposed superintendent. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager, or the Engineer has reasonable objection to the proposed superintendent or (2) that any of them require additional time to review. Failure of the Construction Manager to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner, Construction Manager or Engineer has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

### § 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULE

§ 3.10.1 The Contractor, shall prepare and submit for the Owner's and Engineer's information and the Construction Manager's written approval, a Contractor's Construction Schedule for the Work. Such schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project construction schedule to the extent required by the Contract Documents, shall incorporate all Work Milestone Dates, shall identify, consider and coordinate the purchase of materials and equipment requiring long lead time procurement, shall incorporate the scheduling, timing, phasing and sequencing contained in the Project Construction Schedule maintained by the Construction Manager in connection with the Project, and, shall provide for expeditious and practicable execution of the Work (the "Contractor's Construction Schedule").

- .1 The Contractor's Construction Schedule shall be a critical path method (CPM) precedence diagram network or other mutually agreed upon form of schedule with supporting printouts and computer data prepared on software compatible with Primavera Systems, Inc. P3 software or such other software as may be acceptable to the Owner and the Construction Manager.
- .2 The Contractor shall utilize the CPM format to develop the network logic diagrams, computer-produced schedules, and other schedule supporting data as required. The Contractor shall utilize the Contractor's Construction Schedule to plan, coordinate and manage all construction activities of the Subcontractors, sub-subcontractors, and suppliers. The Contractor shall complete its Work in accordance with the Project Construction Schedule.
- .3 Weekly progress meetings will also be held at the Project Site. The Construction Manager, the Owner (as necessary), the Engineer, the Contractor's field supervisor, and each Subcontractor's field supervisor shall attend. The Construction Manager, Contractor and Owner, as necessary, shall provide the services of qualified main office personnel at each such meeting. The Contractor shall provide the services of qualified main office personnel and its superintendent who shall provide the necessary scheduling information and manpower commitments at each progress meeting until Final Completion. Prior to and in preparation for the monthly progress meeting, the Contractor shall "update" the Contractor's Construction Schedule to reflect the current status of the Project. During the presentation and distribution of this "updated" material at the progress meeting, the Contractor will specifically address those critical areas of concern (as determined by the schedule "update") where immediate action by the Contractor is required.
- .4 The Contractor shall at all times provide adequate rates of progress for the various parts of the Work so as to properly advance the Work and so that the Project, in the opinion of the Construction Manager, at all times meets the requirements of the Project Construction Schedule. Whenever critical items of construction fall behind the planned schedule of construction as shown on the Contractor's Construction Schedule, or when items which were not critical become critical, the Owner, Construction Manager and the Engineer shall be notified by the Contractor and advised of action being taken to return the Project to its original schedule and such action shall be indicated on the Contractor's Construction Schedule which shall then be re-issued by the Contractor.
- .5 In view of the critical nature of the time of completion of the Work, if the Construction Manager, and/or the Owner determines that the rate of progress of the Project or the Contractor's Construction Schedule has been delayed or is in jeopardy of not being met, for any reason other than those causes for which the Contractor is entitled to an extension of the Contract Time, as specifically provided in



the Contract Documents, the parties hereby agree that the Owner and/or Construction Manager shall have the right to require the Contractor and its Subcontractors to take whatever steps are necessary, including Extraordinary Measures (as defined in Subparagraph .6 hereof), to remedy such situation. In such event, the cost of such remedy shall not be deemed to be a change in the Work, nor shall it increase the Contract Sum, nor shall such cost be reimbursable as part of the cost of the Work, nor shall such remedy adjust the Contract Time. The Contractor shall, within three (3) days after the Construction Manager's and/or Owner's request to take such action, notify the Owner and the Construction Manager in writing and implement the steps which the Contractor proposes to take to remedy such situation and provide the Construction Manager, and the Owner, in a form acceptable to the Owner and the Construction Manager and Owner, a detailed mini-progress schedule setting forth the actions to be taken by the Contractor.

- .6 Further, whenever it becomes apparent that any Work Milestone Date of the Contractor may not be met, the Contractor shall take some or all of the following actions (which shall also be deemed "Extraordinary Measures") as directed by the Owner or the Construction Manager, at no additional cost to the Owner:
- (a) Increase construction manpower in such quantities as will substantially eliminate the backlog of work and put the Project back on schedule.
  - (b) Increase the number of working hours per shift, shifts per working day, working days per week, the amount of construction equipment, or hire additional workers if necessary or any combination of the foregoing which will substantially eliminate the backlog of work and put the Project back on schedule.
  - (c) Reschedule activities to achieve maximum practical concurrence of accomplishment and put the Project back on schedule.

§ 3.10.2 The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict, delay in or interference with the Work of other contractors or the construction or operations of the Owner's own forces.

§ 3.10.3 The Contractor shall prepare and keep current, for the Construction Manager's and Engineer's approval, a schedule of submittals which is coordinated with the Contractor's Construction Schedule and allows the Construction Manager and Engineer reasonable time to review submittals.

§ 3.10.4 The Contractor shall conform the performance of the Work to the most recent schedules.

§ 3.10.5 The Contractor, within fifteen (15) days after being awarded the Contract, shall prepare and submit a report detailing the status of the procurement and the supply of the materials needed to complete the Work ("Material Status Report") on a form approved by the Construction Manager. This report shall be updated and submitted on a regular basis to Owner and Construction Manager or more often as directed by the Construction Manager. Delivery dates provided on the Material Status Report shall conform to the Contractor's Submittal Schedule, Submittal Log, Contractor's Construction Schedule, the Project Construction Schedule and the Work Milestone Dates.

§ 3.10.6 The Contractor, within fifteen (15) days after being awarded the Contract, shall prepare and submit a projected schedule for manpower ("Manpower Schedule") for the duration of the Work. This Manpower Schedule shall be updated and submitted on a monthly basis to Owner and Construction Manager or more often as directed by the Construction Manager. The Manpower Schedule shall be broken down by craft or trade for each Trade Contract and Subcontract. This Schedule shall conform to the Contractor's Construction Schedule and the Work Milestone Dates.

§ 3.10.7 In addition to the provisions of §3.10.1 through §3.10.6 included herein, detailed schedule requirements as described in Sections 011100 and 013216 of Division 1 of the Project Manual shall apply.

§ 3.10.8 In the event the Owner or Construction Manager determines that the performance of the Work, or any portion or phase thereof, has not progressed or reached the level of completion required by the Contract Documents, the Owner or Construction Manager shall have the right to order the Contractor to take corrective measures necessary to expedite

the progress of construction, including, without limitation, Extraordinary Measures as defined in Section 8.2.7. Such Extraordinary Measures shall continue until the progress of the Work complies with the stage of completion required by the Contract Documents. The rights of Owner and Construction Manager to require Extraordinary Measures is solely for the purpose of ensuring the Contractor's compliance with the Project Construction Schedule.

- .1 The Contractor shall not be entitled to an adjustment in the Contract Sum in connection with Extraordinary Measures required by the Owner under or pursuant to this §3.10.8.
- .2 The rights furnished under or pursuant to this §3.10.8 may be exercised as frequently as the Owner or Construction Manager deems necessary to ensure that the Contractor's performance of the Work will comply with any completion date set forth in or inferable from the Contract Documents.

**§ 3.10.9** The Owner shall have the right to direct a postponement or rescheduling of any date or time for the performance of any part of the Work that may interfere with the operation of the Owner's premises or any tenants or invitees thereof. The Contractor shall, upon the Owner's request, reschedule any portion of the Work affecting operation of the premises during hours when the premises are not in operation. Any postponement, rescheduling or performance of the Work under this §3.10.9 may be grounds for an extension of the Contract Time, if permitted under §8.3.1, and an equitable adjustment in the Contract Sum if: (1) the performance of the Work was properly scheduled by the Contractor in compliance with the requirements of the Contract Documents and (2) such rescheduling or postponement is required for the convenience of the Owner.

**§ 3.10.10** The Contractor shall be responsible for all costs resulting from its lack of diligence or failure to provide needed labor or materials to meet the requirements of the Work Milestone Dates or the Contractor's Construction Schedule. Owner may withhold payments to Contractor if requested to do so by Contractor's Surety, or otherwise if necessary to protect the Owner from delay or expense occasioned by the Contractor's failure to perform under the Contract.

**§ 3.10.11** Neither Owner nor Construction Manager make any representation regarding the reasonableness of the Contractor's Construction Schedule as it may affect Contractor's performance of the Work. However, Contractor represents that the Contract Sum includes any and all costs which may be incurred in order to meet the Contractor's Construction Schedule.

**§ 3.10.12** Contractor shall obtain Construction Manager's prior written consent to any proposed interruption of utility services by Contractor. Contractor shall notify Construction Manager at least forty-eight (48) hours in advance and in writing of any utility service interruption. Contractor shall minimize the impact of any such interruptions and schedule such interruptions only during the hours of the day agreed to by the Construction Manager.

### **§ 3.11 Documents and Samples at the Site**

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These documents shall be available to the Engineer and delivered to the Construction Manager for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

### **§ 3.12 Shop Drawings, Product Data and Samples**

**§ 3.12.1** Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

**§ 3.12.2** Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

**§ 3.12.3** Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Engineer and Construction Manager is subject to the limitations of Sections 4.2.9 through 4.2.11. Informational submittals upon which the Construction Manager and Engineer are not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Construction Manager or Engineer without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Construction Manager Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the Project submittal schedule approved by the Construction Manager and Engineer, or in the absence of an approved Project submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Multiple Prime Contractors or the Owner's own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples and similar submittals with related documents submitted by other Multiple Prime Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner, Construction Manager, and Engineer, that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been reviewed and approved by the Engineer.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Engineer's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Construction Manager and Engineer in writing of such deviation at the time of submittal and (1) the Engineer has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Engineer's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Construction Manager and Engineer on previous submittals. In the absence of such written notice, the Engineer's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of Engineerure or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Engineer will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Engineer. The Owner and the Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Engineer have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Engineer will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

### § 3.13 Use of Site

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.13.2 The Contractor shall coordinate the Contractor's operations with, and secure the approval of, the Construction Manager before using any portion of the site.

§ 3.13.3 **Great American Ball Park/National Underground Railroad Freedom Center/Paul Brown Stadium/U.S. Bank Arena/Transit Center.** Contractor acknowledges that during the course of the Work on the Project, public entertainment events will be held at Great American Ball Park, the National Underground Railroad Freedom Center, Paul Brown Stadium, and U.S. Bank Arena. Accordingly, Contractor agrees to manage and coordinate the Work in a manner to avoid disruptions to the operations of Great American Ball Park, National Underground Railroad Freedom Center, Paul Brown Stadium, and U.S. Bank Arena. Contractor further acknowledges and agrees that modifications or disruptions to the Work arising from the continued operations of Great American Ball Park, National Underground Railroad Freedom Center, Paul Brown Stadium, and U.S. Bank Arena have been considered in preparing the Contractor's Construction Schedule and Schedule of Values, and in Contractor's overall management and coordination of the Work. Contractor shall manage and coordinate the Work in order that the continued operations of Great American Ball Park, National Underground Railroad Freedom Center, Paul Brown Stadium, and U.S. Bank Arena do not become the basis for claims for damages or time extensions when the modifications, disruptions or delays are of the type and magnitude reasonably experienced on projects of similar type, size and complexity to this Project. Without limiting the generality of the foregoing, Contractor agrees as follows:

- .1 to use only those entrances or routes specified in the transportation management plan developed by the Owner and Construction Manager, in addition to any requirements of the City of Cincinnati or other governmental agencies;
- .2 to take customary construction precautions and erect such partitions, barricades, fencing, walkways and devices and installations as are reasonably necessary to separate areas where Work is being performed by Contractor from areas used by respective tenants, employees, guests, licensees and invitees of Great American Ball Park, National Underground Railroad Freedom Center, Paul Brown Stadium, and U.S. Bank Arena; and
- .3 to coordinate, supervise and schedule all construction activities, including service interruptions, in advance with the Construction Manager.

### § 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner's own forces or of other Multiple Prime Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner's own forces or by other Multiple Prime Contractors except with written consent of the Construction Manager, Owner and such other Multiple Prime Contractors; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the other Multiple Prime Contractors or the Owner the Contractor's consent to cutting or otherwise altering the Work.

### § 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner's approval, may do so and the Owner shall be entitled to reimbursement from the Contractor.

### § 3.16 Access to Work

The Contractor shall provide the Owner, Construction Manager and Engineer access to the Work in preparation and progress wherever located.

### § 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner, Construction Manager and Engineer harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner, Engineer, or Construction Manager. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Engineer through the Construction Manager.

### § 3.18 INDEMNIFICATION

**§ 3.18.1** To the fullest extent permitted by law, the Contractor shall indemnify, defend, and hold harmless the Owner, Construction Manager, Engineer, and all consultants, agents, and employees of any of them (collectively, the "Indemnitees") from and against claims, damages, (including loss of use of the Work itself), civil fines (unless expressly prohibited by law), losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including loss of use resulting therefrom, but only to the extent caused in whole or in part by negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligations shall not be construed to negate, abridge or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this §3.18. The Contractor's indemnity obligations under this §3.18.1 shall, but not by way of limitation, specifically include all claims and judgments which may be made against the Owner, the Construction Manager, the Engineer, the Engineer's consultants, and agents and employees of any of them and further, against claims and judgments arising from violation of public ordinances and requirements of governing authorities due to the Contractor's or Subcontractor's method of execution of the Work. If one or more of the Indemnitees demand performance by the Contractor of obligations under this paragraph or other provision of the Contract Documents, and if Contractor refuses to assume or perform, or delays in assuming or performing, Contractor's obligations, Contractor shall pay each Indemnitee who has made such demand its respective attorneys' fees, costs, and other expenses incurred in enforcing this provision. The defense and indemnity required herein shall, however, be a binding obligation upon Contractor whether or not an Indemnitee has made such demand. Neither the Owner's final acceptance of Work, nor the making of any payment, shall release the Contractor from its obligations under this paragraph. The enumeration elsewhere in the Contract Documents of particular risks assumed by the Contractor or of particular claims for which it is responsible shall not be deemed to limit the effect of the provisions of this subparagraph or to imply that the Contractor assumes or is responsible for only risks or claims of the type enumerated.

**§ 3.18.2** In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this Section 3.18 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

**§ 3.18.3** The obligations of the Contractor under this Section 3.18 shall not extend to the liability of the Construction Manager, Engineer, their consultants, and agents and employees of any of them arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications, or (2) the giving of or the failure to give directions or instructions by the Construction Manager, Engineer, their consultants, and agents and employees of any of them provided such giving or failure to give is the primary cause of the injury or damage.

**§ 3.18.4** The Contractor specifically agrees and undertakes that the insurance coverage provided by Contractor under Article 11 shall provide for the defense and indemnity of the Owner, Engineer and Construction Manager as set forth in §3.18.1, and that the obligation of Contractor and its insurer to defend and indemnify Owner, Engineer and Construction Manager as named additional insureds shall not be subject to any "professional services" or similar

coverage exclusion, except where it has been judicially determined, by means of a declaratory judgment action filed and served upon Owner, Engineer or Construction Manager within a maximum of thirty (30) calendar days after Contractor's first receipt of a demand for defense and indemnity hereunder, that Contractor is wholly without fault or liability (including "vicarious" or similar liability) with respect to the claim, demand, cause of action or other matter concerning which defense and indemnity are being sought by Owner, Engineer or Construction Manager.

### § 3.19 BEFORE STARTING THE WORK

§ 3.19.1 No Work shall be done at the Project Site prior to the pre-construction conference without Owner's and Construction Manager's approval in writing. Before undertaking any element of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. Contractor shall promptly report in writing to Construction Manager any conflict, error, ambiguity or discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from Construction Manager before proceeding with any Work affected thereby. Contractor shall be liable to Owner for failure to report any conflict, error, ambiguity or discrepancy in the Contract Documents of which Contractor knew or reasonably should have known.

§ 3.19.2 Contractor shall submit the following to Construction Manager for review and approval in writing no later than the pre-construction conference:

- .1 Contractor's Construction Schedule;
- .2 a preliminary schedule of Shop Drawing and sample submittals;
- .3 the Schedule of Values for all of the Work, subdivided into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work;
- .4 a letter designating Contractor's Superintendent and commitment for duration of the Contract Time;
- ;
- .5 all information required of Contractor to comply with the insurance requirements of the Contract Documents;
- .6 all information required of Contractor with respect to the filing of a Notice of Furnishing in accordance with the Ohio Revised Code at the commencement of the Work;
- .7 a plan illustrating proposed locations of temporary facilities;
- .8 Noncollusion affidavits and EEO certifications from all subcontractors;
- .9 Contractor's Quality Control Plan; and
- .10 Contractor's Safety Plan.

### § 3.20 PRE-CONSTRUCTION CONFERENCE

§ 3.20.1 Prior to commencement of Work at the Project Site, a pre-construction conference shall be attended by Contractor, Owner, Construction Manager Engineer and such other parties as Construction Manager designates.

### § 3.21 CONTRACTOR'S SCHEDULES

§ 3.21.1 Unless otherwise provided in the Contract Documents, Contractor shall obtain approval in writing of Construction Manager on final versions of the schedules submitted in accordance with this Article 3 before the first progress payment will be made to Contractor. The Contractor's Construction Schedule and the Schedule of Values must provide for an orderly progression of the Work to completion within any specified Work Milestone Dates and Contract Times. Acceptance of any schedule by Construction Manager will neither impose on Construction Manager responsibility for the sequencing, scheduling or progress of the Work nor interfere with or relieve Contractor from Contractor's full responsibility therefor. Contractor's schedule of Shop Drawings and sample submissions must provide an arrangement agreeable to the parties for reviewing and processing the required submittals.

## **§ 3.22 INSPECTION OF RECORDS**

**§ 3.22.1** Contractor's records shall include, but not be limited to, accounting records, payroll records, written policies and procedures, subcontract files (including proposals of successful and unsuccessful bidders, bid recaps, etc.); original estimates, estimating work sheets; correspondence; Change Order files (including documentation covering negotiated settlements); back-charge logs and supporting documentation; general ledger entries detailing cash and trade discounts earned, insurance rebates and dividends; and any other Contractor records which may have a bearing on substantiating charges related to the Contract. These records shall be open to inspection and subject to audit and/or reproduction by Construction Manager, Owner, and their respective agents or authorized representatives. Records subject to audit shall also include those records necessary to evaluate and verify (1) compliance with the Contract; (2) proper pricing of Change Orders; and (3) Claims submitted by the Contractor pursuant to the execution of the Work.

**§ 3.22.2** The Contractor shall afford access to all of the records upon request and shall allow the Owner and Construction Manager to interview and have access to records of any of the Contractor's current or former employees, subcontractors and any and all related parties to the Work, pursuant to the provisions of this Article throughout the term of the Contract and for a period of three (3) years after final payment or longer if required by law. This access will be afforded the Owner or Construction Manager at no additional cost, without additional charge either from the Contractor, or any third party who furnishes records.

**§ 3.22.3** Contractor shall provide Owner with accessibility to records repository at reasonable times which are considered to be between the hours of 8:00 a.m. and 5:00 p.m., Monday through Friday. Adequate and appropriate work space shall be made available to Owner or designee and all requested Contract-related documentation shall be made readily accessible.

**§ 3.22.4** Any adjustments and/or payments which result from any audit or inspection of the Contractor's invoices and/or records shall be made within a reasonable amount of time (not to exceed ninety (90) days from date of audit or inspection) from presentation of Owner's findings to Contractor.

**§ 3.22.5** Contractor shall require all subcontractors, insurance and bonding agents, and suppliers (payees) to comply with the provision of this Article by insertion of the requirements herewith in written agreements between Contractor and payees.

## **§ 3.23 JOINT POLICY FOR SMALL BUSINESS ENTERPRISE, ECONOMIC INCLUSION AND WORKFORCE DEVELOPMENT FOR THE BANKS PROJECT**

**§ 3.23.1** Contractor shall comply with the terms and conditions of the Joint Policy For Small Business Enterprise, Economic Inclusion And Workforce Development For The Banks Project (the "Joint Policy") and the Small Business Enterprise Program Rules and Guidelines set forth in the Project Manual. Contractor and each of the subcontractors and suppliers shall provide to the Construction Manager, the information required pursuant to Sections 5.5, 6.6, and 9.1 of the Joint Policy.

**§ 3.23.2** Contractor hereby acknowledges and agrees to adhere to the Non-Discrimination Policy as set forth in the Joint Policy. Contractor further agrees that, in the hiring of employees for the performance of Work under the Contract or any subcontract, no contractor, subcontractor, or any person acting on a contractor's or subcontractor's behalf, by reason of race, creed, sex, disability or military status as defined in section 4112.01 of the Revised Code, or color, shall discriminate against any citizen of the state in the employment of labor or workers who is qualified and available to perform the Work to which the employment relates (i) has not engaged, is not engaged and will not engage in any kind of unlawful discrimination involving race, color, religion, sex, sexual orientation, national origin, ancestry, disability, veteran status, age, political belief or place of birth, whether or not such unlawful discrimination is related to a contract or procurement activity involving the Project, and (ii) will not, for any purpose related to the Contractor's engagement with respect to the Project, employ or contract with any person or business which the Contractor knows or has reason to know has engaged, is engaged, or will engage in such unlawful discrimination, whether or not such unlawful discrimination is related to a contract or procurement activity or involving the Project.

## **§ 4.11 RESPONSIBLE BIDDER REQUIREMENTS**

**§ 4.11.1** Contractor shall comply with the terms and conditions of the Responsible Bidder Requirements set forth in the Project Manual.

## ARTICLE 4 ENGINEER AND CONSTRUCTION MANAGER

### § 4.1 General

§ 4.1.1 The Owner shall retain an Engineer lawfully licensed to practice Engineering or an entity lawfully practicing Engineering in Ohio. That person or entity is identified as the Engineer in the Agreement and is referred to throughout the Contract Documents as if singular in number. Any reference to Engineer in these General Conditions shall mean the Engineer, THP Limited, Inc.

§ 4.1.2 The Owner shall retain a construction manager lawfully licensed to practice construction management or an entity lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.3 Duties, responsibilities and limitations of authority of the Construction Manager and Engineer as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Construction Manager, Engineer and Contractor. Consent shall not be unreasonably withheld.

§ 4.1.4 If the employment of the Construction Manager or Engineer is terminated, the Owner shall employ a successor construction manager or engineers to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Construction Manager or Engineer, respectively.

### § 4.2 Administration of the Contract

§ 4.2.1 The Construction Manager and Engineer will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for Payment. The Construction Manager and Engineer will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Engineer will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Engineer will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of the site visits, the Engineer will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner and Construction Manager (1) known deviations from the Contract Documents and from the most recent Project schedule prepared by the Construction Manager, and (2) defects and deficiencies observed in the Work.

§ 4.2.3 The Construction Manager shall provide a staffing plan to include one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. The Construction Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner reasonably informed of the progress of the Work, and will report to the Owner and Engineer (1) known deviations from the Contract Documents and the most recent Project schedule, and (2) defects and deficiencies observed in the Work.

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Multiple Prime Contractors in accordance with the latest approved Project schedule.

§ 4.2.5 The Construction Manager, except to the extent required by Section 4.2.4, and Engineer will not have control over, or charge of, construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1, and neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Engineer will have control over or charge of or be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work.

§ 4.2.6 **Communications Facilitating Contract Administration.** Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Construction Manager, and shall contemporaneously provide the same



communications to the Engineer about matters arising out of or relating to the Contract Documents. Communications by and with the Engineer's consultants shall be through the Engineer. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with other Multiple Prime Contractors shall be through the Construction Manager and shall be contemporaneously provided to the Engineer if those communications are about matters arising out of or related to the Contract Documents. Communications by and with the Owner's own forces shall be through the Owner.

**§ 4.2.7** The Construction Manager and Engineer will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9.

**§ 4.2.8** The Engineer and Construction Manager have authority to reject Work that does not conform to the Contract Documents and will notify each other about the rejection. The Construction Manager shall determine in general whether the Work of the Contractor is being performed in accordance with the requirements of the Contract Documents and notify the Owner, Contractor and Engineer of defects and deficiencies in the Work. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require additional inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, upon written authorization of the Owner, whether or not such Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Engineer. However, neither the Engineer's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Engineer or the Construction Manager to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing any of the Work.

**§ 4.2.9** The Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data and Samples. Where there are Multiple Prime Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from Contractor and other Multiple Prime Contractors, and transmit to the Engineer those recommended for approval. By submitting Shop Drawings, Product Data, Samples and similar submittals, the Construction Manager represents to the Owner and Engineer that the Construction Manager has reviewed and recommended them for approval. The Construction Manager's actions will be taken in accordance with the Project submittal schedule approved by the Engineer or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Engineer.

**§ 4.2.10** The Engineer will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Engineer's action will be taken in accordance with the submittal schedule approved by the Engineer or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Engineer's professional judgment to permit adequate review. Upon the Engineer's completed review, the Engineer shall transmit its submittal review to the Construction Manager.

**§ 4.2.11** Review of the Contractor's submittals by the Construction Manager and Engineer is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Construction Manager and Engineer's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Construction Manager and Engineer's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Construction Manager and Engineer, of any construction means, methods, techniques, sequences or procedures. The Engineer's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

**§ 4.2.12** The Construction Manager will prepare Change Orders and Construction Change Directives.

**§ 4.2.13** The Construction Manager and the Engineer will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7. and the Engineer will have authority to order minor changes in the Work as provided in Section 7.4. The Engineer, in consultation with the Construction Manager, will investigate and

make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.14 Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples and similar required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Engineer and the Contractor, and will be delivered to the Owner upon completion of the Project.

§ 4.2.15 The Construction Manager will assist the Engineer in conducting inspections to determine the dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Engineer pursuant to Section 9.8; and receive and forward to the Owner written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Engineer a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

§ 4.2.16 If the Owner and Engineer agree, the Engineer will provide one or more project representatives to assist in carrying out the Engineer's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.17 The Engineer will interpret and decide matters concerning performance under, and requirements of the Contract Documents on written request of the Construction Manager, Owner or Contractor through the Construction Manager. The Engineer's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.18 Interpretations and decisions of the Engineer will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Engineer will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions so rendered in good faith.

§ 4.2.19 The Engineer's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.20 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Engineer, with the Construction Manager's recommendation. The Engineer will review and respond in writing to the Construction Manager to requests for information about the Contract Documents. The Construction Manager's recommendation and the Engineer's response to each request will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Engineer will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

## ARTICLE 5 SUBCONTRACTORS

### § 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include other Multiple Prime Contractors or subcontractors of other Multiple Prime Contractors.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

### § 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Construction Manager for review by the Owner, Construction Manager and Engineer the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager or the Engineer has reasonable objection to any such proposed person or entity or, (2) that the Construction Manager,

Engineer or Owner requires additional time for review. Failure of the Construction Manager, Owner, or Engineer to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager or Engineer has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner, Construction Manager or Engineer has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager or Engineer has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner, Construction Manager or Engineer makes reasonable objection to such substitution.

### § 5.3 Subcontractual Relations

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner, Construction Manager and Engineer. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager and Engineer under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

### § 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor Contractor or other entity. If the Owner assigns the subcontract to a successor Contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor Contractor's obligations under the subcontract.

## ARTICLE 6 CONSTRUCTION BY OWNER OR BY OTHER CONTRACTORS

### § 6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, which include persons or entities under separate contracts not administered by the Construction Manager, and

to award other contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When the Owner performs construction or operations with the Owner's own forces including persons or entities under separate contracts not administered by the Construction Manager, the Owner shall provide for coordination of such forces with the Work of the Contractor, who shall cooperate with them.

§ 6.1.3 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11 and 12.

## § 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner's own forces, Construction Manager and other Multiple Prime Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner's own forces or other Multiple Prime Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Construction Manager and Engineer apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's own forces or other Multiple Prime Contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs, including costs that are payable to a separate contractor or to other Multiple Prime Contractors because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of delays, improperly timed activities, damage to the Work or defective construction by the Owner's own forces or other Multiple Prime Contractors.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner, separate contractors, or other Multiple Prime Contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and other Multiple Prime Contractors shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

## § 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, other Multiple Prime Contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Construction Manager, with notice to the Engineer, will allocate the cost among those responsible.

## ARTICLE 7 CHANGES IN THE WORK

### § 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Construction Manager, Engineer and Contractor; a Construction Change Directive requires agreement by the Owner, Construction Manager and Engineer and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Engineer alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

## § 7.2 Change Orders

A Change Order is a written instrument prepared by the Construction Manager and signed by the Owner, Construction Manager, Engineer and Contractor, stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

## § 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Construction Manager and signed by the Owner, Construction Manager and Engineer, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager and Engineer of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

- .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers compensation insurance;
- .2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
- .5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Construction Manager and Engineer. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Construction Manager and Engineer will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Engineer determine to be reasonably justified. The interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Construction Manager and Engineer concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Construction Manager shall prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

#### § 7.4 Minor Changes in the Work

The Engineer has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order issued through the Construction Manager and shall be binding on the Owner and Contractor.

### ARTICLE 8 TIME

#### § 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Engineer in accordance with Section 9.8.

§ 8.1.4 The term “day” as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

#### § 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

#### § 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner, Owner’s own forces, Construction Manager, Engineer, any of the other Multiple Prime Contractors or an employee of any of them, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor’s control; or by delay authorized by the Owner pending mediation and arbitration, or by other causes that the Engineer, based on the recommendation of the Construction Manager, determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Engineer may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

## ARTICLE 9 PAYMENTS AND COMPLETION

### § 9.1 Contract Sum

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

### § 9.2 Schedule of Values

Where the Contract is based on a Stipulated Sum or Guaranteed Maximum Price, the Contractor shall submit to the Construction Manager, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Construction Manager and Engineer may require. This schedule, unless objected to by the Construction Manager or Engineer, shall be used as a basis for reviewing the Contractor's Applications for Payment. In the event there is one Contractor, the Construction Manager shall forward to the Engineer the Contractor's schedule of values. If there are Multiple Prime Contractors responsible for performing different portions of the Project, the Construction Manager shall forward the Multiple Prime Contractors' schedules of values only if requested by the Engineer.

### § 9.3 Applications for Payment

§ 9.3.1 At least fifteen days before the date established for each progress payment, the Contractor shall submit to the Construction Manager an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner, Construction Manager or Engineer may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Construction Manager and Engineer, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

### § 9.4 Certificates for Payment

§ 9.4.1 Where there is only one Contractor, the Construction Manager will, within seven days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Engineer. Within seven days after the Engineer receives the Contractor's Application for Payment

from the Construction Manager, the Engineer will either issue to the Owner a Certificate for Payment, with a copy to the Construction Manager, for such amount as the Engineer determines is properly due, or notify the Construction Manager and Owner in writing of the Engineer's reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Engineer's notice of withholding certification.

**§ 9.4.2** Where there are Multiple Prime Contractors performing portions of the Project, the Construction Manager will, within seven days after the Construction Manager receives the Multiple Prime Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Multiple Prime Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Multiple Prime Contractors' application with information from similar applications for progress payments from other Multiple Prime Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Multiple Prime Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Engineer.

**§ 9.4.3** Within seven days after the Engineer receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Engineer will either issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager, for such amount as the Engineer determines is properly due, or notify the Construction Manager and Owner in writing of the Engineer's reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager will promptly forward the Engineer's notice of withholding certification to the Contractors.

**§ 9.4.4** The Construction Manager's certification of an Application for Payment or, in the case of Multiple Prime Contractors, a Project Application and Certificate for Payment shall be based upon the Construction Manager's evaluation of the Work and the information provided as part of the Application for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager's knowledge, information and belief, the Work has progressed to the point indicated and the quality of the Work is in accordance with the Contract Documents. The certification will also constitute a recommendation to the Engineer and Owner that the Contractor be paid the amount certified.

**§ 9.4.5** The Engineer's issuance of a Certificate for Payment or in the case of Multiple Prime Contractors, Project Application and Certificate for Payment, shall be based upon the Engineer's evaluation of the Work, the recommendation of the Construction Manager, and information provided as part of the Application for Payment or Project Application for Payment. The Engineer's certification will constitute a representation that, to the best of the Engineer's knowledge, information and belief, the Work has progressed to the point indicated, that the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified.

**§ 9.4.6** The representations made pursuant to Sections 9.4.4 and 9.4.5 are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Construction Manager or Engineer.

**§ 9.4.7** The issuance of a separate Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Engineer has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed the Contractor's construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

## **§ 9.5 Decisions to Withhold Certification**

**§ 9.5.1** The Construction Manager or Engineer may withhold a Certificate for Payment or Project Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Engineer's opinion the representations to the Owner required by Section 9.4.4 and 9.4.5 cannot be made. If the Construction Manager or Engineer is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1 and 9.4.3. If the Contractor, Construction Manager and Engineer cannot agree on a revised amount, the Engineer will promptly issue a Certificate for Payment



or a Project Certificate for Payment for the amount for which the Engineer is able to make such representations to the Owner. The Construction Manager or Engineer may also withhold a Certificate for Payment or, because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a Certificate for Payment or Project Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Engineer's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the acts and omissions described in Section 3.3.2 because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a separate contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Engineer or Construction Manager withholds certification for payment under Section 9.5.1, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Engineer and the Construction Manager and both will reflect such payment on the next Certificate for Payment.

#### § 9.6 Progress Payments

§ 9.6.1 After the Engineer has issued a Certificate for Payment or Project Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Construction Manager and Engineer.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Construction Manager will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Owner, Construction Manager and Engineer on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner, Construction Manager nor Engineer shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary

liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

### **§ 9.7 Failure of Payment**

If the Construction Manager and Engineer do not issue a Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor, within fourteen days after the Construction Manager's receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Construction Manager and Engineer or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner, Construction Manager and Engineer, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

### **§ 9.8 Substantial Completion**

**§ 9.8.1** Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use.

**§ 9.8.2** When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify the Construction Manager, and the Contractor and Construction Manager shall jointly prepare and submit to the Engineer a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

**§ 9.8.3** Upon receipt of the list, the Engineer, assisted by the Construction Manager, will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Engineer's inspection discloses any item, whether or not included on the list, which is not sufficiently complete in accordance with the requirements of the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Engineer. In such case, the Contractor shall then submit a request for another inspection by the Engineer, assisted by the Construction Manager, to determine Substantial Completion.

**§ 9.8.4** When the Engineer, assisted by the Construction Manager, determines that the Work or designated portion thereof is substantially complete, the Construction Manager will prepare, and the Construction Manager and Engineer shall execute a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

**§ 9.8.5** The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

### **§ 9.9 Partial Occupancy or Use**

**§ 9.9.1** The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor and Construction Manager shall jointly prepare and submit a list to the Engineer as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall

be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Engineer after consultation with the Construction Manager.

**§ 9.9.2** Immediately prior to such partial occupancy or use, the Owner, Construction Manager, Contractor and Engineer shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

**§ 9.9.3** Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

#### **§ 9.10 Final Completion and Final Payment**

**§ 9.10.1** Upon completion of the Work, the Contractor shall forward to the Construction Manager a written notice that the Work is ready for final inspection and acceptance and shall also forward to the Construction Manager a final Contractor's Application for Payment. Upon receipt, the Construction Manager will evaluate the completion of Work of the Contractor and then forward the notice and Application, with the Construction Manager's recommendations, to the Engineer who will promptly make such inspection. When the Engineer, finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Engineer will promptly issue a final Certificate for Payment or Project Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Construction Manager's and Engineer's final Certificate for Payment or Project Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

**§ 9.10.2** Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Engineer through the Construction Manager (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

**§ 9.10.3** If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Construction Manager and Engineer so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Manager and Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Engineer through the Construction Manager prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

**§ 9.10.4** The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents; or
- .3 terms of special warranties required by the Contract Documents.

**§ 9.10.5** Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

## ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

### § 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager.

### § 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors;
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction; and
- .4 construction or operations by the Owner or other Contractors.

§ 10.2.2 The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss, including but not limited to Federal and State OSHA laws, rules, and regulations. The Contractor agrees to defend, hold harmless and indemnify the Owner, the Construction Manager and the Engineer and their agents and employees against claims, fines, losses and expenses (including attorney's fees) arising out of or resulting in whole or in part from Contractor's failure to comply with the Contract Documents, legal, safety requirements or other prudent or reasonable safeguards.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Agreement, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities. The Contractor shall also be responsible, at the Contractor's sole cost and expense, for all measures necessary to protect any property adjacent to the Project and improvements therein. Any damage to such property or improvements shall be promptly repaired by the Contractor.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4, except damage or loss attributable to acts or omissions of the Owner, Construction Manager or Engineer or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner, Construction Manager and Engineer.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

**§ 10.2.8** As part of their contractual obligations, each Contractor shall participate in a two hour safety orientation program conducted by the Construction Manager prior to starting any work on site.

**§ 10.2.9** All work shall comply with regulations of OSHA and of other regulatory agencies having jurisdiction for the Work.

**§ 10.2.10** When all or a portion of the Work is suspended for any reason, the Contractor shall securely fasten down all coverings and protect the Work, as necessary, from injury by any cause.

**§ 10.2.11** The Contractor shall promptly report in writing to the Owner and Construction Manager all accidents arising out of or in connection with the Work which cause death, personal injury, or property damage, giving full details and statements of any witnesses. In addition, if death, serious personal injuries, or serious property damages are caused, the accident shall be reported immediately by telephone or messenger to the Owner and the Construction Manager.

**§ 10.2.12** The Contractor shall comply with all legal load restrictions in the hauling of materials on public roads beyond the limits of the Project Site. A special permit will not relieve the Contractor of liability for damage which may result from the moving of material or equipment related to the Work. The operation of equipment of such weight or so loaded as to cause damage to structures or to any other type of construction will not be permitted. Hauling of materials over the Project Site and adjacent property shall be limited as directed. No loads will be permitted on a concrete pavement, base, or structure before the expiration of the curing period. The Contractor shall be responsible for all damage done by the hauling of equipment used in performance of the Work and shall correct such damage at Contractor's own expense.

#### **§ 10.2.9 Injury or Damage to Person or Property**

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

#### **§ 10.3 Hazardous Materials**

**§ 10.3.1** The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to, asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner, Construction Manager and Engineer in writing.

**§ 10.3.2** Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify a presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor, Construction Manager and Engineer the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor, the Construction Manager and the Engineer will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Engineer has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager and the Engineer have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resumed upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

**§ 10.3.3** To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Construction Manager, Engineer, their consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of

tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

#### § 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

### ARTICLE 11 INSURANCE AND BONDS

#### § 11.1 CONTRACTOR'S LIABILITY INSURANCE

##### § 11.1.1 Contractor Liability Insurance Forms

Contractor shall be required to carry insurance as follows:

For Additional Terms see attached Exhibit "A", Contractor Insurance Requirements, Form B

§ 11.1.1.1 All Contractors shall submit Certificates of Insurance prior to execution of Agreement that fully comply with the requirements of the Contract Documents. Failure to provide certificates with the proper coverage and limits will result in delayed payment to the Contractor. The following is an outline of the insurance that must be provided and so indicated on the certificates of insurance.

.1 General Liability and Umbrella Insurance

(a) Contractor shall carry Comprehensive/Commercial General Liability and if necessary Commercial Umbrella insurance written on Insurance Service Office (ISO) form CG 0001 10 01 or its equivalent with limits not less than those indicated below as required by the Contract covering all operations by or on behalf of Contractor providing insurance for bodily injury liability and property damage liability including coverage for:

1. Premises operations
2. Products and completed operations
3. Contractual liability insuring the obligations assumed by Contractor in this Agreement
4. Broad form property damage (including completed operations)
5. Personal and advertising injury liability
6. Explosion, collapse, underground and subsidence hazards (no XCU exclusions are acceptable)
7. Independent contractor liability
8. EIFS (applies only to contractors providing this scope of work)
9. Incidental Medical Malpractice

10. Severability of interests
- (b) The limits of liability shall be not less than these amounts required of Contractor under the Contract Documents or as set forth in Exhibit 1 to these General Conditions as “Contractor Insurance Requirements”
- .iii Contractor’s insurance shall be primary and non-contributing with respect to any insurance or self-insurance programs carried by Contractor or any of the Additional Insureds.
- .2 Comprehensive Automobile Liability Insurance covering liability arising out of any auto (owned, hired and non-owned) providing limits of liability as set forth in Exhibit 1 to these General Conditions
- (a) If The Work requires the removal and transportation of hazardous materials from the Project Site, your Auto liability coverage must include pollution liability coverage applicable to all hazardous waste hauling vehicles including the MCS90 endorsement.
- .3 Umbrella/Excess Liability Insurance
- Contractor shall maintain Umbrella and Excess Liability insurance on an occurrence basis in excess of the General Liability Insurance and Business Automobile Liability insurance, which is at least as broad as each of the underlying policies. The Umbrella and Excess Liability coverage shall be in the amounts and in accordance with the terms set forth on attached Exhibit 1 “Contractor Insurance Requirements.
- .4 Additional Insured Requirements
- (a) The Owner, Construction Manager, and Engineer, and each entities officers, directors, employees, agents and mortgagees) shall be named as additional named insureds under the Contractor’s CGL and Automobile policy for any liability arising out of the performance of the Work. Coverage under the CGL for all required additional named insureds shall be provided by a policy provision or by an endorsement providing coverage at least as broad as Additional Insured endorsement form GC2010 11/85 as published by ISO. A copy of the endorsement form or must accompany the certificate furnished by Owner. Forms deemed by Owner and/or Construction Manager as equivalent will be accepted but must include additional insured status for ongoing operations and completed operations.
- .5 Workers Compensation and Employer’s Liability
- (a) Workers Compensation -State of Ohio Statutory Limits and requirements as defined in Ohio Revised Code 4123
- (b) This work is performed in Ohio and is a State of Ohio project, therefore an Ohio Bureau of Workers’ Compensation (OBWC) approved Drug Free Work Place policy is required.
- (c) Ohio Employer’s Liability –You must, in addition to the above requirements, carry Ohio Employer’s Liability coverage with limits of not less than \$1,000,000 per occurrence and in the aggregate. Such coverage must not contain any exclusionary language that removes coverage for “substantially certain to occur” claims.
- (d) If your work involves ANY employment on or adjacent to navigable waterways, then the workers’ compensation policy must be endorsed to include U.S. Longshore and Harborworkers (USL&H) and Jones Act coverages as applicable.
- (e) Contractor shall provide Board with copy of current OBWC Certificate of Premium Payment prior to commencement of work and upon each renewal date.

.6 General Insurance Requirements

- (a) Certificate Holder shall be Board of Commissioners of Hamilton County Ohio and certificate of insurance is to be mailed to Hamilton County, Risk Manager, Room 607, 138 East Court Street, Cincinnati, OH 45202. The name of the Project "Lot 28, Banks Subdivision, Garage and Park" shall be placed on the certificate. Copies of the certificate and supporting forms showing compliance with the insurance requirements must be provided prior to commencement of work. Certificate shall be reissued when any insurance coverage contained therein is renewed.
- (b) Contractor's policies shall be endorsed to provide that there will be no cancellation or reduction in coverage without thirty (30) days prior written notice to Board of Commissioners of Hamilton County Ohio
- (c) Contractor shall ensure that all tiers of their subcontractors shall procure and maintain insurance in like form and adequate amounts including Additional Insured requirements, all as set forth in the Contractor Insurance Requirements agreement.
- (d) Contractor's insurance shall be primary and non-contributing with respect to any insurance or self-insurance programs carried by Board of Commissioners of Hamilton County Ohio or any of the Additional Insureds.
- (e) Umbrella Excess Liability in combination with primary liability coverages and limits as outlined above to satisfy the required limits of liability is acceptable.
- (f) Umbrella / Excess liability coverage used in conjunction with primary policies shall have concurrency of effective dates with underlying policies; drop down feature, and; "Pay on behalf of" wording.
- (g) Contractor shall provide Board with copy of current OBWC Certificate of Premium Payment prior to commencement of work and upon each renewal date.

§ 11.1.2 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations under the Contract Documents and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 claims under workers compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;
- .2 claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 claims for damages insured by usual personal injury liability coverage which are sustained (1) by a person as a result of an offense directly or indirectly related to employment of such person by the Contractor, or (2) by another person;
- .5 claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle; and
- .7 claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.3 The insurance required by Section 11.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law or as set forth in Exhibit 1 to these General Conditions as "Contractor Insurance Requirements", whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment.



§ 11.1.4 Certificates of insurance acceptable to the Owner shall be submitted to the Construction Manager for transmittal to the Owner with a copy to the Engineer prior to execution of Agreement. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least thirty (30) days' prior written notice has been given to the Owner. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment as required by Section 9.10.2. Information concerning reduction of coverage shall be furnished by the Contractor in accordance with 11.1.1.1.5(b).

#### § 11.2 Owner's Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

#### § 11.3 Property Insurance

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for the Engineer's, Contractor's, and Construction Manager's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 **Boiler and Machinery Insurance.** The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Construction Manager, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

**§ 11.3.3 Loss of Use Insurance.** The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

**§ 11.3.4** If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

**§ 11.3.5** If during the Project construction period the Owner insures properties, real or personal or both, adjoining or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

**§ 11.3.6** Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

**§ 11.3.7 Waivers of Subrogation.** The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees each of the other, and (2) the Construction Manager, Engineer, Engineer's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as the Owner and Contractor may have to the proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Construction Manager, Construction Manager's consultants, Engineer, Engineer's consultants, Owner's separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

**§ 11.3.8** A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

**§ 11.3.9** If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

**§ 11.3.10** The Owner in good faith shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement.

## § 11.4 BID GUARANTY AND CONTRACT BOND

**§ 11.4.1** The Owner shall require the Contractor to furnish a Bid Guaranty and Contract Bond in accordance with section 153.571 of the Revised Code covering faithful performance of the Contract and payment of obligations arising thereunder as set forth in the Contract Documents. Including specifically:

- .1 Except as otherwise required by statute, the form and substance of such bonds shall be satisfactory to the Owner in the Owner's sole judgment;
- .2 Bonds shall be executed by a responsible surety licensed in Ohio, with a Best's rating of no less than A/XII and shall remain in effect for a period not less than two (2) years following the Date of Substantial Completion or the time required to resolve any items of incomplete Work and the payment of any disputed amounts, whichever time period is longer;
- .3 The Performance Bond and the Labor and Material Payment Bond shall each be in an amount equal to the Contract Sum;
- .4 The Contractor shall require the attorney in fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of his power of attorney indicating the monetary limit of such power;
- .5 Every Bond under this Paragraph 11.4.1 must display the Surety's Bond Number.

**§ 11.4.2** Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall permit a copy to be made.

**§ 11.4.3** The Contractor shall keep the surety informed of the progress of the Work, and, where necessary, obtain the surety's consent to, or waiver of: (1) notice of changes in the Work; (2) request for reduction or release of retention; (3) request for final payment; and (4) any other material required by the surety. The Owner shall be notified by the Contractor, in writing, of all communications with the surety. The Owner may, in the Owner's sole discretion, inform surety of the progress of the Work and obtain consents as necessary to protect the Owner's rights, interest, privileges and benefits under and pursuant to any bond issued in connection with the Work.

**§ 11.4.4** If the Surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in the State of Ohio or it ceases to meet the requirements of the preceding paragraph, Contractor shall within ten (10) days thereafter, substitute another bond and surety, both of which must conform to the requirements of the Project Manual and be otherwise acceptable to Owner.

## § 11.5 GENERAL REQUIREMENTS

**§ 11.5.1** All insurance coverage procured by the Contractor shall be provided by insurance companies having policyholder ratings no lower than "A" and financial ratings not lower than "XII" in the Best's Insurance Guide, latest edition in effect as of the date of the Agreement, and subsequently in effect at the time of renewal of any policies required by the Contract Documents.

**§ 11.5.2** If the Owner or the Contractor is damaged by the failure of the other party to purchase or maintain insurance required under Article 11, then the party who failed to purchase or maintain the insurance shall bear all reasonable costs (including attorneys' fees and court and settlement expenses) properly attributable thereto.

## ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

### § 12.1 Uncovering of Work

**§ 12.1.1** If a portion of the Work is covered contrary to the Construction Manager's or Engineer's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by either, be uncovered for their observation and be replaced at the Contractor's expense without change in the Contract Time.

**§ 12.1.2** If a portion of the Work has been covered which the Construction Manager or Engineer has not specifically requested to observe prior to its being covered, the Construction Manager or Engineer may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in

accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or one of the other Contractors in which event the Owner shall be responsible for payment of such costs.

## § 12.2 Correction of Work

### § 12.2.1 Before or After Substantial Completion

The Contractor shall promptly correct Work rejected by the Construction Manager or Engineer or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Construction Manager's and Engineer's services and expenses made necessary thereby, shall be at the Contractor's expense.

### § 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Engineer, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors or other Multiple Prime Contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

## § 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

## ARTICLE 13 MISCELLANEOUS PROVISIONS

### § 13.1 Governing Law

The Contract shall be governed by the laws of the **State of Ohio**. **Any litigation arising out of the Contract or construction Project shall be maintained in the Court of Common Pleas of Hamilton County, Ohio** The parties further agree that this choice of venue is to be considered mandatory, and not permissive in nature, thereby precluding the possibility of litigation in any venue or jurisdiction other than that specified in this Section 13.1

**The parties agree that any final judgment rendered in any such action or such proceeding as provided herein shall be conclusive as to the subject matter of such final judgment, subject only to any right of appeal provided by the laws of the State of Ohio, and that once any such right of appeal has been exhausted or waived, such final judgment may be enforced in other jurisdictions in any manner provided by law.**

It is the intent of Owner and Contractor that the Contract Documents comply, in all manners of form and substance, with the requirements of Chapter 153 of the Ohio Revised Code and other applicable law with respect to contracts for public improvements. In the event of any ambiguity, inconsistency or conflict between the any provision contained herein or in the Contract Documents and the requirements of applicable governing law, the requirements of applicable governing law shall control in all respects, and any such offending provision contained in the Contract Documents shall be deemed redrafted and reformed to the extent necessary to comply with applicable governing law.

### **§ 13.2 Successors and Assigns**

**§ 13.2.1** The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

**§ 13.2.2** The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

### **§ 13.3 Written Notice**

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity or to an officer of the corporation for which it was intended; or if delivered at or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

### **§ 13.4 Rights and Remedies**

**§ 13.4.1** Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

**§ 13.4.2** No action or failure to act by the Owner, Construction Manager, Engineer or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

### **§ 13.5 Tests and Inspections**

**§ 13.5.1** Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Construction Manager and Engineer timely notice of when and where tests and inspections are to be made so that the Construction Manager and Engineer may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

**§ 13.5.2** If the Construction Manager, Engineer, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Construction Manager and Engineer will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Construction Manager and Engineer of when and where tests and inspections are to be made so that the Construction Manager and Engineer may be present for such procedures. Such costs except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Construction Manager's and Engineer's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Construction Manager for transmittal to the Engineer.

§ 13.5.5 If the Construction Manager or Engineer is to observe tests, inspections or approvals required by the Contract Documents, the Construction Manager or Engineer will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

### § 13.6 COMMENCEMENT OF STATUTORY LIMITATION PERIOD

§ 13.6.1 As between the Owner and Contractor:

- .1 **Before Substantial Completion.** As to acts or failures to act occurring prior to the relevant date of Substantial Completion, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than such date of Substantial Completion;
- .2 **Between Substantial Completion and Final Certificate for Payment.** As to acts or failures to act occurring subsequent to the relevant date of Substantial Completion and prior to issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of issuance of the final Certificate for Payment; and
- .3 **After Final Certificate for Payment.** As to acts or failures to act occurring after the relevant date of issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of any act or failure to act by the Contractor pursuant to any warranty provided under Paragraph 3.5, the date of any correction of the Work or failure to correct the Work by the Contractor under Paragraph 12.2, or the date of actual commission of any other act or failure to perform any duty or obligation by the Contractor or Owner, whichever occurs last.

### § 13.7 GENERAL PROVISIONS

§ 13.7.1 All personal pronouns used in this Contract, whether used in the masculine, feminine, or neuter gender, shall include all other genders; and the singular shall include the plural and vice versa. Titles of articles, paragraphs, and sub-paragraphs are for convenience only, and neither limit nor amplify the provisions of this Agreement in itself. The use herein of the word "including," when following any general statement, term, or matter, shall not be construed to limit such statement, term, or matter to the specific items or matters, whether or not non-limiting language (such words as "without limitation," or "but not limited to," or words of similar import) is used with reference thereto, but rather shall be deemed to refer to all other items or matters that could reasonably fall within the broadest possible scope of such general statement, term or matter.

§ 13.7.2 Whenever possible, each provision of this Contract shall be interpreted in a manner as to be effective and valid under applicable law. If, however, any provision of this Contract, or portion thereof, is prohibited by law or found invalid under any law, only such provision or portion thereof shall be ineffective, without in any manner invalidating or affecting the remaining provisions of this Agreement or valid portions of such provision, which are hereby deemed severable.

§ 13.7.3 Each party hereto agrees to do all acts and things and to make, execute and deliver such written instruments,

as shall from time to time be reasonably required to carry out the terms and provisions of the Contract Documents.

**§ 13.7.4** Any specific requirement in this Contract that the responsibilities or obligations of the Contractor also apply to a Subcontractor is added for emphasis and are also hereby deemed to include a Subcontractor of any tier. The omission of a reference to a Subcontractor in connection with any of the Contractor's responsibilities or obligations shall not be construed to diminish, abrogate or limit any responsibilities or obligations of a Subcontractor of any tier under the Contract Documents or the applicable subcontract.

**§ 13.8** Contractor shall each enter into an agreement with the Owner on AIA Document A132-/CMA Standard Form of Agreement Between Owner and Contractor -2009 Construction Manager - Adviser Edition, as amended, and shall provide bonds to the Owner as described below.

**§ 13.8.1** Execution of contracts, bonds and certificates: All contracts, bonds and certificates shall be executed and delivered within the time limits established in the Instructions to Bidders.

**§ 13.8.2** Bid security: Failure to execute contract agreements and deliver contracts, bonds and other documents required within the time period established after acceptance shall be basis for forfeiture to the Owner of the bid security of the bidder or bidders responsible.

**§ 13.9** The requirements listed as Subparagraphs to this Paragraph 13.9 apply to each successful bidder.

**§ 13.9.1** Execution of Agreement: Subsequent to and within seven (7) calendar days of the notice of recommendation of award, the successful bidders shall return signed Agreements and pre-award submittals to the Construction Manager.

**§ 13.9.2** Documents required prior to contract awards to be submitted by successful bidder for each contract:

- .1 Insurance certificates.
- .2 Certification of insurance company to do business in the State of Ohio as certified by the Ohio Department of Insurance.
- .3 Worker's Compensation certificates.
- .4 Schedule of values.
- .5 List of proposed Subcontractors, manufacturers and suppliers.
- .6 Notice of Furnishing. (Required by Ohio Lien Laws.)
- .7 Projected Manpower Utilization

**§ 13.9.3** Documents required at the preconstruction meeting to be submitted by each Contractor:

- .1 Noncollusion Affidavits and EEO certification from all Subcontractors.
- .2 Detailed schedule of values.

### **§ 13.10 Interest**

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

### **§ 13.11 Time Limits on Claims**

The Owner and the Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in

any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and the Contractor waive all claims and causes of action not commenced in accordance with this Section 13.11.

## **ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT**

### **§ 14.1 Termination by the Contractor**

**§ 14.1.1** The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;
- .3 Because the Construction Manager has not certified or the Engineer has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

**§ 14.1.2** The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

**§ 14.1.3** If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner, Construction Manager and Engineer, terminate the Contract and recover from the Owner payment for Work executed including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

**§ 14.1.4** If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner, Construction Manager and Engineer, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

### **§ 14.2 Termination by the Owner for Cause**

**§ 14.2.1** The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
  - .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
  - .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
  - .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.
- .5 is in material breach of any warranty or representation in the Contract Documents;
  - .6 fails to materially comply with any applicable Project Construction Schedule; Contractor's Construction Schedule;
  - .7 fails to proceed continuously with the construction and completion of the Work;
  - .8 fails to furnish the Owner with assurances satisfactory to the Owner evidencing the Contractor's ability to complete the Work in compliance with the requirements of the Contract Documents.



§ 14.2.2 When any of the above reasons exist, the Owner, after consultation with the Construction Manager, and upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Construction Manager's and Engineer's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall, upon application, be certified by the Initial Decision Maker after consultation with the Construction Manager, and this obligation for payment shall survive termination of the Contract.

§ 14.2.5 If and to the extent necessary or appropriate in connection with bonds furnished by the Contractor, the Contractor's "default" may include, but is not limited to, any of the grounds for termination set forth in Subparagraph 14.2.1 and any of the grounds for withholding certification of or recommendation of payment set forth in Subparagraph 9.5.1.

§ 14.2.6 Upon termination of the Contract under Paragraph 14.2, the Owner expressly declines to accept performance of the Contract from Contractor's trustee in bankruptcy, if any, as contemplated by U.S.C. Title 11, Section 365. This declination shall not affect the Owner's rights under any bonds furnished by the Contractor.

§ 14.2.7 If, after notice of termination for failure to fulfill the Contract obligations, it is determined that the Contractor had not defaulted, termination shall be deemed to have been effected for the convenience of the Owner and the Contractor shall be paid in accordance with Paragraph 14.3.

§ 14.2.8 Under Paragraph 14.1, the Contractor will be paid only the value of Work completed and material supplied as of the date of termination, and shall not be paid for anticipated lost profits or consequential damages arising out of or resulting from such termination.

### § 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and the Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent:

- .1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of this Contract.

### § 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
  - .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work;
- and

- 3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.3.3 All obligations of the Contractor under the Contract with respect to completion of the Work, including but not limited to, all warranties, guarantees and indemnities, shall apply to all Work completed or substantially completed by the Contractor prior to a convenience termination by the Owner. Notwithstanding the above, any convenience termination by the Owner or payments to the Contractor shall be without prejudice to any claims or legal remedies that the Owner may have against the Contractor for any cause.

§ 14.3.4 Upon a determination that a termination of this Contract, other than a termination for convenience under this Article, was wrongful or improper for any reason, such termination shall automatically be deemed converted to a convenience termination under this Article 14, and the Contractor's remedy for such wrongful termination shall be limited to the recoveries specified under Paragraph 14.3.2.

§ 14.3.5 In the event that Contractor is terminated, whether for cause or convenience, the Contractor's sole remedy shall be for damages subject to the terms, conditions and limitations described herein. In no event shall Contractor be entitled to reinstatement or other equitable relief from a court.

§ 14.3.6 Adjustments made in the cost of performance may have a mutually agreed fixed or percentage fee.

## ARTICLE 15 CLAIMS AND DISPUTES

### § 15.1 Claims

§ 15.1.1 **Definition.** A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 **Time Limits on Claims.** Claims by either party must be made within fourteen (14) days after occurrence of the event giving rise to such Claim or within fourteen (14) days after the claimant first recognizes the condition giving rise to the Claim, whichever is later; provided, however, that the claimant shall use its best efforts to furnish notice of any Claim as expeditiously as possible after discovery of same, including, without limitation, Claims arising from concealed or unknown conditions, and, once such Claim is recognized, shall cooperate with the Construction Manager and the party against whom the Claim is made in any effort to mitigate the alleged or potential damages, delay, or other adverse consequences arising from the condition which gives rise to the Claim. Claims must be made by written notice. An additional Claim made after the initial Claim has been implemented by Change Order will not be considered unless submitted in a timely manner.

§ 15.1.3 **Continuing Contract Performance.** Pending final resolution of a Claim, including litigation, unless otherwise agreed in writing the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. Owner shall notify Contractor in writing as to whether Owner agrees to and accepts said Claim, whether Owner accepts said Claim only in part, or whether Owner rejects said Claim in its entirety. Notwithstanding the rejection by Owner of all or part of a Claim, Contractor shall promptly comply with any written order of Owner or Construction Manager to carry out the Work underlying such Claim and so long as Contractor promptly complies and carries out the Work underlying such Claim, Contractor may, at its option, proceed with the Work "under protest" in order to preserve its rights to such claims as allowed under the applicable provisions of the Contract Documents. It is expressly understood and agreed that Owner has a right under the Contract Documents to reject, in whole or in part, any Claim submitted by Contractor if Owner reasonably and in good faith believes that such Claim is not valid or justified.

§ 15.1.4 **Claims for Concealed or Unknown Conditions.** If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or reasonably inferable therefrom or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents or reasonably inferred therefrom then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than three (3) days after first observance of the conditions. The Construction Manager, with the Engineer's assistance will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost of, or time

required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Construction Manager, after consultation with the Engineer determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Construction Manager shall so notify the Owner and Contractor in writing, stating the reasons. Claims by either party in opposition to such determination must be made within three (3) days after the Construction Manager has given notice of the decision. If the Owner and Contractor cannot agree on an adjustment in the Contract Sum or Contract Time, the adjustment shall be referred to the Construction Manager for initial determination, subject to further proceedings pursuant to Section 4.8. No adjustment in the Contract Time or Contract Sum shall be permitted, however, in connection with a concealed or unknown condition which does not differ materially from those conditions disclosed or which reasonably should have been disclosed by the Contractor's (1) prior inspections, tests, reviews, and pre-construction services for the Project, or (2) inspections, tests, reviews, and pre-construction services which the Contractor had the opportunity to make or should have performed in connection with the Project.

**§ 15.1.5 Claims for Additional Cost.** If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4 .

**§ 15.1.6 Claims for Additional Time.**

**§ 15.1.6.1** If the Contractor wishes to make Claim for an increase in the Contract Time, written notice as provided herein shall be given by Contractor to Construction Manager. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

**§ 15.1.6.2** If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time and could not have been reasonably anticipated, and that weather conditions had an adverse effect on the scheduled construction. Contractor confirms that prior to submitting its bid for this Project and in preparing the Contractor's Construction Schedule required under subparagraph 3.10.1, that it understands that inclement weather is not an excuse for delay. Adjustments to the Contract Time may be made in the event of unusually severe weather, provided that such weather conditions and the effects on the Project and the progress of the Work are properly documented by Contractor.

**§ 15.1.6.3** No extension of time shall be granted to the Contractor for a delay caused by the Owner, Construction Manager, Engineer, any of the other contractors, or other causes beyond the Contractor's control, unless the delay affects the critical path of the Work and then only to the extent that the delay affects the critical path of the Work. No extension of time shall be granted to the Contractor to the extent that, notwithstanding the existence of any such circumstance beyond the Contractor's control, delay would have resulted in any event due to a concurrent unexcused delay by the Contractor.

**§ 15.1.7 Waiver of Claims: Final Payment.** The making of final payment shall constitute a waiver of Claims by the Owner except those arising from:

- .1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents;
- .4 damages, whether direct, consequential, indirect, liquidated or unliquidated, sustained or asserted either as a result of any wrongful act or neglect of the Contractor, or as a result of any breach of the Contract.

**§ 15.1.8 Injury or Damage to Person or Property.** If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, of any of the other party's employees or agents, or of others for whose acts such party is legally liable, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding seven (7) days after first observance. The notice shall

provide sufficient detail to enable the other party to investigate the matter. If a Claim for additional cost or time related to this Claim is to be asserted, it shall be filed as provided in Sections 4.7.7 or 4.7.8.

**§ 15.1.9** No course of conduct or dealings between the parties, nor express or implied acceptance of alterations or additions to the Work, and no Claim that the Owner has been unjustly enriched by any alteration or addition to the Work, whether or not there is in fact any such unjust enrichment, shall be the basis for any Claim to an increase in the Contract Sum or change in the Contract Time.

## **§ 15.2 Initial Decision**

**§ 15.2.1** Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Engineer will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

**§ 15.2.2** The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

**§ 15.2.3** In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

**§ 15.2.4** If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

**§ 15.2.5** The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Engineer and Construction Manager, if the Engineer or Construction Manager is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

**§ 15.2.6** Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

**§ 15.2.6.1** Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

**§ 15.2.7** In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

**§ 15.2.8** If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

**§ 15.3 Mediation**

**§ 15.3.1** Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

**§ 15.3.2** The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

**§ 15.3.3** The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.



**CONTRACTOR INSURANCE REQUIREMENTS  
FORM B (Contractors)**

**Board of Commissioners of Hamilton County, Ohio, requires that all Contractors submit a Certificate of Insurance before the commencement of work that fully complies with the requirements of the Agreement. Failure to provide the certificate with the proper coverage and limits will delay payment to the Contractor. The following is an outline of the insurance that must be provided and so indicated on the Contractor's certificate of insurance.**

**Commercial General Liability Insurance**

Contractor shall carry Comprehensive/Commercial General Liability, and if necessary Commercial Umbrella insurance, written on Insurance Service Office (ISO) form CG 00 01 or its equivalent with limits not less than those indicated below as required by this Contract or Agreement covering all operations by or on behalf of Contractor providing insurance for bodily injury liability and property damage liability including coverage for:

1. Premises and operations
2. Products and completed operations
3. Contractual liability insuring the obligations assumed by Contractor in this Agreement
4. Broad form property damage (including completed operations)
5. Personal and advertising injury liability
6. Explosion, collapse, underground and subsidence hazards (no XCU exclusions are acceptable)
7. Independent contractor liability
8. EIFS (applies only to contractors providing this scope of work)
9. Incidental Medical Malpractice
10. Severability of interests
11. Waiver of subrogation

The limits of liability shall be not less than these amounts required of Contractor under the Contract Documents:

- \$1,000,000 Each Occurrence (combined single limit for bodily injury and property damage)
- \$1,000,000 Personal Injury
- \$3,000,000 Products-Completed Operations Aggregate
- \$3,000,000 General Aggregate

- The general aggregate limit shall apply on a per project basis to Contractor's work under this Agreement per ISO endorsement CG 25 03.

**Products-Completed Operations coverage must be maintained for a minimum period of five years from Substantial Completion of the project and provide coverage for Contractor and all Additional Insureds listed below.**

**Comprehensive Automobile Liability Insurance** covering liability arising out of any auto (owned, hired, and non-owned) providing limits of liability of not less than:

- \$1,000,000 combined single limit for bodily injury and property damage – each accident

If your contracted work requires the removal and transportation of hazardous materials from the project site, your Auto liability coverage must be amended to include pollution liability coverage applicable to all hazardous waste hauling vehicles and include the MCS90 endorsement, with at least \$3,000,000 combined single limit.

### **Workers Compensation and Employer's Liability**

Workers Compensation -State of Ohio Statutory Limits and requirements as defined in Ohio Revised Code 4123

This work is performed in Ohio and is a State of Ohio project, therefore an Ohio Bureau of Workers' Compensation (OBWC) approved Drug Free Work Place policy is required.

Ohio Employer's Liability –You must, in addition to the above requirements, carry Ohio Employer's Liability coverage with limits of not less than \$1,000,000 per occurrence and in the aggregate. Such coverage must not contain any exclusionary language that removes coverage for “substantially certain to occur” claims.

If your work involves ANY employment on or adjacent to navigable waterways, then the workers' compensation policy must be endorsed to include U.S. Longshore and Harborworkers (USL&H) and Jones Act coverages as applicable.

Contractor shall provide Board with copy of current OBWC Certificate of Premium Payment prior to commencement of work and upon each renewal date.

### **Umbrella / Excess Liability Insurance**

The Contractor shall maintain Umbrella and Excess Liability insurance on an occurrence basis in excess of the Commercial General Liability insurance and Business Automobile Liability insurance, which is at least as broad as each of the underlying policies. The Contractors Umbrella and Excess Liability shall contain coverage for:

1. Pay on behalf of wording
2. Concurrency of effective dates with primary policies
3. Blanket contractual liability
4. Punitive damages coverage (where not prohibited by law)
5. Aggregates: apply where applicable in primary
6. Care, custody, and control
7. Follow form primary
8. Drop down feature
9. Waiver of subrogation

The limits of liability shall not be less than these amounts:

\$5,000,000 Each Occurrence

\$5,000,000 Aggregate

### **Additional Insured Requirements**

Description of Operations: The Banks Phase 3C: Bid Package #2 – Podium and Park

The Owner (Board of County Commissioners Hamilton County Ohio), Construction Manager (Messer), and Engineer (THP Limited), and each entities' officers, directors, employees, agents, and mortgagees shall be named as additional insureds under the Contractor's CGL and Automobile policies for any liability arising out of the performance of the Work. Waiver of Subrogation applies in favor of additional insureds.

**Coverage under the CGL for all required Additional Named Insureds shall be provided by a policy provision or by an endorsement providing coverage at least as broad as Additional Insured endorsement form GC 20 10 published by ISO.**

### **General Insurance Requirements**

- Certificate Holder shall be Board of Commissioners of Hamilton County Ohio and certificate of insurance is to be mailed to Hamilton County, Risk Manager, Room 707, 138 East Court Street, Cincinnati, OH 45202. The name of the project “Banks Phase 3C – Podium and Park” shall be placed on the certificate. Copies of the certificate and supporting forms showing compliance with the insurance requirements must be provided prior to commencement of work. Certificate shall be reissued when any insurance coverage contained therein is renewed.
- Contractor’s policies shall be endorsed to provide that there will be no cancellation or reduction in coverage without thirty (30) days prior written notice to Board of Commissioners of Hamilton County Ohio
- Contractor shall ensure that all tiers of their subcontractors shall procure and maintain insurance in like form and adequate amounts including Additional Insured requirements, all as set forth in the Contractor Insurance Requirements agreement.
- Contractor’s insurance shall be primary and non-contributing with respect to any insurance or self-insurance programs carried by Board of Commissioners of Hamilton County Ohio or any of the Additional Insureds.
- Umbrella Excess Liability in combination with primary liability coverages and limits as outlined above to satisfy the required limits of liability is acceptable.
- Umbrella / Excess liability coverage used in conjunction with primary policies shall have concurrency of effective dates with underlying policies; drop down and follow form features, and; “Pay on behalf of” wording.
- Contractor shall provide Board with copy of current OBWC Certificate of Premium Payment prior to commencement of work and upon each renewal date.



SECTION 008260  
JOINT POLICY FOR SMALL BUSINESS ENTERPRISE, ECONOMIC  
INCLUSION AND WORKFORCE DEVELOPMENT  
FOR THE BANKS PROJECT

PART 1 GENERAL

1.1 SUMMARY

- A. Joint Policy for Small Business Enterprise, Economic Inclusion and Workforce Development
- B. Subcontractor Approval Request (Form 2004)
- C. Subcontractor Monthly Business Utilization Report (Form 2005)
- D. Subcontractor Substitution (Form 2006)
- E. Workforce Monthly Tracking (Form WF-01)
- F. Workforce Number of Employees Report (Form WF-02)
- G. Workforce Monthly Employee Information Report (Form-WF-03)

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

# **JOINT POLICY FOR SMALL BUSINESS ENTERPRISE, ECONOMIC INCLUSION AND WORKFORCE DEVELOPMENT FOR THE BANKS PROJECT**

## **1. Banks Project Economic Inclusion Policy**

**1.1 Purpose.** The Banks project is a joint property development project of Hamilton County, Ohio (the “County”), the City of Cincinnati, Ohio (the “City”) and a master developer, Riverbanks Renaissance, LLC (the “Developer”). The Mayor of the City, Cincinnati City Council (the “Council”) and the Commissioners of Hamilton County, Ohio (the “Commissioners”) have established this Joint Policy for Small Business Enterprise, Economic Inclusion and Workforce Development (this “Banks Inclusion Policy”) for the Banks development project (the “Banks Project”) for the purpose of promoting equal business opportunity for small and disadvantaged businesses, including minority-owned and women-owned firms, and to ensure that such businesses receive or participate directly or indirectly in contracts and procurements related to the Banks Project awarded by the County and/or the City. Further, this Banks Inclusion Policy has been adopted to support and encourage the participation of small businesses and disadvantaged businesses, including, but not limited to, those owned by minorities and women, in the retail, hospitality and entertainment components of the Banks Project through active recruitment, facilitation of relationships and aggressive information-sharing. This Banks Inclusion Policy also has been established for the purposes of ensuring non-discrimination in the award and administration of such contracts and procurements and to promote the economic inclusion of qualified workers in the local region through employment opportunities related to the Banks Project.

## **2. Non-Discrimination Policy**

**2.1 Contracts and Procurements.** The County and the City each is an equal business opportunity government which provides, and will continue to provide, equal access to contracting and procurement opportunities for all businesses. It is the policy of the County and the City that no contracts should be awarded, and no procurement decisions should be made, by or on behalf of the County and/or the City as the result of unlawful discrimination based upon race, color, religion, sex, sexual orientation, national origin, ancestry, disability, veteran status, age, political belief or place of birth.

**2.2 Employment.** The County and the City each has a long-standing commitment to ensuring non-discrimination and equal opportunity in employment. Under federal and state laws, the County and the City are obligated to avoid unlawful discrimination, to ensure that their respective contractors and suppliers avoid unlawful discrimination, and to ensure that contractors, subcontractors and suppliers for the Banks Project are selected by the County, the City and their respective contractors and suppliers without engaging in unlawful discrimination. Prior to being awarded a contract or procurement with the County or the City, each Contractor shall be required to certify in writing to the County or the City, as the case may be, that (a) the Contractor will comply with all of the requirements of this non-discrimination policy (the “Non-discrimination Policy”) and (b) the Contractor, directly or indirectly, (i) has not engaged, is not

engaged and will not engage in any kind of unlawful discrimination involving race, color, religion, sex, sexual orientation, national origin, ancestry, disability, veteran status, age, political belief or place of birth, whether or not such unlawful discrimination is related to a contract or procurement activity involving the Banks Project, and (ii) will not, for any purpose related to the Contractor's engagement with respect to the Banks Project, employ or contract with any person or business which the Contractor knows or has reason to know has engaged, is engaged, or will engage in such unlawful discrimination, whether or not such unlawful discrimination is related to a contract or procurement activity or involving the Banks Project. As used herein, "**Contractor**" means any bidder, contractor, subcontractor, professional service provider, supplier, vendor or other person doing business with or soliciting business from the County and/or the City relating to the Banks Project, unless the context otherwise requires.

### **3. DBE Policy Statement and Objectives [49 CFR Part 26.23]**

**3.1 Policy and Objectives.** The County and the City have received, or may receive, federal financial assistance from the U. S. Department of Transportation (the "DOT") to finance a portion of the Banks Project and, as a condition to receiving such assistance, must comply with DOT regulations under 49 CFR Part 26, "*Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs*". In order to comply with DOT requirements and to give effect to this Banks Inclusion Policy, the County and the City have adopted this Disadvantaged Business Enterprise (as defined below) policy ("DBE Policy") and have established a Disadvantaged Business Enterprise program for DOT-assisted contracts related to the Banks Project (the "DBE Program") in accordance with applicable DOT regulations. It is the policy of the County and the City to ensure that DBEs as defined in 49 CFR Part 26 have an equal opportunity to receive and participate in DOT-assisted contracts ("DBE Policy"). It also is the policy and objectives of the County and the City:

- (a) To ensure non-discrimination in the award and administration of DOT-assisted contracts;
- (b) To create a level playing field on which DBEs can compete fairly for DOT-assisted contracts;
- (c) To ensure that only firms that fully meet eligibility standards set forth in 49 CFR Part 26 are permitted to participate as DBEs in the DBE Program;
- (d) To ensure that the DBE Program is narrowly tailored in accordance with applicable law;
- (e) To help remove barriers to the participation of DBEs in DOT-assisted contracts; and
- (f) To assist with the development of firms that can compete successfully in the marketplace outside of the DBE Program.

**3.2 Liaison Officer.** The Director of Hamilton County Small Business Development has been designated as the DBE liaison officer for the DBE Program (the “DBE Liaison Officer”). In that capacity, he/she is responsible for implementing all aspects of the DBE Program and ensuring that the County and the City comply with all provisions of 49 CFR Part 26 in connection with the award and performance of DOT-assisted contracts related to the Banks Project. Implementation of the DBE Program shall be accorded the same priority as compliance with all other legal obligations incurred by the County and the City in their financial assistance agreements with the DOT. The DBE Liaison Officer shall have direct and independent access to the Commissioners, the County Administrator of Hamilton County (the “County Administrator”), the Mayor of Cincinnati (the “Mayor”) and the Council with respect to matters concerning the DBE Program. [49 CFR Part 26.25]

**3.3 Dissemination of Policy.** The County has disseminated or will disseminate this DBE Policy statement to the Commissioners and all departments and divisions of the County. The City has disseminated or will disseminate this DBE Policy statement to the Mayor and all departments and divisions of the City. This DBE Policy statement also shall be distributed to DBEs and non-DBE business communities that currently perform, or have performed, work for the County or the City on DOT-assisted contracts by publishing this statement in general circulation, minority-focused and trade association publications, by electronic or regular mail to local disadvantaged business development organizations and by posting a copy of this DBE Policy statement on the County’s website and the City’s website. [49 CFR Part 26.23]

**3.4 No Quotas or Set-Asides.** Neither the County nor the City will use quotas or will set aside contracts for DBEs on DOT-assisted contracts or in any way in the administration of the DBE Program, except as permitted under DOT regulations to address egregious instances of unlawful discrimination. [49 CFR Part 26.43]

**3.5 Expiration.** The County and the City shall continue to carry out the DBE Program until all funds from DOT financial assistance for the Banks Project have been expended. [49 CFR Part 26.21(c)]

## **4. DBE Program Requirements**

### **4.1 Definitions.** [49 CFR Part 26.5]

4.1.1 “**Disadvantaged Business Enterprise**” or “**DBE**” means a for-profit small business concern that is at least 51% owned by one or more individuals who are both socially and economically disadvantaged or, in the case of a corporation, in which 51% of the stock is owned by one or more such individuals; and whose management and daily business operations are controlled by one or more socially and economically disadvantaged individuals who own it. To be eligible for DBE certification under the DBE Program, (i) a firm (including its affiliates) must be an existing small business, as defined by the U. S. Small Business Administration (“SBA”) standards, and must not have average annual gross receipts as defined by SBA regulations over the firm’s previous three fiscal years in excess of \$20.41 million (subject to adjustment from time to time for inflation); [49 CFR Part 26.65]

4.1.2 “**DOT-Assisted Contract**” means any contract between the County and/or the City and a contractor (at any tier), funded in whole or in part with DOT financial assistance, including letters of credit or loan guarantees, except a contract solely for the purchase of land;

4.1.3 “**Socially and economically disadvantaged individual**” means any individual who is a citizen (or lawfully admitted permanent resident) of the United States and who is:

(a) An individual who the County or the City finds to be a socially and economically disadvantaged individual on a case-by-case basis;

(b) An individual in one or more of the following groups, members of which are *rebuttably presumed* to be socially and economically disadvantaged:

(i) “Black Americans,” which includes persons having origins in any of the Black racial groups of Africa;

(ii) “Hispanic Americans,” which includes persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;

(iii) “Native Americans,” which includes persons who are American Indians, Eskimos, Aleuts, or Native Hawaiians;

(iv) “Asian-Pacific Americans,” which includes persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tonga, Kirbati, Juvalu, Nauru, Federated States of Micronesia, or Hong Kong;

(v) “Subcontinent Asian Americans,” which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka;

(vi) Women; and

(vii) Any additional groups whose members are designated as socially and economically disadvantaged by the SBA, at such time as the SBA designation becomes effective.

An individual whose personal net worth exceeds \$750,000 (excluding the individual’s ownership interest in the firm applying for DBE certification, the individual’s equity in his or her primary residence and any contingent liabilities) is deemed not to be economically disadvantaged. [49 CFR Part 26.67(d)]

All terms used in this DBE Policy statement which otherwise are not defined in this statement shall have the respective meanings assigned to them, if any, in 49 CFR Part 26.

**4.2 Non-Discrimination. [49 CFR Part 26.7]** Neither the County nor the City will exclude any person from participation in, deny any person the benefits of, or otherwise discriminate against anyone in connection with the award and performance of any contract covered by 49 CFR Part 26 on the basis of race, color, sex, or national origin. In administering the DBE Program, neither the County nor the City will, directly or through contractual or other arrangements, use criteria or methods of administration that have the effect of defeating or substantially impairing accomplishment of the objectives of the DBE Program with respect to individuals of a particular race, color, sex or national origin.

**4.3 DBE Financial Institutions. [49 CFR Part 26.27]** The County and the City will investigate thoroughly the full extent of services offered by financial institutions owned and controlled by socially and economically disadvantaged individuals in the County, if any, and shall make reasonable efforts to use these institutions and to encourage prime contractors for DOT-assisted contracts related to the Banks Project to use such institutions. Any information on the availability of such institutions shall be maintained by the DBE Liaison Officer.

**4.4 DBE Directory. [49 CFR Part 26.31]** The County and the City shall maintain and make available to interested persons a directory identifying all firms eligible to participate as DBEs in the DBE Program. For each firm, the directory will include its address, phone number, and types of work the firm has been certified to perform as a DBE. The directory will be made available on request to interested persons, including bidders, for work related to the Banks Project in connection with their efforts to meet the DBE goals established by the County and the City and made a part of bid specifications. The directory will serve as a primary source for locating potential contractors and suppliers. The directory will be revised at least annually and updated information included in the directory will be made available to contractors and the public on request.

**4.5 Required Contract Clauses.** Both the County and the City will require the following assurance to be included in every DOT-assisted contract between the County or the City, as the case may be, and a contractor, and in each subcontract the contractor signs with a subcontractor:

“The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the County and/or the City deems appropriate.” [49 CFR Part 26.13(b)]

The County and the City will include the following clause in each DBE-assisted prime contract:

“The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than ten (10) days from the receipt of each payment the prime contractor receives from the County and/or the City. If the County and/or the City require retainage from the prime contractor and incremental acceptances of portions, as determined by the County or the City, as the case may be, of the contract work are made by the County and/or the City, then the prime contractor agrees to return all related retainage from subcontractors, if any, within ten (10) days after receiving payment from the County and/or the City for the contract work satisfactorily completed and accepted by the County and/or the City, including such incremental acceptances of portions of such work. Any delay or postponement of payment over ten (10) days may occur only for good cause following written approval of the County and/or the City, as applicable, which approval shall not be unreasonably withheld, conditioned or delayed. This clause applies to both DBE and non-DBE subcontracts. Each subcontractor shall provide in all contracts with lower tier subcontractors or suppliers clauses requiring that the subcontractor shall pay the lower tier subcontractors and suppliers in accordance with the foregoing provisions. Any violation of these provisions by the prime contractor may be considered a breach of contract and may result in the suspension or termination of this contract or such other remedy as deemed appropriate by the County or the City, as the case may be, and DOT. The foregoing requirements shall not be construed to limit or impair any contractual, administrative or judicial remedies otherwise available to the prime contractor or any subcontractor in the event of a dispute involving late payment or nonpayment by the prime contractor, deficient subcontractor performance and/or noncompliance by a subcontractor.” [49 CFR Part 26.29]

**4.6 Monitoring and Enforcement Mechanisms. [49 CFR Part 26.37]**The County and the City will monitor DBE contracts, DBE scheduled work and payments to contractors related to the Banks Project in order to ensure compliance with this DBE Program and that work committed to DBEs at contract award is actually performed by DBEs. Non-compliance with this DBE Policy by the offending party may be considered a breach of contract and may result in the suspension or termination of that party’s contract or such other remedy as deemed appropriate by the County or the City, as the case may be, and the DOT. The County and the City will bring to the attention of the DOT any false, fraudulent, or dishonest conduct in connection with the DBE Program known to the County or the City, as the case may be, as provided in 49 CFR Part 26.109. [49 CFR Part 26.37] The County and the City also will consider similar action under the County’s or the City’s own legal authorities granted through the contract documents, including responsibility determinations in future contracts.

**4.7 Overall DBE Goals. [49 CFR Part 26.45]**

(a) The County and the City, together with the Ohio Department of Transportation (“ODOT”), are required to and have established an overall goal for DBE participation in DOT-assisted contracts related to the Banks Project in accordance with the provisions of 49 CFR Part 26.45. The overall DBE participation goal must be based on demonstrable evidence of the availability of DBEs in the County which are ready, willing and able to participate in the DOT-assisted contracts relative to all businesses in the County which are ready, willing and able to participate in such contracts. The goal also must reflect the determination of the County, the City and ODOT of the level of DBE participation expected

absent the effects of discrimination. The overall goal for utilization of DBEs in connection with the publicly-funded portion of the Banks Project with respect to DOT-assisted contracts is \_\_\_\_\_% (the “DBE Goal”). **[NOTE: DBE PARTICIPATION GOAL TO BE SET BY ODOT WITH RECOMMENDATION FROM THE COUNTY AND THE CITY.]**

The Developer for the Banks Project fully supports the DBE Policy and the DBE Goal for the publicly-funded portion of the Banks Project.

(b) The County and the City will meet the maximum feasible portion of the DBE Goal by using *race-neutral* means to facilitate DBE participation in the Banks Project. The County and the City will attempt to achieve increased DBE participation in DOT-assisted contracts through *race-neutral* means, including, but not limited to, encouraging prime contractors to subcontract portions of the work on the Banks Project to DBEs, including work that such prime contractors otherwise might perform with their own work forces; ensuring the inclusion of DBEs and other small businesses on the County’s and/or the City’s mailing lists for bidders; and advising prime contractors of the County’s website and the City’s website with DBE information. [49 CFR Part 26.51(a)]

(c) The County and the City will use *contract goals* to meet any portion of the DBE Goal that the County and the City project cannot be met using *race-neutral* means. *Contract goals* shall be established so that, over the period to which the overall goal applies, the *contract goals* cumulatively will result in meeting any portion of the DBE Goal that is not projected to be met through the use of *race-neutral* measures. The County and the City will establish *contract goals* only on those DOT-assisted contracts that have subcontracting possibilities. The County and the City will not be required to establish *contract goals* on every such contract, and the size of *contract goals* will be adapted to the circumstances of each such contract (e.g., type and location of work, availability of DBEs to perform the particular type of work, etc.). [49 CFR Parts 26.51(d) and (e)] The County and the City will express *contract goals* as a percentage of the total amount of a DOT-assisted contract.

**4.8 Good Faith Efforts. [49 CFR Part 26.53]** When the County and/or the City has established a DBE *contract goal*, the County and/or the City will award the contract only to a bidder/offeror who makes good faith efforts to meet the goal as required under 49 CFR Part 26.53. Compliance with good faith efforts requirements will be treated as a matter of responsiveness to bid specifications. Each solicitation for which a *contract goal* has been established will require the bidders/offerors to submit the following information with each bid submitted:

- (a) The names and business and e-mail addresses of DBE firms that will participate in the contract;
- (b) A description of the work that each DBE firm will perform;
- (c) The dollar amount of the participation of each DBE firm participating;



(d) Written and signed documentation of commitment to use DBE subcontractors whose participation it submits to meet a *contract goal*;

(e) Written and signed confirmation from each DBE firm that it is participating in the contract as provided in the prime Contractor's commitment; and

(f) If the contract goal is not met, evidence of good faith efforts of the bidder/offeror to meet such goal.

**4.9 Counting DBE Participation. [49 CFR Part 26.55]** The County and the City will count DBE participation towards overall and *contract goals* under the DBE Program as provided in 49 CFR Part 26.55.

**4.10 DBE Certification. [49 CFR Part 26.83]** Only firms certified as eligible DBEs as described in 49 CFR Part 26.83 are eligible to participate in the DBE Program.

## **5. SBE Policy Statement and Objectives**

**5.1 Policy and Objectives.** The County and the City recognize that small businesses contribute financially to the County and the City through the payment of local taxes and the employment of local residents, who themselves support the County and the City through the payment of local taxes. The County and the City also acknowledge that small businesses generally have an economic and competitive disadvantage with respect to County and City contract and procurement opportunities because of their size and economic status. The County and the City believe that the growth and development of these economically-disadvantaged small businesses will increase the number of qualified business competitors in the local community, will improve and strengthen the local tax base which supports the County and the City, and will have a positive impact on the local workforce. It is the policy of the County and the City to support and encourage the participation of economically-disadvantaged small businesses in their procurement and contracting activities, including such activities related to the Banks Project (the "SBE Policy"). Accordingly, as part of the Banks Inclusion Policy, the County and the City have established the Banks Small Business Program (the "SBE Program") to encourage the participation of small businesses, directly and indirectly, in the contracts and procurements awarded by the County and/or the City related to the Banks Project. As part of the SBE Program, the County and the City also will encourage Contractors awarded Banks Project contracts to engage or use small businesses as subcontractors and/or suppliers for work to be performed under such contracts. Further, the County and the City will collect data to measure the participation of small businesses and minority and women-owned businesses in contracting and procurement activities related to the Banks Project. On an annual basis during the completion of the Banks Project, the County and the City will review this SBE Policy and the SBE Program and, if appropriate, will modify the policy and/or the program to more effectively achieve the objective of including small businesses in the contracting and procurement activities of the County and/or the City relating to the Banks Project.

**5.2 Definitions.** For purposes of this SBE Policy and the SBE Program, as used herein, “small business”, “small business enterprise” and “SBE” means a “small business enterprise” as defined under Section 323-1-S of the Municipal Code of the City of Cincinnati, Ohio, except that any requirement for the maintenance of fixed offices within the geographical boundaries of the County or the City (or any other geographic area) contained in such definition will not be applicable for purposes of the SBE Program. As used herein, “Contractor” means any bidder, contractor, subcontractor, professional service provider, supplier, vendor or other person doing business with or soliciting business from the County and/or the City relating to the Banks Project, unless the context otherwise requires.

### **5.3. SBE Participation Goals.**

(a) In furtherance of the SBE Policy, it is the goal of the County and the City to award to small businesses, directly or indirectly through contracting, subcontracting and/or procurement activities of Contractors, contracts and procurements which represent at least 30% for Construction, 15% for Commodities and General Services and 10% for Professional Services, respectively, of the aggregate dollars spent annually by the County and/or the City on the Banks Project (the “SBE Goal”). In order to achieve the SBE Goal, the County and the City will encourage Contractors to use small businesses in the performance of contracts awarded to them relating to the Banks Project.

The Developer for the Banks Project fully supports the SBE Policy and the SBE Goals for the publicly-funded portion of the Banks Project and, with respect to the privately-funded portion, it is the goal of the Developer to achieve percentage goals equal to the SBE Goals with respect to the use of small business enterprises.

(b) The following categories are hereby established to identify the contracting and procurement activities covered by this SBE Policy, which categories may be amended from time to time by the County and the City:

(i) **Category A. – Construction:** including, without limitations, any and all contracts relating to new construction and the construction, renovation and/or maintenance of buildings, facilities and other erected structures owned or leased by the County and/or the City and the rehabilitation, remodeling and repairs of roads and bridges.

(ii) **Category B. – Commodities:** including, without limitations, the purchase of all goods, equipment, office and other supplies, art, furniture, and other tangible personal property otherwise not covered by Categories A, C and D herein.

(iii) **Category C. - General Services:** including, without limitations, the procurement of advertising, printing, non-construction repairs, janitorial services, training seminars and workshops, computer and information systems security, shipping and mailing, microfiche and microfilm, courier, storage, travel, consulting and any other non-professional services.

(iv) **Category D. – Professional Services:** including, without limitations, the purchase of any and all services for which applicable selection criteria may require a bidder or Contractor to possess a license or other certificate of competency, such as in the areas of accounting and auditing, insurance, laboratory, legal, medical and transportation, or as otherwise described as consultants in the Ohio Revised Code.

(c) Each Contractor for the Banks Project will be required to submit to the County and/or the City, as the case may be, with the Contractor's bid a plan for the engagement of small businesses by the Contractor in connection with the Banks Project. A Contractor's failure to submit a small business utilization plan to the County and/or City with the Contractor's bid may result in a determination that the bid is non-responsive and rejection of the bid.

(d) The County and/or the City may establish goals for the utilization of SBEs for each contract awarded by the County or the City, as the case may be, in connection with the Banks Project, and the goal related to each contract may differ from the goals for other contracts because of the availability of SBEs or other factors.

(e) The County and the City are required to award all contracts for the Banks Project to the "**lowest and best**" bidder. Accordingly, inability of a Contractor to meet the established contract goal or any other goal set forth in this SBE Policy with respect to the utilization of SBEs will not exclude the Contractor from award of a contract if the Contractor's bid otherwise is deemed by the County and/or the City, as the case may be, to be the "**lowest and best**" bid.

(f) For purposes of determining whether the SBE Goal is reached, SBE participation in Banks Project contracts will be counted as follows:

(i) The total dollar value of the contract awarded to an eligible SBE will be counted toward the SBE Goal;

(ii) The County or the City may count toward the SBE Goal a portion of the total dollar value of a contract with an eligible joint venture equal to the percentage of the ownership and contract of the SBE in the joint venture;

(iii) The County or the City may count toward the SBE Goal only expenditures to SBEs that perform a "**commercially useful function**" in the work of a contract. An SBE is considered to perform a "**commercially useful function**" when it is responsible for execution of a distinct element of the work of a contract and carrying out its responsibilities by actually performing, managing, and supervising the work involved. A business which stocks sufficient quantities of supplies in direct inventory, held for sale or resale, to cover anticipated future demands for the supplies engages in a "**commercially useful function**" for purposes of the SBE Program. SBEs that engage in the business of providing brokerage shall not be deemed to perform a "**commercially useful function**" unless the brokerage services are those required or sought by the County or the City, as the case may be. To determine whether an SBE is performing a commercially useful function, the County or the City, as the case may be, will evaluate the amount of work subcontracted, industry practices, and other relevant factors; and

(iv) Consistent with normal industry practices, an SBE may enter into subcontracts. If an SBE subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of normal industry practices, the SBE will be presumed not to be performing a commercially useful function. The SBE may present evidence to rebut this presumption to the County or the City, whichever has awarded the relevant contract.

**5.4 Program Support.** To facilitate the use of small businesses by Contractors, the County and the City, working together with the Consultant (as hereinafter defined), will:

5.4.1 Sponsor and hold pre-bid meetings to inform potential bidders of the SBE Goal and the availability of small businesses to perform work related to or to serve as suppliers for the Banks Project;

5.4.2 Notify small businesses of contracting, subcontracting and procurement opportunities related to the Banks Project directly and by placing notices and specifications related to such opportunities in their respective government bulletins; and, as funding permits, in major local newspapers in general circulation, local trade and trade association publications, small business enterprise media and other periodicals;

5.4.3 Provide copies of bid notices to local trade associations, local small business chambers of commerce, technical assistance agencies and small business contractor associations;

5.4.4 Provide small businesses with information and list of resources relating to insurance, bonding and financing;

5.4.5 Encourage the formation of joint ventures among small businesses and between small businesses and prime Contractors which may provide an opportunity for small businesses to gain experience;

5.4.6 Make copies of specifications and requests for proposals available for review by any prospective bidder;

5.4.7 Conduct outreach events directed to small businesses regarding contracting procedures and specific contracting opportunities related to the Banks Project;

5.4.8 Make available a list of small business resources that may assist with the development and improvement of immediate and long-term business management, recordkeeping and financial and accounting capabilities; and

5.4.9 Develop and distribute to potential Contractors for the Banks Project through print and electronic means a current directory of small businesses which are certified in accordance with this SBE Policy and which are available to serve as subcontractors and suppliers for the Banks Project, categorized by types of firms to facilitate identifying SBEs with capabilities relevant to a particular specification. Each SBE listing will contain the business name, contact person, mailing and e-mail addresses, phone number, legal structure of the business, and details concerning the SBE's specialty(ies). The directory will be continuously updated and maintained electronically as well as in hard copy. In compiling the directory, the County and the City will seek to identify and certify as many SBEs as possible that have the potential of doing business related to the Banks Project.

## **5.5 Monitoring SBE Participation.**

(a) The County and the City will monitor and track the participation of small businesses in the Banks Project to determine if the SBE Goal is being met and whether Contractors are in compliance with the Non-discrimination Policy. In order to assist the County and the City in that effort, each Contractor for the Banks Project will be required to:

(i) submit to the awarding government entity (the County or the City, as appropriate) with each contract bid related to the Banks Project information regarding any and all small businesses proposed to be used by the Contractor in connection with the performance of the contract, including, but not limited to, a list of the name, business and e-mail addresses and telephone number of, and a brief description of the services to be performed or procurements to be filled (including the amount to be paid for such services or procurements) by, each such small business, which list also shall identify specifically each minority and women-owned business to be utilized in performing the contract if awarded to the Contractor; and

(ii) upon award of a contract related to the Banks Project, compile and deliver to the County and the City *monthly* reports regarding the engagement of small businesses in connection with the Banks Project in

sufficient detail so as to allow the County and the City to monitor and track the participation of small businesses in contract and procurement activities related to the Banks Project, including, but not limited to, a list of the name, business and e-mail addresses, telephone number and federal tax identification number of, and a brief description of the actual services performed or procurements filled by (including the amount paid or to be paid for such services or procurements), each small business during the period covered by the report in connection with the Banks Project contract or procurement awarded to such Contractor. In addition, for monitoring purposes, each such report shall identify specifically each minority and women-owned business included in the list.

(b) A Contractor's non-compliance with the foregoing disclosure or reporting requirements may be considered a breach of contract and may result in the suspension or termination of the Contractor's contract related to the Banks Project or such other remedy as may be deemed appropriate by the County and/or the City.

(c) The County and the City at least annually will prepare or cause to be prepared a consolidated report based on a compilation and analysis of the reports submitted by the Developer and other information, if any, provided to the County and the City by Contractors, regarding the use of small businesses for contracts and procurements related to the Banks Project. The report also will discuss the use of minority-owned and women-owned businesses for services and procurements related to the Banks Project to the extent that such information is available to the County and/or the City. The report will be made available promptly to the general public on the County's and the City's websites as well as in hard copy upon request.

**5.6 SBE Certification.** For purposes of the Banks Project, only small businesses which are certified by the City pursuant to Section 323-1-S of the Municipal Code of the City of Cincinnati, Ohio will be eligible to participate in the SBE Program. Notwithstanding the foregoing, no requirement regarding the maintenance of fixed offices within the geographical boundaries of the County or the City (or any other geographic area) will be required for such certification.

**5.7 Limitations.** The provisions of this SBE Policy shall not apply to contracts or procurements valued at \$5,000 or less. In addition, the provisions of this SBE Policy shall not apply to the publicly-funded portion of the Banks Project to the extent that applicable federal and/or state laws, regulations or policies prohibit the application of this SBE Policy to such portion.

**5.8 Application of Other SBE Policies.** This SBE Policy and the SBE Program established pursuant hereto shall be applied to all contracts and procurements of the County and/or the City awarded or to be awarded in connection with the Banks Project in lieu of any other existing small business enterprise policy, program or contracting and procurement requirements of the County and/or the City.

## **6. Workforce Development Policy Statement and Objective [41 CFR Part 60]**

**6.1 Policy and Objectives.** The County and the City are equal opportunity employers. The County and the City believe that the reduction in unemployment among local residents, particularly minorities and women, constitutes a valid local government purpose. The County and the City also recognize their obligation to use contracting and procurement activities to facilitate the creation of jobs for unemployed and underemployed individuals. In addition, a portion of the Banks Project will be financed by the federal government through DOT, which requires compliance with Executive Order No. 11246, as amended (the “Executive Order”), and regulations promulgated by the U. S. Department of Labor, Office of Federal Contract Compliance Programs (“OFCCP”), under 41 CFR Part 60 (the “DOL Regulations”). The Executive Order prohibits discrimination in employment and requires affirmative action by contractors and subcontractors to ensure equal employment opportunities without regard to race, color, sex, religion and/or national origin in performing non-exempt federally-assisted construction contracts and subcontracts. The Executive Order and the DOL Regulations apply to a construction contractor’s or subcontractor’s employees who are engaged in on-site construction, including those construction employees who work on a non-federally assisted construction site. It is the policy of the County and the City to comply, and to require all Contractors awarded contracts or subcontracts related to the Banks Project to comply, with the Executive Order and the DOL regulations (“Banks Workforce Policy”) to the extent applicable. Therefore, in order to increase the capacity of minorities and women to participate in local construction projects, to promote the employment of minorities and women in connection with the Banks Project and to comply with the Executive Order and the DOL regulations, as part of the Banks Inclusion Policy, the County and the City have established the Banks Workforce Development Program (the “Banks Workforce Program”). Each Contractor working on the publicly-funded portion of the Banks Project shall comply with all applicable provisions of the Executive Order, the DOL Regulations and all other rules, regulations, and relevant orders of the U. S. Secretary of Labor. For purposes of this policy, “**Contractor**” means any bidder, contractor, subcontractor, professional service provider, supplier, vendor or other person doing business with or soliciting business from the County and/or the City relating to the Banks Project, unless the context otherwise requires.

All terms used in this Banks Workforce Policy statement which otherwise are not defined in this statement shall have the respective meanings assigned to them, if any, in the Executive Order and/or the DOL Regulations.

### **6.2 Required Contract Clauses.**

(a) Pursuant to the DOL Regulations, the equal opportunity clause published at 41 CFR Part 60-1.4(b) (the “Equal Opportunity Clause”) is required to be included in, and to be made a part of, all nonexempt federally-assisted construction contracts and subcontracts. Each Contractor working on the publicly-funded portion of the Banks Project shall include the Equal Opportunity Clause in each of its contracts and subcontracts. The Equal Opportunity Clause shall be considered to be part of each contract and subcontract related to the

Banks Project required by the Executive Order or the DOL Regulations to include such a clause, whether or not such clause is physically incorporated in such contract. [41 CFR Part 60-4.3(a)]

(b) The Standard Federal Equal Employment Opportunity Construction Contract Specifications published at 41 CFR Part 60-4.3(a) (the “Specifications”) are required to be included in, and to be made a part of, all federal and federally-assisted construction contracts in excess of \$10,000 to be performed in geographical areas designated by the Director of OFCCP (the “Director”) pursuant to 41 CFR Part 60-4.6 and in construction subcontracts in excess of \$10,000 necessary in whole or in part to the performance of nonconstruction federal contracts and subcontracts covered under the Executive Order. Each Contractor working on the publicly-funded portion of the Banks Project shall include the Specifications in each of its contracts and subcontracts as may be required under the Executive Order and/or the DOL Regulations. The Specifications shall be considered part of each contract and subcontract required by the DOL Regulations to include such a clause, whether or not such clause is physically incorporated in such contracts. [41 CFR Part 60-4.3(a)]

**6.3 Affirmative Action Program. [41 CFR Part 60-1.40]** Each nonconstruction Contractor awarded a contract by the County or the City related to the publicly-funded portion of the Banks Project, if the Contractor has 50 or more employees and a federally-assisted contract of \$50,000 or more, or has United States bills of lading which in any 12-month period total, or can reasonably be expected to total, \$50,000 or more, shall develop and maintain a written affirmative action program for each of its establishments. Each Contractor awarded a contract or subcontract related to the Banks Project shall require each of its nonconstruction subcontractors, if the nonconstruction subcontractor has 50 or more employees and a federally-assisted contract of \$50,000 or more, or has United States bills of lading which in any 12-month period total, or can reasonably be expected to total, \$50,000 or more, to develop and maintain a written affirmative action program for each of its establishments. An affirmative action program required by this section must comply with applicable DOL Regulations, must be developed within 120 days from the commencement of the awarded Banks Project related contract and must be updated annually. [41 CFR Part 60-1.40(a)] In order to comply with DOL Regulations, an affirmative action program must include the components specified in 41 CFR Parts 60-2.10(b) and 60-2.17, including placement goals for minorities and women. As part of its affirmative action program, a Contractor must conduct a workforce analysis of each job title, determine workforce availability of women and minorities for each job group, and conduct a utilization analysis to determine whether women or minority group persons are "underutilized" in any job group. Based on these analyses, the Contractor shall establish goals to overcome the underutilization of minorities and women and shall make a good faith effort to achieve those goals.

**6.4 The Banks Project Workforce Participation Goals. [41 CFR Parts 60-4.3 and 60-4.6]**

(a) Under the Executive Order and DOL Regulations, construction Contractors are not required to maintain a written affirmative action program, but must make *good faith efforts* to meet demographic goals related to geographic specific census data for minorities and a *nationwide* goal for women as determined by the Director or his designee. From time to time, the Director issues goals for minorities and women utilization based on appropriate workforce



demographic or other relevant data, which covers construction projects or construction contracts performed in specific geographical areas. The goals for minority and women participation in construction projects are expressed in percentage terms for the covered Contractor’s aggregate workforce in *each* construction trade on *all* construction sites. The current percentage goal for the utilization of women established by the Director is 6.9% of work hours and applies to all of a Contractor’s construction sites regardless of where the federal or federally-assisted contract is being performed. Minority utilization goals are formulated in terms of work hours performed in a specific Standard Metropolitan Statistical Area (“SMSA”) or Economic Area, and the specified goals apply to all of a Contractor’s work in the SMSA, both federally-assisted and private construction work. Therefore, the current goals for minorities and women participation in the workforce for the Banks Project as established by the Director are as follows:

	Goal for minority participation in each trade	Goal for women participation in each trade
For Hamilton County:	11.0%	6.9%
For City of Cincinnati:	11.0%	6.9%

It is the aim of the County and the City to achieve the workforce participation goals with respect to the Banks Project as set forth above. In addition, based upon current labor force information, the County and the City have established a combined goal for the participation of minorities and women in the workforce for the Banks Project of 22% (the “Workforce Participation Goals”).

The Developer for the Banks Project fully supports this Banks Project workforce policy (the “Banks Workforce Policy”) and the Workforce Participation Goals for the publicly-funded portion of the Banks Project and, with respect to the privately-funded portion, it is the goal of the Developer to achieve significant participation of minorities and women as measured in labor hours.

(b) In accordance with the Executive Order and the DOL Regulations, the Workforce Participation Goals apply to a covered Banks Project construction Contractor’s total construction workforce in the SMSA, even if some of the Contractor’s employees perform work under non-federal or nonfederally-assisted construction contracts or subcontracts and even though such work may occur in geographical areas where the Contractor does not currently work on federal or federally-assisted construction projects. The goals applicable to other construction work performed by a Contractor outside of the SMSA (which includes the County and the City) are the goals established by the Director for those geographic areas where such other construction work is being performed.

**6.5 Good Faith Efforts. [41 CFR Part 60-4.3]**

(a) In order to achieve the Workforce Participation Goals, construction Contractors working on the publicly-funded portion of the Banks Project are required to use their *good faith efforts* to increase the utilization of minorities and women in the skilled construction trades. Further, pursuant to the Executive Order and DOL Regulations, construction Contractors working on the publicly-funded portion of the Banks Project must take certain action to

demonstrate their *good faith efforts* to achieve the Workforce Participation Goals, including, but not limited to:

6.5.1 Maintaining a work environment free of harassment, intimidation, and coercion at all sites and in all facilities at which the Contractor's employees are assigned to work;

6.5.2 Establishing and maintaining current lists of minority and women recruitment sources; providing written notification to minority and women recruitment sources and to community organizations when the Contractor has employment opportunities available; and maintaining a record of the organizations' responses;

6.5.3 Maintaining current files containing the names, residence and e-mail addresses and telephone numbers of each minority or woman off-the-street applicant and minority or woman referral from a union, recruitment source or community organization and of what action was taken with respect to each such individual;

6.5.4 Developing on-the-job training opportunities and/or participating in training programs for the area which expressly include minorities and women, and providing notice of these training opportunities and job programs to recruitment sources, state employment offices and other referral sources compiled by the Contractor as required under DOL Regulations;

6.5.5 Disseminating the Contractor's equal employment opportunity policy to unions and training programs, requesting their cooperation and assistance in meeting equal employment opportunity obligations, and disseminating the Contractor's equal employment opportunity policy by including it in the Contractor's policy manual or collective bargaining agreement, by publicizing it in the Contractor's newspaper, annual report , etc. (if any), by specific review of the policy with all management personnel and with all minority and women employees at least once a year, and by posting the Contractor's equal employment opportunity policy on bulletin boards accessible to all employees at each location where the construction work is performed;

6.5.6 Disseminating the Contractor's equal employment opportunity policy in advertising and in the news media of general circulation (including minority and women news media);

6.5.7 Directing recruitment efforts, both oral and written, to minority, women and community organizations, to schools with minority and female students and to minority and women recruitment and training organizations serving the Contractor's recruitment area and employment needs;

6.5.8 Encouraging current minority and women employees to recruit other minorities and women; and

6.5.9 Documenting and maintaining records of all solicitations of offers for subcontracts from minority and women construction contractors and suppliers, including circulating solicitations to minority and women contractor associations and other business associations.

(b) Although Contractors are required to make *good faith efforts* to meet the Workforce Participation Goals, the goals are neither quotas, set-asides nor a device to achieve proportional representation or equal results. The Workforce Participation Goals are not intended to require a Contractor to hire a person who does not have the qualifications needed to perform the assigned job successfully, to hire an unqualified person in preference to another applicant who is qualified, or to hire a less qualified person in preference to a more qualified person. Rather the goals are used to target and measure the effectiveness of affirmative action efforts to eradicate and prevent barriers to equal employment opportunities related to the Banks Project, and no sanctions will be imposed on a Contractor solely for failure to meet the Workforce Participation Goals.

(c) To promote and facilitate such employment, the County and the City, working together and through the Consultant (as hereinafter defined) and/or the Southwest Ohio Regional Workforce Investment Board (the “SWORWIB”), which is funded jointly by the County and the City, will:

6.5.10 Sponsor and hold pre-bid meetings to inform potential bidders of the Workforce Participation Goals and the availability of qualified minorities and women to work on the Banks Project;

6.5.11 Notify minorities and women of employment opportunities related to the Banks Project by placing notices of such opportunities in their respective government bulletins, on their respective websites and, as funding permits, in major local newspapers of general circulation, local trade and trade association publications, small business enterprise media and other periodicals;

6.5.12 Provide copies of notices of employment opportunities related to the Banks Project to local minority and women trade associations, local minority and women chambers of commerce, technical assistance agencies, employment agencies, community resource organizations and minority and women contractor associations;

6.5.13 Work with various community-based/workforce development programs that provide instruction and training opportunities for minorities and women interested in gaining experience in construction and related fields to establish a job readiness program for, and to increase the pool of minorities and women qualified to work on, the Banks Project;

6.5.14 Coordinate with local union and non-union pre-apprenticeship programs, career, and technical centers, universities, educational associations, and local community organizations who provide workforce development programs to identify minorities and women interested in pursuing careers or jobs in the construction industry; and

6.5.15 Implement pre-apprenticeship programs to develop the skill levels of minorities and women interested in pursuing jobs in the construction industry.

In addition, working together and through the SWORWIB, the County and the City will use their best efforts to develop and distribute to potential Contractors for the Banks Project through print and electronic means a current directory of qualified minority and women construction and other workers available for employment related to the Banks Project, categorized by types of experience and skills to facilitate identifying minorities and women with skills and capabilities relevant to particular job requirements. To the extent permissible by law, each listing will contain the name, residence and e-mail addresses, telephone number, and details concerning the job qualifications of each individual. The directory will be continuously updated and maintained electronically as well as in hard copy.

(d) The Workforce Participation Goals established herein are interim and designed to be reasonably attainable. The County and the City will review the Workforce Participation Goals at least annually and, if legally permissible and appropriate, based upon the relevant facts and circumstances, from time to time, the County and the City may modify or adjust the Workforce Participation Goals.

#### **6.6 Monitoring the Banks Project Workforce Participation.**

(a) The County and the City, working together and through the Consultant, will monitor and track the participation and employment of minorities and women as construction and other workers in connection with the Banks Project to determine if the Workforce Participation Goals are being met. In order to assist the County and the City in that effort, each Contractor awarded a contract for the Banks Project will be required to:

(i) submit to the awarding government entity (the County or the City, as appropriate) promptly after such award information regarding the number of full and part-time employees of the Contractor who will work on the Banks Project, identifying such employees who are minorities and women, including, but not limited to, a list of the name, residence and e-mail addresses, and telephone number of, and a brief general description of the work to be performed by, each such employee, information regarding whether the Contractor expects to hire additional employees to work on the Banks Project and, if so, a brief general description of the skills and capabilities requirements for each such additional employee; and

(ii) compile and deliver to the County and the City *monthly* reports regarding the employment, if any, of additional minorities and women to work on the Banks Project.

(b) A Contractor's non-compliance with the requirements of the Executive Order, the DOL Regulations, this Banks Workforce Policy or the Banks Workforce Program, as

such provisions are applicable with respect to the publicly-funded portion of the Project, may be considered a breach of contract and may result in the suspension or termination of the Contractor's contract related to the Banks Project or such other remedy as may be deemed appropriate by the County and/or the City.

**6.7 Limitations.** The provisions of this Banks Workforce Policy and the Banks Workforce Program shall not apply to a Contractor with a federally-assisted construction contract or subcontract valued at \$10,000 or less. [40 CFR 60-4.1]

## **7. Employee Readiness Program**

**7.1 Establishment.** In order to accomplish the Workforce Participation Goals, the County and the City, working together and with the SWORWIB, will cause to be established an employee readiness program (the "ERP") to work in conjunction with various community-based workforce development programs to increase the construction skill levels of County and City residents and to help them reach the qualification levels needed to gain entry into union and open shop apprenticeship programs. Additional details regarding the role and make-up of the ERP are set forth in Schedule A attached. To facilitate this effort, the County and the City, working together and through the Consultant, will:

(a) Coordinate with various community-based workforce development programs that provide instruction and training opportunities for those interested in gaining experience in construction industry and related fields;

(b) Coordinate with local union and non-union pre-apprenticeship programs, career, and technical centers, universities, and educational associations and organizations to identify and engage those interested in pursuing careers in the construction industry and related fields; and

(c) Advertise and promote the availability of workforce project opportunities in a broad-based manner.

**7.2 Employee Readiness Committee.** The County and the City endorse the work and efforts of the SWORWIB and will encourage the SWORWIB to establish an employee readiness committee (the "ERC") to oversee implementation of the ERP. The purpose of the ERC will be to evaluate the effectiveness of the ERP and new and existing apprenticeship programs which are available to residents of the County and/or the City. The membership of the ERC should include an elected official, Contractors, union and non-union officials, a SWORWIB member, and apprenticeship representatives. The ERC should provide input and recommendations to the SWORWIB and, in turn, the SWORWIB should report quarterly to the County, the City and the Consultant about the progress and effectiveness of the ERP.

## **8. Inclusion Outreach Consultant**

**8.1 Engagement of Consultant.** In order to facilitate the implementation and administration of this Banks Inclusion Policy, including the DBE Program, the SBE Program and the Banks Workforce Program, the County, the City and the Developer will hire an inclusion outreach consultant (the “Consultant”) to assist with the Banks Project. The Consultant will be responsible for conducting extensive outreach programs directed at DBEs, including minority and women-owned businesses, SBEs, and qualified minorities and women construction workers, during the preconstruction and construction phases of the Banks Project. The Consultant also will be responsible for tracking, monitoring and preparing monthly participation reports on the utilization of DBEs, including minority and women-owned businesses, SBEs and qualified minorities and women construction workers in connection with the Banks Project.

**8.2 Other Duties of Consultant.** The Consultant will work cooperatively with the Hamilton County Office of Small Business Development (the “Small Business Development Office”), and the City of Cincinnati Office of Contract Compliance (the “COCC”) in connection with the implementation and administration of this Banks Inclusion Policy. In addition, the Consultant will seek input and advice regarding effective outreach efforts as contemplated by this Banks Inclusion Policy from business leaders, DBEs, small business owners and representatives of trade associations and community organizations, including, but not limited to, the Greater Cincinnati & Northern Kentucky African American Chamber of Commerce, the Cincinnati USA Hispanic Chamber of Commerce, the Cincinnati USA Regional Chamber of Commerce, the Greater Cincinnati Building & Construction Trades Council, Allied Construction Industries (ACI), Ohio Valley Chapter of Associated Builders and Contractors, Inc., South Central Ohio Minority Business Council, Cincinnati Women In Construction, Cincinnati Business Incubator, the Cincinnati Minority Contractors Business Assistance Program, the Cincinnati-Hamilton County Community Action Agency, the Cincinnati Unit of the NAACP, the Hamilton County Department of Job and Family Services and the Cincinnati Workforce Development Center.

## **9. Socio-Economic Impact**

**9.1 Data Collection and Analysis.** The County and the City anticipate that the Banks Project will have a significant and positive social and economic impact on the Greater Cincinnati and Hamilton County region. The County and the City also believe that it is important to measure such impact, particularly in the census tract areas within the SMSA that includes the County and the City (the “Hamilton County SMSA”) which have been deemed to be economically distressed. For that purpose, the County and the City will collect and analyze social and economic data to monitor and measure the regional impact of the Banks Project. To assist the County and the City and to facilitate such efforts, each Contractor for the Banks Project will be required to:

(a) prepare and submit to the awarding government entity (the County or the City, as appropriate) quarterly reports regarding:

(i) the use of first-tier subcontractors, suppliers and vendors in connection with the Banks Project during the period covered by the report, including, but not limited to, (i) the name and principal business address of each subcontractor, supplier and vendor and (ii) the dollar value of each Banks Project related subcontract and procurement awarded by the Contractor to the first-tier subcontractor, supplier or vendor during the covered period; and

(ii) the number of persons employed by the Contractor to work on the Banks Project (or to perform any work directly or indirectly related to the Banks Project) during the covered period who reside in the SMSA which includes Hamilton County, together with the aggregate amount of salaries and gross wages paid to such persons, based upon each zip code included in such geographic area.

Each Banks Project related subcontract between a Contractor and a first-tier subcontractor, supplier or vendor shall require the subcontractor, supplier or vendor to prepare and submit to the government entity that awarded the prime contract or procurement to the Contractor (the County or the City, as appropriate) quarterly reports containing information as described or otherwise required pursuant to this provision with respect to the subcontractor's first-tier subcontractor supplier or vendor contract, procurement and/or employment activities related to such awarded subcontract or procurement.

**9.2 Limitations.** The provisions of Section 9.01 shall not apply to individual Banks Project related contracts, subcontracts and/or procurements valued at \$10,000 or less, unless or until the aggregate value of a series of such contracts, subcontracts and/or procurements awarded to the same Contractor, subcontractor, supplier or vendor exceeds \$10,000. The information described under Section 9.01(a)(ii) shall not be required for a supplier or vendor that does not have any office, supply warehouse or distribution facility located within [50] miles of the County.

## **10. Rules and Guidelines**

**10.1 Authorization.** The Small Business Development Office and the COCC are authorized to jointly prepare and issue rules and guidelines for the implementation and administration of this Banks Inclusion Policy consistent with the purposes and intent of such policy as set forth herein. Nothing set forth herein or in such rules and guidelines should be interpreted or applied in any manner that would be in violation of existing applicable state or federal law. [Accordingly, the Banks Project Small Business Enterprise Program Rules and Guidelines dated \_\_\_\_\_, 2007 have been developed by the Small Business Development Office and the COCC and specifically apply to this Banks Inclusion Policy.]

**SCHEDULE A**

Employee Readiness Program

[TO BE ATTACHED]



## The Banks – Public Infrastructure Development Parking Garage and Street Grid

### FORM 2004 SUBCONTRACTOR APPROVAL REQUEST Statement of Intent to Utilize Firms

**Bid or Proposal Reference Number:** \_\_\_\_\_

This form must be completed for each subcontractor, subconsultant and/or supplier, and submitted **to the Construction Manager after bid opening, but before contract award and before work begins**. Information recorded herein will be incorporated in the Contractor's contract. All subcontractors and/or suppliers must be approved prior to starting work on the project.

Contractor Name	Type of Inclusion Program (circle one): SBE      DBE	Contract Amount \$
Contractor Representative	Title	Telephone Number
Contractor Address	City/State	Zip Code
Federal Tax ID #	E-mail Address	

#### SUBCONTRACTOR

Subcontractor Name	Address	City/State/Zip Code
Subcontractor Representative	Title	Telephone Number
Federal Tax ID #	E-mail Address	

Is Subcontractor a SBE certified by the City of Cincinnati Office of Contract Compliance? YES or NO  
OR

Is Subcontractor a DBE certified through the Ohio DBE Unified Certification Program? YES or NO

ITEM NUMBER	DESCRIPTION OF WORK AND/OR SUPPLIES	SUBCONTRACTOR'S CONTRACT AMOUNT \$	% OF TOTAL CONTRACT PRICE	ESTIMATED START DATE	COMPLETION DATE
	Total Value of Work				

#### SIGNATURES

Subcontractor Representative	Date
Contractor Representative	Date
City of Cincinnati Contract Compliance Officer	Date
Hamilton County Compliance Officer	Date

## The Banks – Public Infrastructure Development Parking Garage and Street Grid Subcontractor Monthly Business Utilization Report

Contractor Name:	Approved Contract Value \$:	Trade Contract #:	Bid or Proposal #:	Type of Inclusion Program: SBE or DBE
Date Submitted:	Reporting Period: From	To	Contractor Pay Application #:	
Contact Person:	Business Type: (Circle all that apply) SBE MBE WBE NONE			
Contractor Address:	Federal Tax ID Number:			
Contractor City/State/Zip Code:			County:	
Telephone Number:	Email:			
Trade Contract Description:				

Subcontractor Reporting									
List All Subcontractors/Suppliers (Name of Subcontractor/Supplier, Name of Contact Person, Street Address, Zip, Phone #, Email)	Business Type (SBE/MBE/WBE/ NONE) Indicate All That Apply	Federal Tax ID #	Description of Work/Supplies	Original Subcontract Amount	Total Authorized Change Order Amount To Date	Total Subcontract Amount	***\$ Amount to be paid for this reporting period	Total Amount Paid to Date	Pay App #, Invoice or P.O. # (Include "F" if final payment)

\*\*\* Column should reflect information entered on form AIA Document G703 column E

The undersigned certifies that the information recorded above is correct, and that each of the representations set forth above is true. The undersigned further acknowledges that any misrepresentation hereon may result in termination of contract and/or prosecution under applicable Federal and State laws concerning false statements and false claims.

Authorized Contractor Representative: \_\_\_\_\_ Signature \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_

If Additional Space is Needed, Please Use Copies of This Form.



**THE BANKS PROJECT  
SBE/DBE/MBE/WBE SUBCONTRACTOR SUBSTITUTION REQUEST  
Bid Reference No. \_\_\_\_\_**

THIS FORM MUST BE COMPLETED AND APPROVED BY THE BANKS REVIEW COMMITTEE PRIOR TO TERMINATING A CONTRACT WITH A SMALL BUSINESS ENTERPRISE (SBE) OR DISADVANTAGED BUSINESS ENTERPRISE (DBE) AFTER THE BIDS OR PROPOSALS HAVE BEEN SUBMITTED OR CONTRACT HAS BEEN AWARDED. **CONTRACTOR MUST PROVIDE A WRITTEN EXPLANATION FOR THE SUBSTITUTION REQUEST.** INFORMATION RECORDED HEREIN WILL BE INCORPORATED IN THE AWARDEES' CONTRACT.

Company Name: \_\_\_\_\_ Project Name: \_\_\_\_\_

Address: \_\_\_\_\_ Date Submitted \_\_\_\_\_

\_\_\_\_\_ will be substituted for \_\_\_\_\_ to perform work on  
(Name of Subcontractor/Supplier) (Name of Subcontractor/Supplier)

Or supply goods for the above described contract.

\_\_\_\_\_ will enter into a formal agreement for the work upon approval by the Owner and agrees with  
(Subcontractor/Supplier)

New Subcontractor/Supplier EIN#: \_\_\_\_\_ Circle Type of Business: SBE DBE MBE WBE NONE

**Must attach a copy of the reason for SBE substitution for review prior to any contractor performing work on this portion of the project.**

ITEM NUMBER	DESCRIPTION OF WORK	SUBCONTRACT/P.O. PRICE	% OF TOTAL CONTRACT PRICE	START DATE	COMPLETION DATE
	<u>Total Value of Work</u>				

Prime/General Contractor:

Signature of Company Representative \_\_\_\_\_

Title: \_\_\_\_\_ Date: \_\_\_\_\_ EIN#: \_\_\_\_\_

Subcontractor/Supplier Replaced: I relinquish my quote for the above contract.

Signature of Company Representative \_\_\_\_\_

Title: \_\_\_\_\_ Date: \_\_\_\_\_ EIN#: \_\_\_\_\_

Request : Approved _____ Denied _____
_____ Date _____
Authorized Committee Representative Signature

## The Banks - Phase 3C Public Infrastructure Development Parking Garage And Street Grid Monthly Workforce Tracking Form

Contractor Name:				Contract Value:				Trade Contract #:				Pay Application #:			
Date Submitted:				Business Type: (Circle all that apply)	SBE	*BSBE	MBE	WBE	DBE	NONE					
Contact Person:				Reporting Dates:	From:				To:						
Address:															
City/State/Zip Code:															
Telephone Number:															
Trade Contract Description:				Circle Appropriate Box:	Contractor			Subcontractor							

### The Banks Monthly Workforce

Job Categories Trade Employees	Total Hours	Total Employee Hours Worked				Total Minority (Hours)				Caucasian (Hours)		African American (Hours)		Asian American (Hours)		Hispanic American (Hours)		Native American (Hours)	
		Total Male Hours	Total % Male	Total Female Hours	Total % Female	Minority Male Hours	Total % Minority Male	Minority Female Hours	Total % Minority Female	Caucasian Male Hours	Caucasian Female Hours	African American Male Hours	African American Female Hours	Asian American Male Hours	Asian American Female Hours	Hispanic American Male Hours	Hispanic American Female Hours	Native American Male Hours	Native American Female Hours
FOREPERSON	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EQUIPMENT OPERATORS	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MECHANICS	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCK DRIVERS	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IRONWORKERS	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CARPENTERS	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CEMENT MASONS (and CONCRETE FINISHERS)	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELECTRICIANS	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PIPEFITTERS/PLUMBERS	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAINTERS	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LABORERS-SEMI SKILLED	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LABORERS-UNSKILLED	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>TOTAL</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00%</b>	<b>0.00</b>	<b>0.00%</b>	<b>0.00</b>	<b>0.00%</b>	<b>0.00</b>	<b>0.00%</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

Authorized Contractor Representative Signature:	Title:
Date:	

**The Banks - Public Infrastructure Development Parking Garage and Street Grid**

**Instructions Form WF-01**

**WF-01 Number of Employee Hours Report**

- Contractor Name: Indicate Contractor's official name
- Contract Value \$: Indicate the approved Contract Value in dollars
- Contract #: Indicate the contract number for this contract
- Project #: Indicate the project number for this contract
- Date Submitted: Indicate the date the form is submitted
- Reporting Dates: Indicate the time period covered by this report (from date and to date)
- Contact Person: Indicate the Contractor's contact person responsible for completing this form
- Business Status: Indicate the Contractor's business status. Circle all which apply (if applicable)
- Contractor Address: Indicate the address of the contractor submitting the form
- Federal Tax ID (FTID) Number: Indicate the Federal Tax Identification or Social Security Number of the Contractor submitting the form
- City/State/Zipcode: Indicate the City, State and Zip Code of the Contractor's business location
- County: Indicate the County of the Contractor's business location
- Telephone Number: Indicate the telephone number of the Contractor's designated contact person
- Email: Indicate the email of the Contractor's designated contact person
- Trade Contract Description: Indicate the description of the Contractor's work on this project
- Job Category /Trade Employees: Indicate the job category of the trade employees working on the project
- Total Employee Hours Worked: Indicate the total number of employees hours worked for the time period covered by this report
- Total Minority/Female Hours: Indicate the total number of hours worked by minority and female employees for the period covered by this report
- Caucasian Hours: Indicate the total number of employees hours worked for Caucasian employees
- African American Hours: Indicate the total number of employees hours worked for African American employees
- Asian American Hours: Indicate the total number of employees hours worked for Asian American employees
- Hispanic American Hours: Indicate the total number of employees hours worked for Hispanic American employees
- Native American Hours: Indicate the total number of employees hours worked for Native American employees
- Male/Female: Indicate the number or % of male or female employees for the time period covered by this report
- Foreperson: Indicate the number of employees identified as Foreperson's working on this project
- Equipment Operators: Indicate the number of employees identified as Equipment Operators working on this project
- Mechanics: Indicate the number of employees identified as Mechanics working on this project
- Truck Drivers: Indicate the number of employees identified as Truck Drivers working on this project
- Ironworkers: Indicate the number of employees identified as Ironworkers working on this project
- Carpenters: Indicate the number of employees identified as Carpenters working on this project
- Cement Mason(and Concrete Finishers): Indicate the number of employees identified as Cement Masons(and Concrete Finishers) working on this project
- Electricians: Indicate the number of employees identified as Electricians working on this project
- Pipefitter/Plumber: Indicate the number of employees identified as Pipefitters/Plumbers working on this project
- Painters: Indicate the number of employees identified as Painters working on this project
- Laborer-Semi Skilled: Indicate the number of employees identified as Laborers-Semi Skilled working on this project
- Laborers -Unskilled: Indicate the number of employees identified as Laborers-Unskilled working on this project
- Grand Totals: Indicate the total of employee hours work for the identified categories for the timeframe covered by this report
- Contractor Representative Signature: Indicate the signature of the Contractor's authorized representative
- Title: Indicate the title of the Contractor's authorized representative
- Date: Indicate the date of the Contractor's authorized representative sign the form

\* Job Trade Category Definitions are attached

**FOREPERSON** - Directly supervise and coordinate activities of construction. (Sample: Construction Foreman, Construction Superintendent, Construction Supervisor, Field Supervisor, Foreman, Job Superintendent, Project Superintendent, Site Superintendent, Superintendent, Supervisor)

**EQUIPMENT OPERATORS** - Operate one or several types of power construction equipment, such as motor graders, bulldozers, scrapers, compressors, pumps, derricks, shovels, tractors, or front-end loaders to excavate, move, and grade earth, erect structures, or pour concrete or other hard surface pavement. May repair and maintain equipment in addition to other duties. (Sample: Back Hoe Operator, Engineering Equipment Operator, Equipment Operator, Heavy Equipment Operator, Loader Operator, Machine Operator, Motor Grader Operator, Operating Engineer, Operator, Track Hoe Operator.) Operate equipment used for applying concrete, asphalt, or other materials to road beds, parking lots, or airport runways and taxiways, or equipment used for tamping gravel, dirt, or other materials. Includes concrete and asphalt paving machine operators, form tampers, tamping machine operators and stone spreader operators. (Sample: Equipment Operator (EO), Paver Operator, Roller Operator, Truck Driver, Operator, Screed Operator, Heavy Equipment Operator, Maintenance Equipment Operator (MEO), Asphalt Raker, Asphalt Paver Operator.)

**MECHANICS** - Operate on one or several types of power construction equipment, such as motor graders, bulldozers, scrapers, compressors, pumps, derricks, shovels, tractors, or front-end loaders to excavate, move, and grade earth, erect structures, or pour concrete or other hard surface pavement. May repair and maintain equipment in addition to other duties. (Sample: Back Hoe Operator, Engineering Equipment Operator, Equipment Operator, Heavy Equipment Operator, Loader Operator, Machine Operator, Motor Grader Operator, Operating Engineer, Operator, Track Hoe Operator.)

**TRUCK DRIVERS** – Heavy and Tractor-Trailer Truck Drivers - Drive a tractor trailer combination or a truck with a capacity of at least 26,000 pounds Gross Vehicle Weight (GVW). May be required to unload truck. Requires commercial drivers' license. (Sample: Truck Driver, Driver, Over the Road Driver (OTR Driver), Line Haul Driver, Delivery Driver, Owner Operator, Road Driver, Semi Truck Driver, City Driver, Feeder Driver)

**IRONWORKERS** - Structural Iron and Steel Workers - Raise, place, and unite iron or steel girders, columns, and other structural members to form completed structures or structural frameworks. May erect metal storage tanks and assemble prefabricated metal buildings. (Sample: Ironworker, Iron Worker, Fitter / Welder, Steel Fabricator, Steel Worker, Structural Steel Erector, Tower Hand) Reinforcing Iron and Rebar Workers - Position and secure steel bars or mesh in concrete forms in order to reinforce concrete. Use a variety of fasteners, rod-bending machines, blowtorches and hand tools. Includes rod busters. (Sample: Ironworker, Rod Buster, Iron Worker, Steel Tier, Field Ironworker, Reinforced Ironworker, Rodman)

**CARPENTERS** - Construct, erect, install, or repair structures and fixtures made of wood, such as concrete forms; building frameworks, including partitions, joists, studding, and rafters; and wood stairways, window and door frames, and hardwood floors. May also install cabinets, siding, drywall and batt or roll insulation. Includes brattice builders who build doors or brattices (ventilation walls or partitions) in underground passageways. Construction Carpenters - Construct, erect, install, and repair structures and fixtures of wood, plywood, and wallboard, using carpenter's hand tools and power tools. (Sample: Carpenter, Lead Carpenter, Assembler, Finish Carpenter, Construction Worker, Custom Stair Builder, Installer, Production Worker, Trim Carpenter, Concrete Carpenter) Rough Carpenters - Build rough wooden structures, such as concrete forms, scaffolds, tunnel, bridge, or sewer supports, billboard signs, and temporary frame shelters, according to sketches, blueprints, or oral instructions. (Sample: Carpenter, Apprentice Carpenter, Form Carpenter, Journeyman Carpenter, Rough Carpenter, Union Carpenter, Bridge Carpenter, Bridge Repair Crew Person)

**CEMENT MASON(and Concrete Finishers)** - Smooth and finish surfaces of poured concrete, such as floors, walks, sidewalks, roads, or curbs using a variety of hand and power tools. Align forms for sidewalks, curbs, or gutters; patch voids; and use saws to cut expansion joints. (Sample: Concrete Finisher, Cement Finisher, Cement Mason, Finisher, Mason, Concrete Mason.)

**ELECTRICIANS** - Install, maintain, and repair electrical wiring, equipment, and fixtures. Ensure that work is in accordance with relevant codes. May install or service street lights, intercom systems, or electrical control systems. (Sample: Chief Electrician; Control Electrician; Electrician; Industrial Electrician; Inside Wireman; Journeyman Electrician; Journeyman Wireman; Maintenance Electrician; Mechanical Trades Specialist, Electrician; Qualified Craft Worker, Electrician (QCW, Electrician)

**PIPEFITTER/PLUMBER**- Assemble, install, alter, and repair pipelines or pipe systems that carry water, steam, air, or other liquids or gases. May install heating and cooling equipment and mechanical control systems. Includes sprinkler fitters. (Sample: Pipe Fitter, Pipefitter, Welder, Steamfitter, Sprinkler Fitter, Equipment Service Associate (ESA), Machine Repairman, Journeyman Pipefitter, Millwright, Pipe Welder.) Assemble, install, or repair pipes, fittings, or fixtures of heating, water, or drainage systems, according to specifications or plumbing codes. (Sample: Commercial Plumber; Drain Cleaner, Plumber; Drain Technician; Journeyman Plumber; Master Plumber; Plumber; Plumber Gasfitter; Plumbing and Heating Mechanic; Residential Plumber; Service Plumber)

**PAINTERS** - Paint walls, equipment, buildings, bridges, and other structural surfaces, using brushes, rollers, and spray guns. May remove old paint to prepare surface prior to painting. May mix colors or oils to obtain desired color or consistency. (Sample: Painter, Facilities Painter, Maintenance Painter, Highway Painter, Industrial Painter)

**LABORERS-SEMI SKILLED** – Having or requiring more training and skill than unskilled labor but less than skilled. Perform tasks involving physical labor at construction sites. May operate hand and power tools of all types: air hammers, earth tampers, cement mixers, small mechanical hoists, surveying and measuring equipment, and a variety of other equipment and instruments. May clean and prepare sites, dig trenches, set braces to support the sides of excavations, erect scaffolding, and clean up rubble, debris and other waste materials. May assist other craft workers. (Sample: Construction Laborer, Construction Worker, Curb and Gutter Laborer, Drain Layer, Drop Crew Laborer, Helper, Laborer, Post Framer, Skill Labor, Union Laborer)

**LABORERS UNSKILLED** – All non-classified laborers. Any miscellaneous job classifications are to be incorporated in the most appropriate category listed on the form. All employees on the project should be accounted for.

## The Banks - Phase 3C Public Infrastructure Development Parking Garage and Street Grid Number of Employees Report

Contractor Name:			Contract Value \$:		
Date Submitted:		Reporting Dates:	From:		To:
Contact Person:		Pay Application #:			
Address:		County:			
City/State/Zip Code:		Business Type:			
Telephone Number:		Federal Tax ID:			
Trade Contract Description:		Contact Email:			

Number of Employees																		
	Total Number of Employees	Caucasian Men		Women		Minority		Caucasian		African American		Asian American		Hispanic American		Native American		
		Total Number of Caucasian Men	Percentage of Total Employees	Total Number of Women	Percentage of Total Employees	Total Number of Minority Men and/or Women	Percentage of Total Employees	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	
<b>Joint Policy Questions</b>																		
Total number of employees working on this Banks contract?	0	0	0.00%	0	0.00%	0	0.00%	0	0	0	0	0	0	0	0	0	0	0
Total number of full-time employees working on Banks contract [6.6 (a) (1)]	0	0	0.00%	0	0.00%	0	0.00%	0	0	0	0	0	0	0	0	0	0	0
Total number of part-time employees working on Banks contract [6.6 (a) (1)]	0	0	0.00%	0	0.00%	0	0.00%	0	0	0	0	0	0	0	0	0	0	0
Total number of employees working on Banks contractor (who perform work directly or indirectly) who lives in the Cincinnati Middletown MSA [9.1 (a) (ii)]	0	0	0.00%	0	0.00%	0	0.00%	0	0	0	0	0	0	0	0	0	0	0
Total number of all employees working within this MSA (All employees in company)	0	0	0.00%	0	0.00%	0	0.00%	0	0	0	0	0	0	0	0	0	0	0

\*\*Note minority female workers count in both the women and minority columns but only once in the total number of employees column.

Do you expect to hire additional employees to work on The Banks Project? YES NO

If so, please provide a general description of the skills and capability requirements for each additional employee \_\_\_\_\_

Authorized Contractor Representative: \_\_\_\_\_ Signature \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_

## The Banks - Public Infrastructure Development Parking Garage and Street Grid

### Instructions Form WF-02

#### WF-02 Monthly Workforce Tracking Form

Contractor Name:	Indicate Contractor's official name
Contract Value \$:	Indicate the approved Contract Value in dollars
Contract #:	Indicate the contract number for this contract
Project #:	Indicate the project number for this contract
Date Submitted:	Indicate the date the form is submitted
Reporting Dates:	Indicate the time period covered by this report (from date and to date)
Contact Person:	Indicate the Contractor's contact person responsible for completing this form
Contractor Address:	Indicate the address of the contractor submitting the form
Federal Tax ID (FTID) Number:	Indicate the Federal Tax Identification or Social Security Number of the Contractor submitting the form
City/State/Zip code:	Indicate the City, State and Zip Code of the Contractor's business location
County:	Indicate the County of the Contractor's business location
Telephone Number:	Indicate the telephone number of the Contractor's designated contact person
Email:	Indicate the email of the Contractor's designated contact person
Total # of Employees:	Indicate the total number of participants who worked on this contract
Total # of Caucasian Men:	Indicate the total participation of Caucasian men working on this contract
Total Percent of Caucasian Men:	Indicate the total percentage of Caucasian men working on this contract
Total # of Women:	Indicate the total participation of females working on this contract
Total Percent of Women:	Indicate the total percentage of females working on this contract
Total # of Minorities:	Indicate the total participation of minorities working on this contract
Total Percent of Minorities:	Indicate the total percentage of minorities working on this contract
Caucasian Men :	Indicate the total number of Caucasian men working on this contract
Caucasian Women :	Indicate the total number of Caucasian women working on this contract
African American Men:	Indicate the total number of African American men working on this contract
African American Women:	Indicate the total number of African American women working on this contract
Asian American Men:	Indicate the total number of Asian American men working on this contract
Asian American Women:	Indicate the total number of Asian American women working on this contract
Hispanic American Men:	Indicate the total number of Hispanic American men working on this contract
Hispanic American Women:	Indicate the total number of Hispanic American women working on this contract
Native American Men:	Indicate the total number of Native American men working on this contract
Native American Women:	Indicate the total number of Native American women working on this contract
Total # Minority and/or Women:	Indicate the combined total of minorities and women working on this contract
Percentage of Total Employees:	Indicate the combined percentage of minorities and women working on this contract
Grand Totals:	Indicate the total of employee hours work for the identified categories for the timeframe covered by this report
Contractor Representative Signature:	Indicate the signature of the Contractor's authorized representative
Title:	Indicate the title of the Contractor's authorized representative
Date:	Indicate the date of the Contractor's authorized representative sign the form

\* Job Trade Category Definitions are attached



**The Banks - Public Infrastructure Development Parking Garage and Street Grid  
Monthly Subcontractor Utilization Report**

<b>Contractor Name:</b>		<b>Type of Inclusion Program:</b>		<b>SBE or DBE</b>
<b>Date Submitted:</b>		<b>Contractor Pay Application #:</b>		
<b>Contact Person:</b>		<b>Reporting Period From:</b>		<b>To:</b>
<b>Contractor Address:</b>		<b>Business Type: (Circle all that apply)</b>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Contractor City/State/Zip Code:</b>		<b>County:</b>		<b>*Banks SBE SBE MBE WBE **DBE None</b>
<b>Telephone Number:</b>		<b>Federal Tax ID:</b>		
<b>Trade Contract Description:</b>		<b>Email Address:</b>		

**Employee Information Form**

Employee Name	Minority	Female	Full or Part Time	Home Address	Last 4 digits of Social Security #	Minority Classification	County	Job Trade Category
	(Circle Y or N)	(Circle Y or N)	(Circle FT or PT)					
	Y	N	Y	N	FT	PT		
	Y	N	Y	N	FT	PT		
	Y	N	Y	N	FT	PT		
	Y	N	Y	N	FT	PT		
	Y	N	Y	N	FT	PT		
	Y	N	Y	N	FT	PT		
	Y	N	Y	N	FT	PT		
	Y	N	Y	N	FT	PT		
	Y	N	Y	N	FT	PT		
	Y	N	Y	N	FT	PT		
	Y	N	Y	N	FT	PT		
	Y	N	Y	N	FT	PT		
	Y	N	Y	N	FT	PT		
	Y	N	Y	N	FT	PT		
	Y	N	Y	N	FT	PT		
	Y	N	Y	N	FT	PT		

\*The Banks SBE - An SBE certified by the City of Cincinnati Economic Inclusion      \*\*The Banks DBE - A DBE certified through the Ohio DBE Unified Certification Program  
 \*\*\*Column should reflect the information entered on form AIA Document G703 column E

The undersigned certifies that the information recorded above is correct, and that each of the representations set forth above is true. The undersigned further acknowledges that any misrepresentation hereon may result in termination of contract and/or prosecution under applicable Federal and State laws concerning false statements and false claims.

Authorized Contractor Representative: \_\_\_\_\_ Signature \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_

**The Banks - Public Infrastructure Development Parking Garage and Street Grid  
Instructions Form WF-03**

**WF-03 Monthly Employee Report**

Contractor Name:	Indicate Contractor's official name
Contract Value \$:	Indicate the approve Contract Value in dollars
Contract #:	Indicate the contract number for this contract
Project #:	Indicate the project number for this contract
Date Submitted:	Indicate the date the form is submitted
Reporting Dates:	Indicate the time period covered by this report (from date and to date)
Contact Person:	Indicate the Contractor's contact person responsible for completing this form
Business Type:	Indicate the Contractor's business status. Circle all which apply (if applicable)
Contractor Address:	Indicate the address of the contractor submitting the form
Federal Tax ID (FTID) Number:	Indicate the Federal Tax Identification or Social Security Number of the Contractor submitting the form
City/State/Zipcode:	Indicate the City, State and Zip Code of the Contractor's business location
County:	Indicate the County of the Contractor's business location
Telephone Number:	Indicate the telephone number of the Contractor's designated contact person
Email:	Indicate the email of the Contractors designated contact person
Trade Contract Description:	Indicate the description of the Contractor's work on this project
Employee Name:	Indicate the name of employee working on this project
Minority:	Indicate whether the employee belongs to an ethnic minority group - Circle Response - Yes or No
Female:	Indicate whether the employee is female of any ethnic group - Circle Response - Yes or No
Full/Part Time:	Indicate whether the employee is working in a full time or part time capacity -Circle Response - FT or PT
Home Address:	Indicate the home address of the employee
Last 4 Digits of Employee Social Security #:	Indicate the last 4 social security numbers of the employee
Minority Classification:	Indicate the minority classification of the employee (if applicable)
County:	Indicate the county of the employee
Job Category Trade Employees:	Indicate the job category of the trade employees working on the project
Contractor Representative Signature:	Indicate the signature of the Contractor's authorized representative
Title:	Indicate the title of the Contractor's authorized representative
Date:	Indicate the date of the Contractor's authorized representative sign the form

\*Job Trade Category Definitions are attached

**Consolidated Metropolitan Statistical Area (CMSA) OH-KY-IN**

40006	40011	40045	40055	40075	40355	40359	40363	40379	41001
41003	41005	41005	41006	41007	41008	41010	41011	41012	41014
41017	41018	41019	41021	41025	41030	41033	41034	41035	41040
41043	41044	41045	41046	41051	41052	41053	41054	41055	41056
41062	41063	41071	41072	41073	41074	41075	41076	41083	41085
41086	41092	41094	41095	41096	41097	41098	41099	45001	45002
45003	45004	45005	45011	45012	45013	45014	45015	45018	45030
45032	45033	45034	45036	45039	45040	45041	45042	45044	45050
45051	45052	45053	45054	45055	45056	45061	45062	45063	45064
45065	45066	45067	45068	45069	45071	45101	45102	45103	45105
45106	45107	45111	45112	45113	45114	45115	45118	45119	45120
45121	45122	45123	45130	45131	45132	45133	45135	45140	45142
45144	45146	45147	45148	45150	45152	45153	45154	45155	45156
45157	45158	45159	45160	45162	45164	45166	45167	45168	45169
45171	45172	45174	45176	45177	45201	45202	45203	45204	45205
45206	45207	45208	45209	45211	45212	45213	45214	45215	45216
45217	45218	45219	45220	45221	45222	45223	45224	45225	45226
45227	45229	45230	45231	45232	45233	45234	45235	45236	45237
45238	45239	45239	45240	45241	45242	45243	45244	45245	45246
45247	45248	45249	45250	45251	45252	45253	45254	45255	45258
45262	45263	45264	45267	45268	45269	45270	45271	45273	45274
45275	45277	45280	45296	45298	45299	45335	45458	45612	45616
45618	45650	45657	45660	45671	45679	45684	45693	45697	45999
47001	47003	47006	47010	47011	47012	47016	47018	47019	47020
47021	47023	47024	47030	47031	47033	47034	47035	47036	47037
47038	47039	47040	47041	47042	47043	47060	47224	47250	47325
47331	47353	47357							

SECTION 008270  
Responsible Bidder Requirements

PART I - GENERAL

Contractors shall be required to satisfy all of the following pre-award responsibilities and agree to all of the following provisions which will be incorporated in the contracts for construction projects within the Banks Development. The Board of County Commissioners of Hamilton County, Ohio (the “County”) believe that these requirements are reasonably related to the successful performance of the Banks Development projects. These requirements shall also be set forth and integrated with the Bid Package Conditions.

1. Each bidder shall certify that it will require all contractors who bid or perform any work pursuant to the contract on which the bidder is bidding to satisfy all of these Responsible Bidder Requirements.
2. Each bidder shall certify that it will pay prevailing wages, in amounts determined according to Ohio’s Prevailing Wage Law, R.C. 4115.03 through 4115.16, and O.A.C. 4101:9-4-01 through 4101:9-4-31, on all construction projects that are part of the Banks Development, except as otherwise provided herein. Notwithstanding the foregoing provision, the payment of prevailing wages shall not be required with respect to leasehold and/or tenant improvements and/or the fit out of interior spaces of the office, retail and condominium elements of the Banks Project.
3. As a condition precedent to the award of a contract or subcontract of Two Hundred and Fifty Thousand Dollars (\$250,000) or more, the Public Parties may require the lowest bidder to engage in a review of the constructability and scope of the bid to verify that the contractor included all required work.
4. If the bid of the lowest bidder is more than twenty percent (20%) below the bid of the next lowest bidder, the Public Parties may request that the lowest bidder identify three (3) construction projects that it has successfully completed within the five (5) years before the submission of the bid. This information may be provided in the post-bid scope review to the Public Parties.
5. Each bidder shall certify that it will employ supervisory personnel on the project that (a) are qualified to perform in such supervisory capacity and (b) have any license or licenses required by applicable law to perform in such capacity.

6. Each bidder shall certify that it is not currently debarred from performing state or federal construction contracts (after all appeals), because of a violation of Fair Labor Standards Act and/or any state or federal prevailing wage law. Each bidder shall provide a list of every occasion on which it has been debarred from performing local, state or federal construction contracts (after all appeals), because of a violation of the Fair Labor Standards Act and/or any state or federal prevailing wage law, during the last ten years.
7. Each bidder shall certify that it, as well as each subcontractor it will utilize on the Project has implemented an OSHA-compliant Safety Program which includes: a) with respect to all supervisors, completion of OSHA's thirty (30) hour safety course; b) with respect to all field employees, completion of OSHA's ten (10) hour safety program. Each bidder shall provide evidence of implementation of an OSHA compliant safety program as set forth herein.
8. Each bidder shall certify that it has implemented a substance-abuse policy and that it is in compliance with Ohio's Drug Free Workplace Requirements; bidders will provide evidence of implementation of such policies upon written request of the Public Parties.
9. Each bidder shall certify that it has all licenses required by applicable state law and regulation to perform work required herein.
10. Each bidder shall list any professional license or licenses that have been revoked by Ohio or revoked by any other state within five (5) years prior to the date of the contractor's bid.
11. Each bidder shall certify that it has no final judgments against it which are not secured by payment bond or other surety at the time of award which are equal to or exceed fifty percent (50%) of the contractor's net work.
12. Each bidder shall certify that it has complied with applicable unemployment and workers compensation laws for at least two (2) years preceding the date of bid submittal.
13. Each bidder shall certify that with respect to each a prime trade contract (e.g., plumbing, HVAC, electrical and fire safety) it will not subcontract more than seventy-five percent (75%) of the bid amount for that prime trade contract. A bidder may apply for a waiver of the foregoing requirement by the Public Parties, which waiver shall be subject to the review and approval of the Public Parties.
14. Each bidder shall certify that it does not have an Experience Modification Rating of more than 1.3 (a penalty rated employer) with respect to the Ohio Bureau of Workers' Compensation risk assessment rating.

15. Each bidder shall certify that it will have in place a meaningful Health Care Medical Plan, and provide, as part of its responsibility review, evidence of a Health Care Medical Plan list of eligible employees and the bidder's share of the cost for those employees working on the Banks' Project. Notwithstanding the foregoing, a bidder with gross revenues of two million dollars (\$2.0M) or less in any of the preceding three years shall be exempted from providing a Health Care Medical Plan as set forth herein. However, any such bidder exempted from this requirement shall certify that it will comply with the applicable prevailing wage requirements with respect to medical insurance.
16. Each bidder shall certify that it will have a meaningful pension or retirement program for its employees and provide, as part of its responsibility review, evidence that it contributes, on a regular basis to an employee pension or retirement program for its field employees and the list of employees for the employees with such coverage. Notwithstanding the foregoing, a bidder with gross revenues of two million dollars (\$2.0M) or less in any of the preceding three years shall be exempted from providing a pension or retirement program as set forth herein. However, a bidder exempted from this requirement shall certify that it will comply with the applicable prevailing wage requirements with respect to a pension or retirement program.
17. Each bidder shall certify that it shall employ field employees on this project that will meet at least one of the following criteria:
  - a. Completion of a state or federally approved apprenticeship program in the skilled trade craft such employee is performing a journeyman; or
  - b. Worked as a skilled trade person for at least three (3) years in the craft; or
  - c. Currently enrolled in a state or federally approved apprenticeship program for the craft; or
  - d. Completed the Banks Employee Readiness Program.

A bidder may request a waiver from the Public Parties of the foregoing requirements with respect to a field employee or a particular position. In requesting such waiver, a bidder shall be required to provide documentation of the skills and experience of such employee or the applicable position which form the basis for such request. Any waiver or the foregoing requirements shall be subject to the review and approval of the Public Parties.
18. Each bidder shall certify that it is not debarred from bidding on the construction project contract in question.
19. A bidder's falsification of any of the certifications herein or failure to comply with the requirements set forth herein, shall be the basis for a default termination of the contract.

## PART 1 PRODUCTS

The Banks – Lot 28 BP #2 –  
Park & Garage December 17, 2021  
THP No. 98090.40

Not used.

## PART 2 EXECUTION

Not used.

END OF SECTION

SECTION 009000  
CONTRACT CONSTRUCTION MANAGEMENT FORMS

PART 1 GENERAL

1.1 SUMMARY

- A. The following documents, referred to in the General Conditions, are available from the Construction Manager upon request:
1. Change Order Form (AIA G701 - 2001 – as amended & modified)
  2. Application and Certificate for Payment (AIA G702 - 1992 – as amended & modified)
  3. Continuation Sheet (AIA G703-1992 – as amended & modified)
  4. Certificate of Substantial Completion (AIA G704 - 2000 – as amended & modified)
  5. Contractor's Affidavit of Payment of Debts and Claims (AIA G706 - 1994 – as amended & modified)
  6. Contractor's Affidavit of Release of Liens (AIA G706A - 1994 – as amended & modified)
  7. Consent of Surety to Final Payment (AIA G707 – 1994 – as amended & modified)
  8. Contractor's Affidavit
  9. Construction Change Directive Form (AIA G714/CMA – 1992 as amended & modified)

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION





# AIA Document G714™ – 2017

## Construction Change Directive

**PROJECT:** *(name and address)*  
The Banks, Phase 3C Lot 28 Banks  
Subdivision  
Garage and Park, Bid Package # 2

**CONTRACT INFORMATION:**  
Contract For: General Construction  
Date:

**CCD INFORMATION:**  
Directive Number: 001  
Date:

**OWNER:** *(name and address)*  
Board of County Commissioners of  
Hamilton County, Ohio  
138 E. Court Street, Room 603  
Cincinnati, Ohio 45202

**ARCHITECT:** *(name and address)*  
TIIP Limited, Inc.  
100 E. 8th Street, 3rd Floor  
Cincinnati, Ohio 45202

**CONTRACTOR:** *(name and address)*

The Contractor is hereby directed to make the following change(s) in this Contract:  
*(Insert a detailed description of the change and, if applicable, attach or reference specific exhibits.)*

### PROPOSED ADJUSTMENTS

- The proposed basis of adjustment to the Contract Sum or Guaranteed Maximum Price is:
  - Lump Sum decrease of \$0.00
  - Unit Price of \$        per
  - Cost, as defined below, plus the following fee:  
*(Insert a definition of, or method for determining, cost)*
  - As follows:

- The Contract Time is proposed to remain unchanged. The proposed adjustment, if any, is (0 days).

*NOTE: The Owner, Architect and Contractor should execute a Change Order to supersede this Construction Change Directive to the extent they agree upon adjustments to the Contract Sum, Contract Time, or Guaranteed Maximum price for the change(s) described herein.*

When signed by the Owner and Architect and received by the Contractor, this document becomes effective IMMEDIATELY as a Construction Change Directive (CCD), and the Contractor shall proceed with the change(s) described above.

Contractor signature indicates agreement with the proposed adjustments in Contract Sum and Contract Time set forth in this CCD.

\_\_\_\_\_  
ARCHITECT *(Firm name)*

\_\_\_\_\_  
OWNER *(Firm name)*

\_\_\_\_\_  
CONTRACTOR *(Firm name)*

\_\_\_\_\_  
SIGNATURE

\_\_\_\_\_  
SIGNATURE

\_\_\_\_\_  
SIGNATURE

\_\_\_\_\_  
PRINTED NAME AND TITLE

\_\_\_\_\_  
PRINTED NAME AND TITLE

\_\_\_\_\_  
PRINTED NAME AND TITLE

\_\_\_\_\_  
DATE

\_\_\_\_\_  
DATE

\_\_\_\_\_  
DATE

SECTION 011100  
SUMMARY OF WORK

PART 1 GENERAL

**1.01 GENERAL PROVISIONS OF BID PACKAGE #2 TRADE CONTRACTS**

- A.** The following summary is a description of work for all Contract Descriptions for THE BANKS – PHASE 3C. Work related to the Project is as indicated on the Drawings and Specifications as prepared by THP Limited, Inc. This section describes and assigns work to each Contract as designated by the Construction Manager. Each Contractor shall cooperate and coordinate with all other Contractors for proper and expedient completion of the work in this Project. Each Contract Description identifies the major portions of Scope of Work to be performed by the Bidder in specific Contract Descriptions. This summary should in no way be construed as being all-inclusive. It is issued as a guide to aid in the assignment of work. Refer to the Drawings and Specifications for a detailed accounting of any work not explicitly specified or noted. Each Trade Contract Description lists specification sections included, in whole or in part, in that Contract Description. All work activities not explicitly specified or noted, but required to complete the work included in a Contract Description are a part of the work scope.

PART 2 TRADE CONTRACT DESCRIPTIONS

**2.1 SECTION INCLUDES:**

1. List of Trade Contracts
2. General Provisions of Bid Package #2 Trade Contracts
3. Contract Descriptions

**2.2 LIST OF TRADE CONTRACTS**

1. List of Bid Package #2 Trade Contracts:

TC-03	Concrete Structure and Site Concrete
TC-04	Park Finishes

2. General Provisions of Bid Package #2 Trade Contracts
  - A. Each Contractor shall be responsible for the proper protection of adjacent structures and public rights of way.
  - B. Prospective bidders are reminded that all of the contracts described herein contain specific Joint Policy for Small Business Enterprise, Economic Inclusion and Workforce Development for the Banks Project requirements.
  - C. Each Trade Contractor shall comply with the Responsible Bidder Requirements specified in section 001000 and herein.
  - D. All work is to comply with the rules and regulations of governing authorities having jurisdiction. Work shall be performed by skilled tradesmen having experience in performing the work.
  - E. Storage of all materials is limited and must be approved by the Construction Manager. Offsite storage of material may be required. All costs associated with material delivery in small quantities, relocation of materials that impede work progress, and off site material storage must be included in the bid.
  - F. A 48-HOUR NOTICE MUST BE GIVEN FOR DELIVERIES. IF NOTICE WAS NOT GIVEN DELIVERIES MAY BE TURNED AWAY. ALL COST ASSOCIATED WITH THIS ACTION WILL BE THE RESPONSIBILITY OF THE CONTRACTOR. ALL DELIVERIES MUST BE COORDINATED & APPROVED BY THE CONSTRUCTION MANAGER. NO PARKING BY EMPLOYEES OR DELIVERY VEHICLES IS PERMITTED ON SITE. STORAGE, TOOL OR OFFICE TRAILERS WILL NOT BE PERMITTED ON SITE WITHOUT THE PRIOR APPROVAL OF, AND IN COORDINATION WITH, THE CONSTRUCTION MANAGER.
  - G. Each Contractor is responsible to review the site and be familiar with all existing conditions within and around the building including local conditions and requirements. The impact of the site conditions on the cost of performing the work shall be included in the bid. Contractors shall notify the Construction Manager in writing of any discrepancies or conditions detrimental to proper performance of the Work.
  - I. Each Contractor to provide to all other trades information and materials, shop drawings, diagrams, templates, and embedments necessary for the coordination of the Work. It is each Contractor's responsibility to field verify and coordinate all interface with other trades.

- J. Where new work connects with existing, do all necessary cutting and patching required to make a satisfactory connection with the work to be performed under the Contract Documents so as to leave the entire work in a finished and workmanlike condition. This requirement shall include all required work where new items connect, fit, or otherwise interface with existing surfaces. Provide all labor and materials to this end, whether or not shown or specified. Verify and match existing conditions. This shall include full block replacement to nearest construction expansion joint of any concrete pavement removed or damaged.
- K. Each Contractor shall at all times maintain a clean and safe passage to all areas of the site, and for the public around the site.
- L. Each Contractor shall field verify all dimensions, materials and conditions of the existing site.
- M. Initial benchmarks and control lines will be provided by the Construction Manager. Each Contractor is responsible for all detailed layout and grade from the indicated benchmark and control points.
- N. Each Contractor is to coordinate all work with the work of other trades for proper function and sequence to avoid construction delays or additional cost.
- O. Each Contractor is responsible for daily cleanup and disposal of all debris associated with its work activities. This shall include removal of debris from public property and/or roadways caused by work on site or carried outside of the site by vehicles employed by the Contractor. Street cleaning of this debris is expected by each Contractor, as necessary. Debris not removed by the Contractors will be discarded at the delinquent Contractor's expense. All areas of work are to be broom cleaned at the end of each work day. In addition to daily cleanup each Trade Contractor to provide 1 person for every 4 Trade Contractor employee and their subs to a once a week jobsite general cleanup activity. Each Trade Contractor to provide its worker with all the necessary tools and equipment to do cleanup. There will be no tools or equipment provided by the Construction Management organization. Coordination of the weekly cleanup will be the responsibility of the General Trades Contractor. Designated eating areas will be identified by the Construction Manager. These areas will be the only place for workers to eat and drink. Workers found violating this policy maybe directed to leave the jobsite.
- P. Each Contractor shall be restricted to working hours of 7:00am to 4:00pm unless alternate arrangements are approved by the Construction Manager. This does not alleviate the Trade Contractor's responsibility to work overtime as required to maintain the schedule.

- Q. Signs of any type are prohibited, except as specifically assigned by the Contract Documents.
- R. Each Contractor shall be responsible for the protection of its own materials, tools, equipment, and finish work until substantial completion is granted. Damage to or theft of any materials, tools or equipment prior to substantial completion will be repaired or replaced at the Contractor's expense.
- S. Each Contractor shall provide all temporary heat, utilities and protection required for the completion of all work as scheduled, except where specifically provided by others in the Contract Documents.
- T. Each Contractor shall have their superintendent attend all weekly Trade Contractor Meetings (time & location to be scheduled by Construction Manager).
- U. Each Contractor shall secure all permits required by governing authorities for the completion of its own work scope. This includes all Plumbing, HVAC, Traffic or permit that are issued by the City's Department of Transportation and Engineering, street barricade and other special permits. No Permits will be secured by the Construction Manager.
- V. Each Contractor shall submit daily reports and the weekly work plan twenty-four (24) hours before the weekly Trade Contractor meetings. Failure to submit these items each week for the prior week's work will result in rejection of this Contractor's pay request.
- W. Testing shall be performed in accordance with the Contract Documents. Where Owner and Contractor testing are specified, the Contractor shall provide complete testing. The Owner may provide additional testing at its discretion.
- X. Each Contractor is responsible for the complete review of, and coordination with, the Trade Contract Descriptions for other Contractors. Where overlap occurs, include the cost of such work in your bid, and the Construction Manager will decide which Contractor will perform this work. Appropriate credit will be deducted from the other Contractor's Contract.
- Y. Each Contractor must provide a full-time superintendent on site throughout the duration of their work on site. This superintendent shall be authorized to make all decisions relative to the work on site, and shall be the primary contact for all correspondence. Part time or token representatives who are not so authorized will not be permitted. Failure to comply with this requirement will result in rejection of this Contractor's pay request. Any change of superintendent shall be pre-approved by the Construction Manager.

- Z. Time is of essence on this project. Each Trade Contractor shall phase, construct and complete their work within the requirements included in Specification Section 013216 and the subsequent development of and updating of the Banks Phase 3C – Bid Package 2 Schedule by the Construction Manager.
- AA. Each Contractor shall complete the Resource Utilization and Inclusion Tracking Forms that are included in the Specifications. The forms shall be completed on a monthly basis and submitted with the monthly pay request. Completed resource utilization forms must be submitted with the pay request in order for the pay request to be processed.
- AB. Each Contractor will be required to attend several phasing meetings pertaining to Lean Construction. Contractor shall have the appropriate personnel (more than one) attend the reverse phase scheduling meeting. Each Trade Contractor shall participate in the implementation of the Lean Construction process throughout the duration of the Project.
- AC. Safety hard hats, safety eye protection, High Vis, and Gloves shall be worn by all employees on this job site. This includes all of this Contractor's Subcontractors and Suppliers.
- AD. This Contractor shall comply with all requirements of the Williams-Stiger Occupational Safety and Health Act of 1970 and subsequent amendments thereto. This Contractor shall furnish to the Construction Manager a copy of its Safety Program, including a copy of its Hazardous Material Program, prior to the commencement of work on site. No payment will be made until these documents are received.
- AE. Any barricade or safety device removed by this Contractor's employees shall be immediately re-erected by Contractor. Upon failure to do so, the Construction Manager may direct the re-erection of it and the cost will be paid by the Contractor.
- AF. All shop drawings and submittals must be submitted within one week from Notice to proceed, unless otherwise specified. No pay request will be processed until all required submittals have been received.
- AG. Each Contractor shall provide personnel for traffic control and traffic coordination during all deliveries of material and equipment required in their scope of work. The Contractor shall coordinate all such activities with the Construction Manager and the City of Cincinnati, Department of Transportation and Engineering.
- AH. All portions of existing site and all utilities not part of the Work which are damaged, moved or altered in any way during construction shall be replaced or repaired to the County's satisfaction at the Contractors expense.

- AI. Each Trade Contractor shall include in their Schedule of Values (G702) a line item for their Small Business Enterprise spending. Each SBE should be shown separately.
- AJ. Each Contractor shall attend the pre-award conference. This conference will be scheduled by the Construction Manager. All trade contractors shall be notified in writing of the date the conference will be held.
- AK. Each Contractor shall update their record / as-built drawings on a monthly basis, the updated as-built shall be submitted to the Construction Manager by the 20th of the month. If the Contractors as-builts are not updated and submitted, the Contractors pay request for that month will not be processed.
- AL. Each Trade Contractor shall make good faith efforts to meet and/or exceed the project workforce participation goals as outlined in Section 008260 page 15.
- AN. To facilitate the punch list process, each Trade Contractor must complete its punch list items within 3 business days (excluding weekends) of receipt (via fax, email, or distribution to the site leader) of each punch list item. Failure to complete the punch list will result in a back charge for the total cost, to have others complete the work as designated by the Construction Manager.
- AO. Trade Contractor to identify recycle and waste management opportunities when assessing their scope of work. These items will be reviewed at the pre-award meeting.
- AP. The flow of traffic on City streets and public walkways must be maintained at all times. It shall be this Trade Contractor's responsibility to obtain all permits and provide all labor and material that are necessary for street and sidewalk lane closures. All work involved that impacts existing streets and/or sidewalks or impedes public access in any way shall be coordinated through the Construction Manager **prior to the date of the work.**

AQ. The Construction Manager will be utilizing a web-based information management system to facilitate communications among project partners including but not limited to Owners, Architects, Engineers, Construction Manager, and Trade Contractors. The system being utilized is Autodesk document management software. All trade contractors must have an e-mail address and access to the internet. Autodesk will be utilized for the following functions:

- Project Contact Directory- this will be maintained by the Construction Manager
- Requests for Information Management
- Meeting Minutes Distribution
- Posting of Official Notices and/or Communications
- Submittal Management
- Contract Document Management
  - Contract Drawings in PDF
  - Site Photographs
- Punchlist Management
- Field Work Order Management

The Construction Manager will issue user names and passwords to each Trade Contractor and will provide training and technical assistants to the user groups. Use of this system is mandatory. There will be no costs passed on to the users for access to the system or license fees. Users will be responsible for the costs associated with access to the internet.

AR. All Contractors shall use platform type ladders where ladders are necessary on this project. Other ladder types will not be allowed on site.



3. **A. CONTRACT DESCRIPTION TC-03: Concrete Garage Structure**  
4.

The Scope of Work in this Contract TC-03 includes all labor, material, tools, equipment, services, and supervision necessary to complete all work specified herein, in accordance with the Contract Documents, as described below to a complete functional safe and operating state.

Included is the Work as indicated in this Contract Description TC-03 the Drawings, the General Conditions and Division 1 of the General Requirements. This scope of work includes, but is not necessarily limited to, the following Specification Sections:

Bidding Requirements, Contract Forms and Conditions of the Contract

The following items represent specific inclusions in this Contract TC-03: Concrete Garage Structure. They are provided as a guide to aid in the assignment of work and in no way should be construed as being all-inclusive.

This Contract shall include:

1. All work in this trade category is to be performed in accordance with the Specifications and with the recommendations of the Geotechnical Exploration report included in the documents as appendix B.
2. General Building Permit is provided by the Construction Manager. Any other required permits or licenses are the responsibility of this Trade Contractor for this work scope.
3. Contractor performing work must have all licenses and certifications as required by the specifications and/or authorities having jurisdiction.
4. Geotechnical monitoring and testing services are provided by others. This Trade Contractor shall coordinate and assist in the inspection and testing of all work on a daily basis.
5. Prior TC-01 Contractor Provided removal of the existing asphalt parking surface and gravel, Existing surface to be removed as work progresses to maintain a solid working surface. Review existing site condition prior to bid date.
6. Provide Mass Fill of structural fill per the documents. Fill material to be reviewed and approved by third party testing agency. Borrow site to be pre-approved.
7. Provide final grading of structural fill.
8. Protection of erosion during structural fill to be included to prevent soils from leaving site.
9. Street, sidewalk, and podium cleaning to be included for mud, debris, etc leaving the site caused by this contractor.

10. Provide locations for settling plates. Settling plates to be monitored as required by Third party testing agency. Settling to occur prior to site concrete work.
11. This Contractor shall include all excavation and backfill as needed for foundations (including grade beams) from the existing conditions. All borrow material or engineered fill shall meet the requirements of the specifications.
12. Demo of Sidewalks, curb cut, and other concrete located in the Right of Way to be by prior TC-02. Put back to be by TC-02 in Right Of Way. Demo of Concrete not in the ROW is by TC-01.
13. This contractor is responsible for the Concrete structure complete including Podium, grade beams located outside of the SOG footprint, battered walls, park site walls and granite back up walls, light pole bases, and other foundations within the park shall be included as part of this trade contract. Reinforcing steel shall be provided as part of this work scope. Pile Caps, Grade beams under the SOG, Columns, Basement Wall, and SOG were included in TC-01 Scope of Work.
14. Include sub surface concrete walk ways located under the granite pavers.
15. All concrete to receive waterproofing to include rubbing out and patching of pin holes, voids, etc as per waterproofing manufacturer requirements.
16. This contractor is responsible for providing all sealants, sealers and admixtures as required.
17. Cold Weather conditions to be accounted for as required.
18. Coordination with miscellaneous metals contractor shall be included for anchor bolts, embedded plates and other items imbedded in the concrete work. This contractor shall receive, inventory and install miscellaneous metal anchors, plates and sleeves as required for a complete, correct installation. Material shall be furnished and delivered by others. This contractor shall receive and set in place items which are to be cast into concrete structure. Layout shall be coordinated with the future miscellaneous metals contractor. This contractor shall be responsible for remedial work required if the anchors or plates are moved during concrete placement.
19. Provide and maintain temporary protection and plates to maintain safe access across site related to this work. All holes, trenches, etc are to be protected. A ramp (Earthen or built) is to be provided for access into all excavations
20. This contractor shall provide temporary safety railing around protective floor cover over openings in the concrete slabs as required to meet OSHA standards. This includes covers over the sleeve openings. Temporary Podium Slab edges railing to be included.

21. Slab tolerance shall be monitored by this contractor during and after each concrete placement. As-built information for each horizontal slab placement shall be provided the day after placement.
22. Spoil removal for this work scope is the responsibility of this Trade Contractor. All materials are to be removed from site and legally disposed as required for this scope of work.
23. Temporary water and temporary power required for this work scope shall be the responsibility of this Trade Contractor. Temporary power stations to be installed by TC-04.
24. Dewatering and/or mucking as required to complete this work scope shall be the responsibility of this Trade Contractor. All open holes/excavations shall be kept clean and free from water as required by the contract documents. This Trade Contractor shall provide barricades or other measures to protect the public and other workers on site from a fall hazard into excavations/holes.
25. This Trade Contractor shall include all reinforcing steel as required for a complete, correct installation. All deliveries, hoisting and rigging into place are to be provided by this Trade Contractor as required.
26. This Trade Contractor shall be responsible for dust control as required for this work scope.
27. Traffic control for this work scope is the responsibility of this Trade Contractor.
28. Only the washing of the chute will be permitted on site. Wash out of the concrete truck to be done at the batch plant. This contractor is responsible for clean-up of all dunnage from deliveries and hauling off-site within a timely manner.
29. Provide all layout and engineering from control points and benchmarks provided on survey drawings.
30. Coordination between TC-03 and TC-04 to be included. Granite shops are in progress and the structure will need to align with the Granite Shops. Asbuilts to be provided for Granite installers including slab edges, walls, etc to assure proper granite fitment.
31. This Trade Contractor shall employ a utilities location service to locate all utilities for location and elevation prior to commencement of any work on Site. Underground utilities that are to remain shall be permanently located, maintained and protected with signage and barricades until completion of Contract Time.
32. This Trade Contractor shall include any necessary permits required for temporary road shutdowns if required to perform this work scope.
33. All hoisting associated with this Trade Contract is to be included in this work scope.
34. Reference Section 017419 for removal of all debris.
35. The temporary plywood protection shown at the existing garage will be provided and maintained by others.
36. This contractor to include demo of the existing railings. This includes

- the concrete curb located on the existing stairs at the 515 level. Railings to be turned over to the Construction Manager in a protected manner. Railings are to be maintained until a safe condition is met.
37. This Contractor shall account for the potential of Class C soils when performing this scope of work. This shall include the forming of pile caps as required. OSHA/Messer safety standards shall be maintained when constructing gradebeams in regards to the sloping of excavations and employee entry.
  38. Include allowance of 2,000lbs of rebar including labor to be installed at the CM direction.
  39. This Trade Contractor shall include a \$ 50,000 allowance to account for potential design changes initiated by the Owner.

**B. CONTRACT DESCRIPTION TC-04: Park Finishes**

The Scope of Work in this Contract TC-04 includes all labor, material, tools, equipment, services, and supervision necessary to complete all work specified herein, in accordance with the Contract Documents, as described below to a complete functional safe and operating state.

Included is the Work as indicated in this Contract Description TC-04 the Drawings, the General Conditions and Division 1 of the General Requirements. This scope of work includes, but is not necessarily limited to, the following Specification Sections:

Bidding Requirements, Contract Forms and Conditions of the Contract	
General Requirements	
Section 024100	Demolition
Section 321216	Asphalt Paving
Section 321723	Pavement Markings

The following items represent specific inclusions in this Contract TC-04: Park Finishes. They are provided as a guide to aid in the assignment of work and in no way should be construed as being all-inclusive.

This Contract shall include:

1. All work associated with Lot 28 parks scope. Park scope is typically defined as any work above structural concrete deck
2. General Building Permit is provided by the Construction Manager. Any other required permits or licenses are the responsibility of this Trade Contractor for this work scope.
3. Geotechnical monitoring and testing services are provided by others. This Trade Contractor shall coordinate and assist in the inspection and testing of all work on a daily basis.

4. Temporary Toilets, dumpsters, and site fencing to be by TC-02. Temporary fall fencing, plates, covers, etc to be included as required for this scope of work.
5. Concrete Topping slabs and sub structure concrete to be by TC-03
6. The Concrete structural podium and site concrete by TC-03.
7. Waterproofing and expansion joints to be included. Subsurface and surface expansion materials to be included.
8. Contractor to furnish and install a complete waterproofing system per the documents. Waterproofing to be installed as structural decks are completed. Coordination with TC-03 scope to be included. Drainage board and root barrier to be installed with any means required to prevent movement until soils, gravel, topping slabs, granite, etc are placed on top.
9. Waterproofing to be inspected by a third party provided by the owner.
10. Waterproofing penetrations to be included. Additional detailing as required for railings, bollards, structures, etc.
11. Repair of existing waterproofing to be included as required per the documents.
12. Site signage to be included.
13. This Contractor shall include all excavation and backfill as needed. All borrow material or engineered fill shall meet the requirements of the specifications.
14. This contractor is responsible for providing all sealants, sealers and admixtures as required for the Parks scope of work.
15. Provide all preparation, priming and painting on ceilings, metals, doors/frames, conduits and masonry as shown in the plans. Include any Masonry water repellent.
16. Protect all surfaces not to be painted - remove over-spray from these items as required.
17. Provide a second trip to each area to touch-up and paint MEP items not previously installed. Include homerun conduits to be installed within existing garages.
18. Furnish and install all permanent fire extinguishers and cabinets.
19. A thorough cleaning with the use of a fire hose having the necessary pressure is to be provided for as a form of final cleaning and acceptance, also required prior to striping.
20. Provide all parking stall, striping, blocks including directional arrows and HC markings as shown on the plans.
21. Stripe garage per plans.
22. Include all required bollards including stainless steel. Removal of existing by TC-02. Reinstallation to be included by TC-04.
23. Provide and install all required sleeves for scope of work associated with this Trade Contract.
24. This contractor is to include coordination with all trades for sleeves. This contract to include installation of all sleeves required for TC-04. Include coring for all locations missed. This contractor to be responsible for reinforcing details located at sleeved opening per

- the documents. Each Trade Contract is to be responsible for their own sleeve installation. This contractor is responsible for maintaining sleeve locations and orientation before and during concrete pours, granite installation, etc.
25. This Contractor shall provide a complete electrical scope as shown within the documents for all park level and garage level including but not limited to conduit, wire, light fixtures, light poles, lighting controls, panels, and all associated shut downs.
  26. This Contractor shall furnish and install power to all equipment/fixtures. Hook up all equipment/fixtures at the machine and/or disconnect panel is to be provided for. Provide all fuses and disconnects required – per code to make equipment operational.
  27. Furnish and install all conduit and wiring for lighting
  28. Furnish and install concrete curbs and pads for equipment as needed and/or as required by code.
  29. This Trade Contractor shall include all off hours work required for the specific tie-ins and or shutdowns for this Bid Package.
  30. This Trade Contractor will be responsible for fire stopping and sealing of penetrations through fire rated and non-rated construction. This Trade Contractor to submit UL drawings on how they plan to handle each different type of penetration through rated partitions. These details are to be strictly adhered to in the field and each penetration is to be labeled with the UL number.
  31. Trade Contractors responsibility to coordinate all work and provide all conduit, anchor bolts etc. as required for light pole to function as designed. Pole bases by TC-04
  32. Contractor to provide and install light poles located in Lot 28.
  33. Provide CO Monitoring system extension per the drawings.
  34. Provide a pull string for all empty conduits that are to be installed.
  35. Contractor to provide lighting submittals, schedule, and delivery dates within 2 week of contract.
  36. This contractor shall provide a complete plumbing scope installation. To include but not limited to domestic/irrigation water line from Lot 27, booster pumps, back flows, irrigation connection, risers, under drains, slot drains etc. Drain bodies shown cast into structural podium/tree pits to be included. Coordination and installation with TC-03 to be included. TC-01 will provide the underground scope of work with a stub up for connection. Final connection or adjustment by TC-04.
  37. Include complete Fire suppression extension from Lot 27 dry system.
  38. Provide and maintain temporary protection and plates to maintain safe access across site. Protection of work as required to assure quality.
  39. Spoil/trash removal for this work scope is the responsibility of this Trade Contractor. All materials are to be removed from site and legally disposed. Dumpsters provided by TC-02.

40. Temporary power shall be the responsibility of this Trade Contractor. Provide temporary power stations at ground and park level. Include two power post containing 8 receptacles with enough power to adequately supply them.
41. Railing scope to be by others. Include coordination between waterproofing, granite contractor and railing installation.
42. **Provide Stone scope of work minus horizontal unit pavers.** Horizontal unit pavers to be provided by and installed by others. Pavers and **all Stone Shop drawings** to be completed by previously TC-10 contractor. This Contractor to include coordination with the unit paving contractor.
43. Furnish and install complete granite/Stone scope per the construction documents. To include but not limited to: granite coping, stair treads, seat walls, cladding, decorative features, etc.
44. Granite/Stone to match existing Smale Park standard color, texture, and quarry. Samples to be provided and approved prior to material release.
45. Granite installation to be sequenced with waterproofing and railing installation..
46. Granite pavers thickness as shown on the drawings.
47. Mortar, setting beds, polymeric sand, and other installation materials to be included.
48. Material and installation to be delivered and installed in phases/sequences as the project progresses.
49. On site storage is limited. Limited lay down areas for granite to be provided within Lot E fenced area. Additional areas maybe available but are not guaranteed.
50. Remove existing granite per the construction documents, store, clean, and reinstall as shown.
51. Include stone cladding at perimeter walls.
52. Include all engineering for granite installation. **Shop drawings by others.** This includes clips, fasteners, methods, etc.
53. Provide all required mounting hardware, angles, ledges, etc.
54. Include all metal frames, misc metals, framing, CMU etc as required to install the granite/stone. This is to include the frame and associated installation work located along Elm St. Concrete back up by TC-03.
55. Include all CMU walls and back up including dowels, grouting, head joints, grouting, head angles, caulk joints, etc. Water Repellant to be included on CMU exposed to view.
56. Furnish and install complete landscaping and irrigation system.
57. Provide complete irrigation system including integration with existing systems. Rework Zoning as required.
58. Include irrigation system at applicable tree pits and plantings.
59. Irrigation system including but not limited to controller, piping, valves, boxes, zoning, controller, wiring, conduit, sleeves, heads, sprayers, and hose down quick disconnects. Irrigation connection to be connected to existing system.

60. Soil, trees, plants, shrubs, etc to be included.
61. Tree Pit and planter Under drains, corner drains, aeration, etc to be included.
62. Tagging of species to be regionally source and approved with architect and owner present.
63. Planting materials to be transplanted in appropriate seasons to maintain proper warranties.
64. Mulch and sod to be included where applicable.
65. Include tie downs, restraints, edging, and other installation systems as noted on construction documents.
  
66. Dewatering as required to complete this work scope shall be the responsibility of this Trade Contractor. All open holes/excavations shall be kept clean and free from water as required by the contract documents. This Trade Contractor shall provide barricades or other measures to protect the public and other workers on site from a fall hazard into holes.
67. All deliveries, hoisting and rigging into place are to be provided by this Trade Contractor as required.
68. This Trade Contractor shall be responsible for dust control as required for this work scope.
69. Traffic control for this work scope is the responsibility of this Trade Contractor.
70. Provide all layout and engineering from control points and benchmarks provided on survey drawings.
71. This Trade Contractor shall include any necessary permits required for temporary road shutdowns if required to perform this work scope.
72. Reference Section 017419 for removal of all debris.
73. The temporary plywood protection shown at the existing garage will be provided and maintained by others.
74. This Contractor shall provide all hangers and inserts as required for a complete, correct installation.
75. Contractor to include Site furnishings relocation, new furnishings, and installation per manufacturer requirement/details.
76. A thorough cleaning having the necessary equipment and materials is to be provided for as a form of final cleaning and acceptance, as required prior to turn over including stone and stainless features.
77. This Trade Contractor shall include all off hours work required for the specific tie-ins
78. Provide all applicable warranties, maintenance, etc per the construction documents.
79. This Trade Contractor shall include a \$ 100,000 allowance to account for potential design changes initiated by the Owner.

**End of Section**



## SECTION 01 21 00 - ALLOWANCES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
- B. Types of allowances include the following:
  - 1. Lump-sum allowances.
  - 2. Unit-cost allowances.
  - 3. Quantity allowances.
  - 4. Contingency allowances.
  - 5. Testing and inspecting allowances.
- C. Related Requirements:
  - 1. Section 01 22 00 – Unit Prices for procedures for using unit prices.

#### 1.2 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Subcontract, advise Contractor of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

#### 1.3 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

#### 1.5 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

#### 1.6 LUMP-SUM ALLOWANCES

- A. Allowance shall include cost to Subcontractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include material, sales and/or use tax, labor (and/or erection), overhead, tools, equipment, delivery to project site, unloading and warehousing if necessary.
- B. This type of allowance shall be adjusted by the difference of the allowed amount vs. actual expenditures performed on a T&M basis, usually with pre-agreed to unit rates.
- C. Example: A bid category for masonry may include a Lump Sum Allowance of \$5,000 for temporary heating. The bidder shall include this \$5,000 allowance in its Base Bid and document actual expenditures to the Contractor. The bidder's contract amount will then be adjusted based on actual usage.

#### 1.7 MATERIAL ALLOWANCES

- A. The allowance itself shall include the cost of purchasing the specified materials only, including sales and use tax if applicable. The cost of labor (and/or erection), overhead, profit, tools, equipment, delivery, unloading, warehousing, etc. shall be included in the Base Bid and shall NOT be included in the stated allowance.
- B. This type of allowance shall be adjusted by the difference of the allowed material purchase price and the actual purchase price, either additive or deductive, with no consideration given for either increased or decreased OH&P.
- C. Example: A bid category for carpet may include a Material Allowance of \$15.00/sy to purchase carpet. The cost for installation, tools, equipment, delivery, unloading, warehousing, overhead, profit, etc. shall be included in the Base Bid and are not part of the allowance.
- D. Subcontractor shall submit proposals to Contractor for materials selections by the Architect. After selection, subcontractor shall following normal submittal procedures.
- E. Subcontractor shall note if Contract Time will be affected with any material selection.
- F. Invoices shall be submitted to the Contractor to verify actual purchase amounts and quantities.

1.8 QUANTITY ALLOWANCES

- A. The allowance itself is to adjust quantity only. All costs such as material, sales tax, labor (and/or erection), overhead, profit, tools, equipment, delivery, unloading, warehousing, etc. shall be included in the Base Bid.
- B. This type of allowance shall be adjusted by the difference in the allowed quantity vs. the actual quantity times a unit price, which includes all material, labor, equipment, OH&P, etc.
- C. Example: A bid category for steel may include a Quantity Allowance of 5 tons of misc. steel that may not be designed at the time of bidding. The bidder shall include the cost of furnishing, fabricating and installing (erecting) this 5 tons of misc. steel in the Base Bid and a unit price to adjust the bidder's contract amount if the actual quantity is different from the allowed amount.
- D. Sufficient documentation to substantiate the quantity difference shall be submitted to the Contractor.

1.9 UNUSED MATERIALS

- A. Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
  - 1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

**PART 2 - SCHEDULE OF ALLOWANCES**

- 2.1 TC-03 - \$50,000.00  
TC-04 - \$100,000

**END OF SECTION 01 21 00**

## SECTION 012513

### PRODUCT SUBSTITUTION PROCEDURES

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Product options available to Bidders and Contractors, plus procedures for securing approval of proposed substitutions.
- B. Refer to Section 001000.2 - Instructions to Bidders Article 3.3 SUBSTITUTIONS, as amended and modified.

##### 1.2 QUALITY ASSURANCE

- A. The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.
- B. All bids shall be based upon specified standards or approved substitutes.
- C. Where proprietary products or types of construction are used in Specifications, the first named in any grouping is the one used as the basis of design. Use of a second, third, or approved substitution shall not relieve Contractor of the responsibility of investigating the effect these products will have on the Work.
- D. Include all costs in bid in order to accommodate the product to be provided.

##### 1.3 PRODUCT OPTIONS

- A. Contract is based on standards of quality established in Contract Documents.
  - 1. In agreeing to the terms and conditions of Contract, Contractor has accepted a responsibility to verify that specified products will be available and to place orders for all required materials in such a timely manner as is needed to meet his agreed construction schedule.
  - 2. Neither Owner nor Architect has agreed to substitution of materials or methods called for in Contract Documents, except as they may specifically otherwise state in writing.
- B. Materials and/or Methods Specified by Name:
  - 1. This Contract uses some materials and methods that are related to the structure's function as Phase III of the Central Riverfront Intermodal Parking Garage. This structure and its systems must function in combination with the prior two Phases of the facility's construction. Materials and/or

methods specified by name are typically essential for compatibility or synchronization with, or maintenance of, existing facilities and equipment.

- C. Where materials and/or methods are specified by name and/or model number, followed by the words "or approved equal":
  - 1. Material and/or method specified by name establishes the required standard of quality.
  - 2. Materials and/or methods proposed by Contractor to be used in lieu of materials and/or methods so specified by name shall in all ways equal or exceed qualities of the named materials and/or methods.
- D. Where the phrase "or equal," or "or approved equal" occurs in Contract Documents, do not assume that materials, equipment, or methods will be approved as equal unless the item has been specifically so approved for this Work by the Owner in consultation with the Architect.

#### 1.4 SUBSTITUTIONS

- A. Any bidder desiring to use a material, product, equipment, or type of construction not named in Contract Documents shall comply with Section 001000.2 - Instructions to Bidders Article 3.3 SUBSTITUTIONS.
- B. Substitution requests submitted to Construction Manager for approval must be accompanied by such supporting evidence as the Architect may require, such as samples, drawings, specifications, and test reports, giving full and complete information. In all cases, the Owner's decision shall be final and binding on all concerned.
- C. Approval of substitutions shall be announced by the Construction Manager as described in Section 001000.2 - Instructions to Bidders Article 3.3 SUBSTITUTIONS.

#### 1.5 DELAYS

- A. Delays in construction arising by virtue of non-availability of a specified material and/or method will not be considered by the Architect as justifying an extension of Contract Time.

#### PART 2 PRODUCTS

Not used.

#### PART 3 EXECUTION

Not used.

END OF SECTION

## SECTION 013100

### PROJECT COORDINATION

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Administrative and supervisory requirements necessary for coordination of Work on the Project include, but are not limited to:
  - 1. Contractor responsibilities.
  - 2. Subcontractor responsibilities.
  - 3. Mutual responsibilities.
  - 4. Review of Contract Documents and existing job conditions.
  - 5. Supervision and construction procedures.
  - 6. Labor and materials.

##### 1.2 CONTRACTOR RESPONSIBILITIES

- A. Schedule and coordinate the Work in conformance with the starting and sequencing times, and the Total Contract Time defined in the Construction Documents.
- B. Before starting work at the Project Site, and before purchasing or fabricating materials that are affected by field conditions, inspect the conditions affecting the Work and take all necessary field measurements.
- C. Before fabricating materials or products, examine the Construction Documents for adjacent and related work.
- D. Notify the Construction Manager in writing of work conditions shown or specified that are unsatisfactory for the proper installation and subsequent performance of the Work; or that are not in accordance with the product manufacturer's or fabricator's specifications, requirements, or recommendations. Do not proceed with the Work until conditions are correct.

##### 1.3 SUBCONTRACTOR RESPONSIBILITIES

- A. Before starting work at the Project Site, and before purchasing or fabricating materials that are affected by field conditions, inspect the conditions affecting the Work and take all necessary field measurements.

- B. Before fabricating materials or products, examine the Construction Documents for adjacent and related work.
- C. Notify the Contractor in writing of work conditions shown or specified that are unsatisfactory for the proper installation and subsequent performance of the Work; or that are not in accordance with the product manufacturer's or fabricator's specifications, requirements, or recommendations. Do not proceed with the Work until conditions are correct.
- D. Abide by the Project Schedule and coordination requests made by the Contractor.

#### 1.4 MUTUAL RESPONSIBILITIES

- A. Supply other Contractors with necessary dimensions and shop drawings where required for the coordination of the Work. Additional cost caused to a Contractor or to the Owner due to ill-timed or defective work or the failure to perform work is the responsibility of the Contractor that caused the additional cost.
- B. Move stored materials that interfere with the operation of the Owner or other Contractors.
- C. Coordinate and cooperate with other Contractors to achieve intended execution of each Section where Work of one Specification Section affects Work of other Sections. Do not install successive Work until conditions are inspected and found satisfactory for successive Work. Installation of successive Work is *prima-facie* evidence that the Contractor for successive work accepts the installation conditions. Performance of successive Work is the responsibility of Contractor that performs the successive work.
- D. Comply with safety codes and regulations applicable to the performance of the Contract. Owner, Architect, and Construction Manager are not liable for observing, checking, instructing, and giving directions relating to Contractor's safety procedures. Owner, Architect, and Construction Manager do not review the adequacy of Contractor's safety measures in, on, or near construction site.
- E. Owner's field representative, Architect, and Construction Manager do not have the authority to verbally order or approve modifications to the Work. Authorization must be in writing, signed by the Owner's authorized representative, or by Change Order.

#### 1.5 REVIEW OF CONSTRUCTION DOCUMENTS

- A. Conform to requirements of the Construction Documents. If conflicts are found between Drawings, between Specifications, or between Drawings and Specifications, include the most costly material, method, or detail in Contractor's Bid and in the Contract.
- B. If physical discrepancies are discovered between the actual conditions and those

represented by the Construction Documents, report them immediately to the Construction Manager. Do not proceed with the Work, except at risk, until receiving written instructions.

#### 1.6 SUPERVISION AND CONSTRUCTION PROCEDURES

- A. Where laws, codes, or standards require supervision or inspection of portions of the Work by an architect, engineer, or other competent or qualified person, furnish the necessary supervision and inspection to the satisfaction of the governing authority.
- B. Obtain permission from the Construction Manager before performing work at times other than is allowed by the Construction Documents.
- C. Project meetings will be held at Construction Manager's field office.
- D. Owner reserves the right to hold additional job progress meetings at the Owner's discretion. Construction Manager reserves the right to hold additional job progress meetings at the Construction Manager's discretion. Contractor will be given 48 hours notice (when possible) before unscheduled meetings.
- E. Oral assistance, advice, and interpretations given by the Owner, Architect, or Construction Manager relative to construction means, methods, techniques, sequences, procedures, safety precautions, or programs is a gratuitous service and is not binding. Non-contractual assistance does not make the Owner, Architect, or Construction Manager responsible for the items.
- F. Owner will endeavor to observe the Work, but omissions and failures to provide proper material and failure to perform work correctly are the responsibility of the Contractor. Contractor, not the Owner, is responsible for determining that work under the Contract, as it proceeds and is completed, is performed in accordance with the Construction Documents and governing regulations.

#### 1.7 LABOR AND MATERIALS

- A. Provide products in accordance with the current printed specifications, requirements, and recommendations of the products' manufacturers and fabricators. Should the Construction Documents show or specify the application of a product not conforming to the manufacturer's or fabricator's printed specifications, requirements, or recommendations, notify the Construction Manager in writing.
- B. The minimum, acceptable standards for products and workmanship on this project shall be in compliance with industry standards, recognized standards of good quality, and published standards of recognized National Trade Associations. Use products which are new, sound, and of the quality suitable for their application. Orderly position products and align them with the building structure. Make vertical components plumb and horizontal components level, with surface true to line, grade, and dimension. Make joinery and connections



accurate, close fitting, and well made.

- C. Workers employed on the Project shall work together in harmony, and workers newly assigned to the Project shall cooperate and work harmoniously with work forces on the site, including work forces of the Owner, if any. Upon written notice by the Owner or Construction Manager, Contractor shall remove workers not complying with the provisions of the Contract Documents.
- D. Arrange and establish a location satisfactory to the Construction Manager where the workers may eat. Provide a rubbish container, and clean and remove debris at the end of each working day.

## PART 2 PRODUCTS

Not used.

## PART 3 EXECUTION

Not used.

END OF SECTION

## **SECTION 01 31 19 - PROJECT MEETINGS**

### **PART 1 - MEETING TYPES**

#### 1.1 General

- A. The Contractor will provide a location for meetings and conferences at Project site, unless otherwise indicated.
  - 1. Attendees: Owner, Contractor, Subcontractors, Architect/Engineer and other individuals whose presence is required, as determined by the Contractor.
  - 2. Agenda: Contractor will prepare the meeting agenda and distribute to all invited attendees.
  - 3. Meeting Memoranda: Contractor will conduct the meeting and record significant discussions and agreements achieved and distribute the meeting minutes to everyone concerned.

#### 1.2 Preconstruction Conference

- A. Contractor will schedule a preconstruction conference before construction starts, at a time convenient to Owner, Contractor, and Architect/Engineer. Conference will be at Project site or another convenient location. Contractor will review responsibilities and personnel assignments.
- B. Attendees: Authorized representatives of Owner, Contractor, Architect/Engineer, and their consultants; Subcontractors and their superintendents; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
- C. Agenda: Discuss items of significance that could affect progress, including the following:
  - 1. Tentative construction schedule.
  - 2. Phasing.
  - 3. Critical work sequencing and long-lead items.
  - 4. Designation of key personnel and their duties.
  - 5. Procedures for processing field decisions and Change Orders.
  - 6. Procedures for requests for interpretations (RFIs).
  - 7. Procedures for testing and inspecting.
  - 8. Procedures for processing Applications for Payment.
  - 9. Submittal procedures.
  - 10. Sustainability requirements
  - 11. Preparation of Record Documents.
  - 12. Use of the premises and existing building.
  - 13. Work restrictions.
  - 14. Owner's occupancy requirements.
  - 15. Responsibility for temporary facilities and controls.

16. Construction waste management and recycling.
17. Parking availability.
18. Office, work, and storage areas.
19. Equipment deliveries and priorities.
20. Security.
21. Progress cleaning.
22. Working hours.

D. Meeting Memoranda: Contractor will record and distribute meeting memoranda.

### 1.3 Pre-installation Conferences

A. Contractor will conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.

B. Attendees: Contractor, Architect/Engineer, Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. The specifications additionally identify Suppliers and/or Subcontractors that are required to attend a pre-installation conference.

C. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

1. The Contract Documents.
2. Options.
3. Related requests for interpretations (RFIs).
4. Related Change Orders.
5. Purchases.
6. Deliveries.
7. Submittals.
8. Review of mockups.
9. Possible conflicts.
10. Compatibility problems.
11. Time schedules.
12. Weather limitations.
13. Manufacturer's written recommendations.
14. Warranty requirements.
15. Compatibility of materials.
16. Acceptability of substrates.
17. Temporary facilities and controls.
18. Space and access limitations.
19. Regulations of authorities having jurisdiction.
20. Testing and inspecting requirements.
21. Installation procedures.
22. Coordination with other work.
23. Required performance results.

December 17, 2021

24. Protection of adjacent work.
  25. Protection of construction and personnel.
  26. Construction waste management and recycling
- D. The Contractor will record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
  - E. The Contractor will distribute minutes of the meeting to each party present and to parties who should have been present, Architect/Engineer, and Owner.
  - F. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- 1.4 Progress (Weekly Work Plan) Meetings: Contractor will conduct progress meetings at weekly intervals. Purpose of meetings is to coordinate work efforts among the participating Subcontractors.
- A. Attendees: Contractor, each Subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  - B. Agenda: Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    1. Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to the 6-week look ahead and Reverse Phase Schedules. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time. Review schedule for next period.
    2. Review present and future needs of each entity present, including the following:
      - a. Interface requirements.
      - b. Sequence of operations.
      - c. Status of submittals.
      - d. Deliveries.
      - e. Off-site fabrication.
      - f. Access.
      - g. Site utilization.
      - h. Temporary facilities and controls.
      - i. Work hours.
      - j. Hazards and risks.
      - k. Progress cleaning.
      - l. Quality and work standards.
      - m. Status of correction of deficient items.

The Banks – Lot 28

BP #2 – Park & Garage

December 17, 2021

- n. Field observations.
  - o. Requests for interpretations (RFIs).
  - p. Status of proposal requests.
  - q. Pending changes.
  - r. Status of Change Orders.
  - s. Pending claims and disputes.
  - t. Documentation of information for payment requests.
  - u. Waste management implementation and progress.
- 3. Minutes: Contractor will record and distribute to all Subcontractors the meeting memoranda.
  - 4. Reporting: Distribute meeting memoranda of the meeting to each party present and to parties who should have been present.
  - 5. Schedule Updating: Contractor will revise the Reverse Phase & 6-week look ahead Schedules after each progress meeting where revisions to the schedule have been made or recognized.

**END OF SECTION 01 31 19**

## **SECTION 01 32 16 - CONSTRUCTION PROGRESS SCHEDULE**

### **PART 1 - GENERAL**

- 1.1 Subcontractor shall in conjunction with the Contractor develop an accurate schedule for the completion of the work. The Contractor will utilize Lean Construction / Last Planner methods to manage the project. Each Subcontractor will be required to participate in a detailed schedule planning session for each phase of the project. A detailed schedule will be developed for each phase. The detailed schedules shall be consistent with the Milestone Construction Schedule issued with the bidding documents. Each Subcontractor will be required to attend the weekly Progress Meeting prepared with a weekly work plan for the coming week and a review of work activities required by the detailed schedule for that Subcontractor over the next six weeks. In addition, each Subcontractor will attend brief daily meetings.
- 1.2 See Section 00 31 13 – Preliminary Schedules for the Milestone Construction Schedule used for bidding.

### **PART 2 - LEAN CONSTRUCTION SCHEDULING METHODS**

- 2.1 Overview:
  - A. Lean Construction is a tool to manage schedules and production on projects. By planning and managing the work, uncertainty is removed from the project. When production planning becomes reliable and people fulfill their commitments, performance and workflow are improved, and so are the overall results of the project.
  - B. Lean Construction traces its roots to the Toyota Production System developed after World War II. The system aimed to eliminate the inventory and rework of traditional mass production in favor of a reliable production system that could both work and change quickly to meet a customer's specific requirements without wasteful processes. In mass production, as in traditional construction processes, the project is a series of activities, and the goal is to reduce cost and increase the speed of each activity with consistent high quality.
- 2.2 Application
  - A. Lean Construction involves a systematic approach aiming for more efficient overall workflow. It attempts to understand how value is delivered, making workflow as consistent and reliable as possible, and then reviewing the results to determine how to improve the planning process. Lean differs from traditional construction methods because it decentralizes hierarchical decision-making. With Lean Construction, those closest to the work (the "Last Planners") must have the authority to make the decisions and plan the work. It also utilizes peer pressure to get the job done. Subcontractors agree as a group to meet their deadlines, and each is held accountable not only to the Contractor but also to fellow Subcontractors.

- B. The project will utilize key procedures in the implementation of Lean Construction / Last Planner Methods. These steps require the input of the Foremen for the Subcontractors that will perform the work. These steps are as follows:
1. Flow Planning – This schedule is created to fit within the parameters of the Milestone Construction Schedule. Subcontractors work together to determine the work areas, sequence of work, and Takt time for the project. This ensures that the overall work flow of the project is optimized.
  2. Reverse Phase Scheduling (RPS) – This process is used in lieu and/or in addition to Flow Planning. Similar to Flow Planning, this schedule is created to fit within the parameters of the Milestone Construction Schedule. Subcontractors plan the project starting with the last work activity and working backwards. This ensures that all Subcontractors consider what work must be done prior to any schedule activity and adequate durations are in place for late activities. This RPS is thought of as “What Should Be Done.”
  3. Rolling Six-Week Look Ahead Schedules – Upcoming schedule activities move onto the Six-Week Look Ahead Schedules on a weekly basis. All possible constraints for preventing these activities are identified. This six-week look ahead is the work that “Can Be Done” in the next six-week period.
  4. Weekly Work Plans (WWP) – These plans are brought to weekly Progress Meetings by all Subcontractor foremen and are specific to the work they “Will Be Doing” in the upcoming week. In order for work activities to be on the WWP, there cannot be any known constraints that would prevent the work from occurring.
  5. Plan of Day (POD) – These brief daily meetings evaluate daily performance against key activities identified and coordinated in the WWP. By understanding daily performance, Subcontractor foremen quickly identify barriers and then make minor adjustments to eliminate the barriers allowing work to proceed as planned.

### 2.3 Implementation

- A. Subcontractors will be involved with all Flow Planning and Reverse Phase Scheduling for the project. Bidders should include the cost for foremen and project managers from each company to attend ½ day planning sessions to establish these schedules as required for the complexity of the project.
- B. The Contractor will provide and update the Six-Week Look Ahead Schedules from information developed in the Flow Planning and Reverse Phase Scheduling process and from Subcontractors input. The Contractor and Subcontractors will review and discuss the Six-Week Look Ahead Schedules at the weekly Progress Meetings.
- C. Each Subcontractor must complete a Weekly Work Plan (WWP) and provide to the Contractor by noon the day before the weekly Progress Meeting. Each Subcontractor will discuss their activities at the weekly Progress Meeting.
- D. All Subcontractor foremen are required to attend the daily POD.
- E. Subcontractors will be required to inform the Contractor, on a daily basis, the status of the work that was committed to be complete.

- F. Additional Flow Planning and Reverse Phase Scheduling may be required to update the schedule when project changes occur. Subcontractors will be required to participate in these planning sessions.

#### 2.4 Updates

- A. Six-Week Look-Ahead Schedules will be updated weekly.
- B. Construction Progress Schedules will be updated periodically as required.
- C. The Milestone Construction Schedule will be updated as required.

#### 2.5 Distribution

- A. The Contractor will provide the Subcontractors access to the Milestone Construction Schedule, Construction Progress Schedules, Six-Week Look Ahead Schedules and Weekly Work Plans.
- B. It is the responsibility of each Subcontractor to inform its field personnel, sub-tier subcontractors and material suppliers of the Milestone Construction Schedule, Construction Progress Schedules, Six-Week Looks Ahead Schedules and Weekly Work Plans, including any updates.

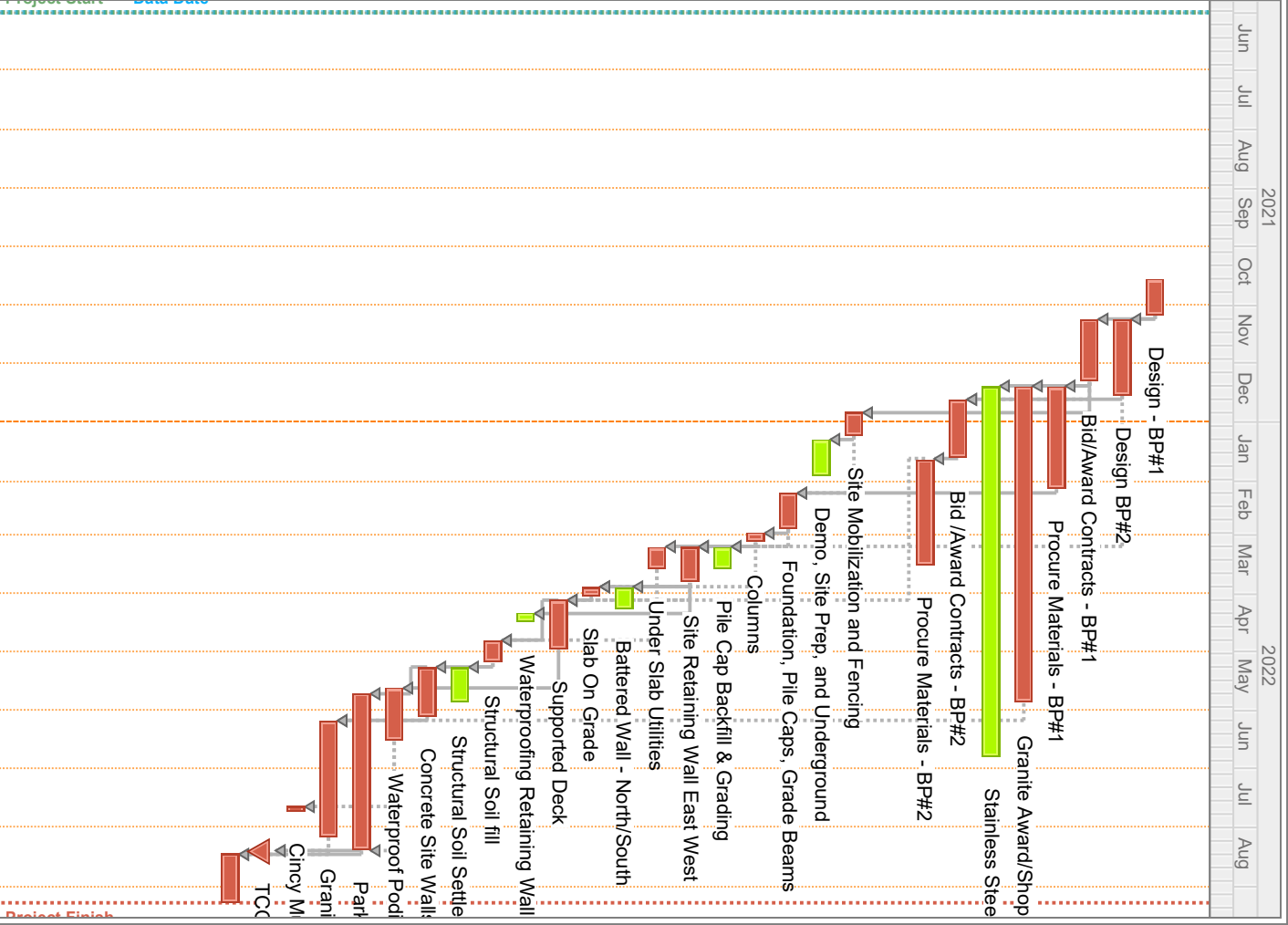
#### 2.6 Records

- A. All schedules generated from Flow Planning and Reverse Phase Scheduling, and updates to the same, shall become the revised Project Schedule and shall be binding on the Subcontractors. Each Subcontractor shall provide necessary manpower, equipment, and material as necessary to the revised Project Schedule.

**END OF SECTION 01 32 16**



ID	Description	Original Duration	Start	Finish
<b>Pre Construction</b>				
10	Design - BP#1	15	10/18/21	11/05/21
15	Design BP#2	30	11/08/21	12/17/21
20	Bid/Award Contracts - BP#1	25	11/08/21	12/10/21
30	Procure Materials - BP#1	40	12/13/21	02/04/22
40	Granite Award/Shop Drawing Approvals/Delivery To Site	120	12/13/21	05/27/22
45	Stainless Steel Railings, Guard Rails, Bollards Award/Sh	140	12/13/21	06/24/22
25	Bid /Award Contracts - BP#2	23	12/20/21	01/19/22
35	Procure Materials - BP#2	40	01/20/22	03/16/22
<b>Construction</b>				
50	Site Mobilization and Fencing	10	12/27/21	01/07/22
55	Demo, Site Prep, and Underground	15	01/10/22	01/28/22
60	Foundation, Pile Caps, Grade Beams	15	02/07/22	02/25/22
80	Columns	5	02/28/22	03/04/22
70	Pile Cap Backfill & Grading	10	03/07/22	03/18/22
85	Site Retaining Wall East West	15	03/07/22	03/25/22
90	Under Slab Utilities	10	03/07/22	03/18/22
87	Battered Wall - North/South	10	03/28/22	04/08/22
95	Slab On Grade	5	03/28/22	04/01/22
100	Supported Deck	20	04/04/22	04/29/22
86	Waterproofing Retaining Wall	5	04/11/22	04/15/22
92	Structural Soil fill	10	04/25/22	05/06/22
93	Structural Soil Settle Period	15	05/09/22	05/27/22
94	Concrete Site Walls, Walk Ways, Site Stairs - South To N	20	05/09/22	06/03/22
105	Waterproof Podium over Garage Space Only	20	05/20/22	06/16/22
110	Park Finishes	60	05/23/22	08/12/22
120	Granite Installation	45	06/06/22	08/05/22
107	Cincy Music Festival Ceremony - Substantial Completion	3	07/21/22	07/23/22
130	TCO Lot 28	0		08/12/22
140	Punchlist & Final Inspections	20	08/15/22	09/09/22



Start Date: 06/01/21  
 Finish Date: 09/09/22  
 Data Date: 06/01/21  
 Run Date: 12/21/21

Riverfront Venue  
 Lot 28 Construction Schedule - BP#2  
 12-17-2021



## **SECTION 01 32 26 - CONSTRUCTION PROGRESS REPORTING**

### **PART 1 - GENERAL**

#### 1.1 Daily Reports

- A. Subcontractors are required to prepare daily reports. This daily construction report should record at a minimum, the following information concerning events at the project site:
1. Number of personnel onsite, including subcontractors.
  2. Summary of work completed.
  3. Equipment onsite.
  4. Material deliveries.
  5. High and low temperatures and general weather conditions, including the presence of snow or rain.
  6. Accidents or incidents.
  7. Unusual events (refer to special reports).
  8. Stoppages, delays, shortages, and losses.
  9. Meter readings and similar recordings.
  10. Emergency procedures.
  11. Orders and requests of authorities having jurisdiction.
  12. Change orders received and implemented.
  13. Construction change directives received and implemented.
  14. Services connected and disconnected.
  15. Equipment or system tests and startups.

- 1.2 Reports are to be submitted in a neat and legible format daily to Contractor each morning for the previous day's work. No progress payments will be made to the Subcontractor until all of their daily reports are received by Contractor for that particular month.

**END OF SECTION 01 32 26**

## SECTION 013300

### SUBMITTALS

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Proposed Subcontractor and Supplier List.
- B. Contractor's Construction Schedule.
- C. Schedule of Values.
- D. Guarantees and Warranties.

##### 1.2 RELATED SECTIONS

- A. Section 013100 - Project Coordination procedures and requirements.
- B. Section 013323 - submittal requirements for Shop Drawings, Product Data, and Samples.

##### 1.3 PROPOSED SUBCONTRACTOR AND SUPPLIER LIST

- A. Submit with Bid. Refer to Section 001000.

##### 1.4 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Submit complete itemized Contractor's Construction Schedule to Construction Manager, within three (3) business days of execution of contract. Contractor's Construction Schedule shall be coordinated with all subcontractors, in accordance with Sections 013216 and 013323.
- B. Revise Contractor's Construction Schedule monthly, at the time of request for payment submittal. When Contractor's Construction Schedule is unchanged, submit a letter certifying that the previous Schedule is unchanged.

##### 1.5 SCHEDULE OF VALUES

- A. Submit Schedule of Values to Construction Manager, within three (3) business days of execution of contract, coordinated with all subcontractors, in accordance with the General Conditions.
- B. Prior to preparation of Schedule of Values, review proposed subdivisions of work in the Schedule of Values with Construction Manager and Architect, for approval.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

1.6 GUARANTEES AND WARRANTIES

- A. With request for inspection for Substantial Completion, submit all warranties, guarantees, and bonds in accordance with Section 014000 – Quality Requirements.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 013323

SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1 GENERAL

1.1 SUMMARY

- A. This Section specifies procedural requirements for non-administrative submittals, including shop drawings, product data, samples, coordination drawings, and other work-related submittals. Shop drawings, product data, samples, coordination drawings, and other work-related submittals are required to amplify, expand, and coordinate information contained in Contract Documents.
- B. Refer to other Division 01 Sections and other Contract Documents for specifications on administrative, non-work-related submittals. Those submittals include, but are not limited to:
  - 1. Permits.
  - 2. Payment applications.
  - 3. Performance and payment bonds.
  - 4. Insurance certificates.
  - 5. Inspection, testing, and certification reports.
  - 6. Schedule of values.
  - 7. Progress reports.
  - 8. Subcontractor and Supplier List(s).
  - 9. Safety plans and other emergency procedures.
  - 10. Schedules.
- C. Miscellaneous submittals are work-related, non-administrative submittals that do not conform to the previous two categories, including but not limited to:
  - 1. Survey data and reports.
  - 2. Project photographs.
  - 3. Record drawings.

4. Field measurement data.

## 1.2 SUBMITTAL PROCEDURES

### A. General:

1. Submit complete and detailed information required by the Specifications. Construction Manager will approve or reject submittals with reasonable promptness.
2. Submit information from a specification section in the following order: (i) product data, (ii) shop drawings, and (iii) samples.
3. Before forwarding information to Construction Manager, review submittal information, check conditions, mark corrections, and sign and date each set.
4. Construction Manager will not review submittal information Contractor has not signed. Contractor's signature means Contractor has checked the submittals for conformance to the project requirements and compatibility with related work.
5. Except where otherwise indicated, the Construction Manager will utilize construction project collaboration software for the electronic transmission, tracking, and management of all submittals. Refer to Section 011100 – Summary of Work.

### B. Coordination:

1. Coordinate submittal preparation and processing with prosecution of the Work. Coordinate each submittal with other submittals and related activities including testing, purchasing, fabrication, delivery, and similar activities that require sequential activity.
2. Contractor shall review, coordinate, and forward submittals of interrelated work as a single, comprehensive submittal package to Construction Manager.

### C. Submittal Time Coordination:

1. Prepare and transmit each submittal to the Construction Manager within 14 calendar days after award of Contract, or as agreed to by the Construction Manager. Prepare and transmit in advance of scheduled performance of related work and other applicable activities.
2. Construction Manager reserves the right to withhold action on submittals that require coordination with other submittals until the related submittals have been received by the Construction Manager.

D. Review Time:

1. Allow minimum of 14 calendar days so the Project will not be delayed because of time required to properly process submittals, including time for resubmittal, if necessary. Advise the Construction Manager on each submittal if processing time is critical to progress of the Work and if the Work would be expedited if processing time is shortened.
2. Construction Manager will advise Contractor when a submittal being processed will be delayed for coordination.
3. Owner will not extend Total Contract Time because of Contractor's failure to transmit submittals to the Construction Manager sufficiently in advance of the affected portion of Work.

E. Submittal Preparation: Mark each submittal with a permanent label for identification. Provide the following information on the label for proper processing and recording of the submittal:

1. Project name.
2. Date.
3. Name and address of Contractor.
4. Name and address of Subcontractor.
5. Name and address of supplier.
6. Name of manufacturer.
7. Number and title of corresponding Specification Section(s).
8. Drawing number and detail references, as appropriate.
9. Similar definitive information as necessary.
10. Stamp each piece of literature or drawing being submitted. A stamp impression on a separate sheet is not permitted. After Contract Award, the Construction Manager will provide further instructions for the stamp's format and contents.

F. Submittal Transmittal:

1. Appropriately package each submittal for transmittal and handling. Include a transmittal form with each hard copy or electronic file submittal from Contractor to Construction Manager. Submittals received from sources other than Contractor will be returned to Contractor without action.

2. Format of transmittal form shall be approved by the Construction Manager.
3. On the transmittal form, record relevant information, any requests for data, as well as any deviations from the requirements of the Contract Documents, including minor variations and limitations.

### 1.3 SPECIFIC SUBMITTAL REQUIREMENTS

- A. General: Comply with requirements specified herein for each type of submittal, as well as any additional specific submittal requirements for individual units of work specified in the applicable Specification Section.
- B. Provide special notation of dimensions established by field measurement. Highlight, encircle, and otherwise indicate deviations from Contract Documents. Construction Manager and Architect will not review shop drawings having incomplete dimensions. Construction Manager and Architect will not review or verify accuracy of field dimensions.
- D. Inspection, Testing, and Certification Reports:
  1. Classify each inspection and test report as being either shop drawings or product data, depending on whether the report is specially prepared for the project, or a standard publication of workmanship control testing at the point of production.
  2. Process inspection and test reports accordingly.
- E. Warranties:
  1. Refer to Section 014000 for general and specific requirements for warranties, product bonds, workmanship bonds, and maintenance agreements.
  2. In addition to copies desired for Contractor's use, furnish five (5) executed copies of warranties, bonds, or agreements. Provide additional copies of warranties for Operations & Maintenance Manuals.
- F. Survey Data: Refer to Section 017700 and individual Sections for general and specific requirements on property surveys, field measurements, quantitative records of actual work, damage surveys, and similar data required by individual Sections of these Specifications.

### 1.4 SUBMITTAL ACTION MARKINGS

- A. Interpret the action marking of the Architect or Engineer on returned submittals as follows:
  1. NO EXCEPTIONS NOTED, or other similar wording:



No corrections; proceed with the work.

2. EXCEPTIONS NOTED, or other similar wording:

Do not fabricate or furnish items noted for correction without correcting noted discrepancies. Resubmittal is not required for approval, but resubmittal is required for the Owner's records for as-built documentation.

3. EXCEPTIONS NOTED, REVISE AND RESUBMIT, or other similar wording:

Submittal is rejected as not in accordance with Contract requirements, or for other justified cause. Correct deficiencies and resubmit for further review.

1.5 ADDITIONAL SUBMITTALS

- A. Permits, Licenses and Certificates: For the Owner's records, submit to Construction Manager copies of permits, licenses, certificates, inspection reports, releases, jurisdiction settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records established in conjunction with compliance with standards and regulations which bear on the Work.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

## SECTION 01 35 43 - ENVIRONMENTAL PROCEDURES - 5S PROGRAM

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. The Zero Injury culture embraces the 5S Strategy to create a safe, organized jobsite to prevent slips, trips and falls.
- B. The 5S Program has been put in place to drive consistency across all projects and set a “Best in Class” standard to help achieve Zero Injury by eliminating slips/trips/falls from poor housekeeping/organization.
- C. This summary should in no way be construed as being all-inclusive. It is issued as a guide to aid each Subcontractor in their understanding of the 5S expectations on this project.

#### 1.2 PROJECT DESCRIPTION AND REQUIREMENTS

- A. As a part of the Lean Culture on our project sites, the Contractor is instituting the following MINIMUM requirements for each Subcontractor to achieve a safer more productive project.
- B. The components of the 5S Program are as follows:
  - 1. **Sort – Just in time Deliveries:** Materials are only allowed to be delivered to the site if they will be installed within a one week time period of delivery. Any materials that will not be installed must be removed from the site.
  - 2. **Straighten – Organized Material & Equipment Storage:** Materials and equipment must be stored in designated laydown areas. Walking and working spaces must be kept organized at all times. No material or equipment is allowed to be stored in egress/access paths. Storage requirements for exterior and interior spaces are as follows:
    - a. Exterior – Materials and equipment must be stored on dunnage, pallets or carts.
    - b. Interior – Materials and equipment must be stored on pallets, carts or racks and easily moveable on wheels.
  - 3. **Shine – Continuous Daily Cleanup:** Requirements for continuous cleanup for exterior and interior spaces area as follows:
    - a. Exterior
      - 1) Each Subcontractor shall immediately pick up all of their debris and deposit it into mobile trash carts/hoppers (provided by respective Subcontractor). Each Subcontractor is responsible for emptying these containers into a dumpster provided by the Contractor.

- 2) Every Subcontractor is required at the end of each and every workday to cleanup and organize equipment, materials and debris from that day's work activities and clean their work area.
- b. Interior: Nothing Hits the Floor – Daily cleanup:
- 1) Every work crew has a cart with necessary cleaning tools. Each Subcontractor shall immediately deposit their debris into mobile trash carts (provide by respective Subcontractor). Each Subcontractor is responsible to remove these carts from the building daily and empty them into a dumpster provided by the Contractor.
  - 2) Every Subcontractor is required at the end of every workday to cleanup and organize equipment, materials, and debris from that day's work activities and sweep their work area.
  - 3) Electrical cords, welding leads, temporary heat, and temporary water lines are to be off the floor 100% of the time and suspended using non-conductive materials.
4. **Standardize – Color Coded Delivery Process:** Each Subcontractor will be designated a specific paint or sticker color (designated by the Contractor and provided by respective Subcontractor) to mark all deliverables to the project. All materials, including but not limited to, pallets, packaging, boxes, buckets, etc., must be marked with their respective paint color. All items that are not marked upon arrival at the project site, will be rejected.
5. **Sustain – Composite Broom Crew:** Every week, or at Contractor's request, each Subcontractor shall provide personnel to participate in cleaning all unidentified debris and broom sweeping for a full work shift or until complete. This polishing effort is in addition to normal daily cleaning.
- a. Each Subcontractor shall provide (1) person for every (10) people working on site for respective company (including subcontractors) to participate in composite crew.
    - 1) Minimum participation by each Subcontractor is (1) person, regardless of number of people Subcontractor has on site up to (10).
    - 2) Participation requirement applies for each week the Subcontractor has personnel on the project site.
  - b. Each Subcontractor shall furnish all equipment, including but not limited to, brooms, shovels, and dump carts, to complete this activity.
  - c. Contractor will determine the location and scope of the composite cleaning crew each week as dictated by the project conditions. It is understood that this may include "exterior Subcontractors" need to work inside the building and vice versa as project conditions require to maintain the best possible project conditions.

- d. Failure to provide the personnel and equipment as described above will result in a backcharge per 1.2.C below.

- C. Failure to abide by any of the requirements above will result in a back charge of \$250/man hour needed to address any deficiencies.

1.3 ASSIGNMENT OF RESPONSIBILITY

- A. The Contractor will provide the following as a part of the 5S Program
  - 1. Logistics planning for designated material storage and assignment of color codes
  - 2. Dumpsters located appropriately for trade contractors to empty carts
  - 3. Oversight of composite cleaning crews.
- B. Each Subcontractor will provide, at a minimum, the following for the 5S Program
  - 1. Mobile Trash Carts/Hopper
    - a. One cart per each individual crew
    - b. Covers for carts as applicable to project work requirements
  - 2. Cleaning Equipment
    - a. Brooms, shovels, etc., for daily cleanup and composite crews
  - 3. Marking Paint and/or Colored Tags for materials, equipment, etc., brought to the project site.
- C. Color Codes for all Subcontractor material delivered to/stored on the project site are as follows:

Contractor	Light Green	
General Trades	Brown	
Sitework / Site Utilities	Yellow	
Steel	Dark Blue	
Concrete / Foundations	Green	
Roofing	Purple	
Aluminum & Glass	White	
Framing & Drywall	Light Blue	
Flooring	Maroon	
Fire Protection	Pink	
Plumbing	Blue	

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021

HVAC	Silver	
Electric	Red	
Telecommunications	Orange	
Painting	Black	
Casework / Millwork	Teal	

END OF SECTION 01 35 43

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## SECTION 014000

### QUALITY REQUIREMENTS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Required inspection and testing services assist in the determination of compliance of the Work with specified or indicated requirements. Required services do not relieve Contractor of the responsibility to comply with Contract Documents.
- B. Quality control services include inspections, tests, and related actions, including reports performed by independent agencies and governing authorities.
- C. Specific quality control requirements for individual units of work are in those Specifications Sections.
- D. Inspections, tests, and related actions specified in Contract Documents are not intended to limit Contractor's quality control procedures which facilitate overall compliance with Contract Document requirements.
- E. Requirements for Contractor to provide quality control services required by the Owner, governing authorities, or other authorized entities are not limited by provisions of this Section.
- F. Replace rejected work at no additional cost to the Owner and without extension to Total Contract Time.

##### 1.2 RESPONSIBILITIES

- A. Contractor Responsibilities:
  - 1. All inspections, tests, and similar quality control services are Contractor's responsibility, except where specifically indicated as being the Owner's responsibility, or where specifically indicated as the responsibility of another agency or organization.
  - 2. Costs for quality control services that are the Contractor's responsibility which are specified to be performed by an independent lab or agency (not directly by Contractor) shall be included in the Base Bid.
  - 3. Where services are specified to be performed by an independent lab or agency, Contractor shall employ and pay an independent agency, testing laboratory, or other qualified firm that is approved by the Owner.
- B. Owner Responsibilities:

1. Owner will pay for quality control testing associated with geotechnical testing and inspection, ready-mix concrete testing and inspection, and reinforcing steel inspections, unless noted otherwise.
  2. Owner will employ and pay for the services of an independent agency, testing laboratory, or other qualified firm to perform services which are the Owner's responsibility.
- C. Retest Responsibility:
1. When results of required inspections, tests, or similar services indicate non-complying Work, subsequent tests are Contractor's responsibility.
  2. Testing of revised and replaced work is Contractor's responsibility.
- D. Responsibility for Associated Services:
1. Cooperate with independent agencies performing required inspections, tests, and similar services by providing auxiliary services listed in this paragraph.
    - a. Provide access.
    - b. Take samples or assist with taking samples.
    - c. Deliver samples to test laboratories.
    - d. Secure and protect samples and test equipment at the Project Site.
  2. Provide other auxiliary services as are reasonably requested.
- E. Coordination:
1. Coordinate the sequence of inspections, tests, and similar services to accommodate those required services with a minimum of delay in progress of the Work. Coordinate to avoid removing and replacing work to accommodate inspections and tests. Contractor is responsible for scheduling times for inspections, tests, taking of samples and similar activities, whether the services are the Owner's or Contractor's responsibility.
  2. If the laws, ordinances, rules, regulations, or order of public authorities having jurisdiction require work to be inspected, tested, or approved, notify the Construction Manager in advance so the Construction Manager may observe inspection, testing, or approval.
- F. Special Tests:
1. Owner may require Contractor to perform special test(s) on installed

materials or equipment to verify conformance to Specifications.

2. Owner will pay for test(s) where materials or equipment meet or exceed specified requirements. If tested item(s) fail to meet requirements, Contractor is responsible for costs of the test(s) and to make corrections at no cost to the Owner.

### 1.3 QUALITY ASSURANCE

#### A. Qualification for Service Agencies:

1. Except as otherwise indicated, engage inspection and test service agencies, including independent testing laboratories, which are prequalified as complying with *Recommended Requirements for Independent Laboratory Qualification* by the American Council of Independent Laboratories, and which are recognized in the industry as specialized in the types of inspections and tests to be performed.
2. Contractor's testing agencies are subject to approval by the Owner.

#### B. Codes and Standards: Perform required testing in accordance with applicable codes and regulations and with standards indicated in the Specifications Sections.

### 1.4 SUBMITTALS

#### A. General:

1. Refer to Section 013323 for general submittal requirements and Section 017700 for close-out requirements. Refer to individual Specification Sections for specific requirements.
2. Electronically distribute certified, written reports of each inspection, test, or similar service directly to:
  - a. Construction Manager. Submit up to 2 hard copies, if requested by the Construction Manager.
  - b. Electronically distribute copies of each written report directly to the governing authority, Owner, Architect, and/or Engineer, if the Owner or Construction Manager so directs.

#### B. Report Data: Written reports of each inspection, test, or similar service shall include, but are not limited to:

1. Name of testing agency or test laboratory.
2. Dates and detailed description of exact location(s) of where samples were taken or where tests or inspections were performed.



3. Names of individuals making the inspection or test.
  4. Designation of the work and test method.
  5. Complete inspection or test data.
  6. Test results.
  7. Interpretations of test results.
  8. Notation of significant ambient conditions at the time of sample taking and testing.
  9. Comments or professional opinion of whether inspected or tested work complies with the requirements of Contract Documents.
  10. Recommendations on retesting, if applicable.
- C. The Contractor is responsible for notifying the testing agency or laboratory of the requirements of this Section.

#### 1.5 REPAIR AND PROTECTION

- A. General:
1. After completing inspection, testing, sample-taking and similar services, repair damaged Work and restore substrates and finishes to eliminate deficiencies, including deficiencies in the visual qualities of exposed finishes.
  2. Protect Work exposed by quality control service activities. Protect repaired Work.
  3. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

#### 1.6 GUARANTEES, WARRANTIES AND BONDS

- A. Warrant the Work for one (1) year, starting with date of Substantial Completion for the Contract, unless the requirements herein are superseded by more stringent requirements in individual technical Specification Sections.
- B. Should defects develop in the Work within the specified period due to faulty materials or workmanship, correct the Work to conform to Contract Documents. Execute repairs and corrective work, including cost of making good other work damaged or otherwise affected by making repairs, without extra charge to Owner and within 5 calendar days after written notice by the Owner or Construction Manager. On parts of the Work corrected under the Warranty, extend the warranty period for the corrected parts for one year from the date of

correction.

- C. Submit five (5) copies of warranties, guarantees, and bonds. Show the name and location of the Project and the name of the Owner (County of Hamilton). Owner shall have the right to assign warranties, guarantees, and bonds in whole or in part to end-users as designated by the Owner.
- D. Delivery of warranties, guarantees, and bonds does not relieve Contractor of obligations of the Contract.

1.7 FORM OF WARRANTY

- A. Warranty period on equipment, labor, and materials shall be the manufacturer's standard, or as specified in the Specifications Sections, but not less than required by paragraph 1.6.A this Section.
- B. Furnish specified written warranties with the request for inspection for Certificate of Substantial Completion. Submit warranties on Contractor's letterhead. Include one warranty for each separate Contractor and Subcontractor scope or unit of work, signed jointly by Contractor and Subcontractor or supplier.
- C. Form of warranty is as follows (form of warranty not written as follows is cause for its rejection):

(Form of Warranty is on the following page.)

\*\*\*\*\*

## WARRANTY

Name of Project: \_\_\_\_\_

Scope of Work: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

We warrant the Work to be in accordance with the Contract Documents. We will correct the parts of the Work not in conformance with the Contract Documents, or that becomes, or is found to be defective, within one year after the Date of Substantial Completion. We will bear the cost of making good the damage caused by the defective Work, including damage caused by its correction or removal, to the Owner's property or to property for which the Owner is liable. This warranty does not apply to Work which has been abused, neglected, or altered by others. The warranty period begins at 12:00 Noon on the Date of Substantial Completion.

Substantial Completion Date: \_\_\_\_\_ (\*)

Signed by:

Contractor: \_\_\_\_\_

Subcontractor/Supplier: \_\_\_\_\_

\*\*\*\*\*

\* (Obtain this date from the Owner before completing the warranty form. Insert the date on the indicated line. Do not type this instruction on the Warranty Form.)

### PART 2 PRODUCTS

Not used.

### PART 3 EXECUTION

Not used.

END OF SECTION

## SECTION 014216

### DEFINITIONS, STANDARDS, AND REGULATORY REQUIREMENTS

#### PART 1 GENERAL

##### 1.1 SUMMARY

###### A. General:

This Section provides definitions and specifies procedural and administrative requirements for compliance with governing regulations and the codes and standards imposed upon the Work. Requirements include obtaining permits, licenses, inspections, releases, and similar documentation, as well as payments, statements, and similar requirements associated with regulations, codes, and standards.

##### 1.2 DEFINITIONS

###### A. General Explanation:

Definitions and explanations contained in this Section are not necessarily complete or exclusive; they are general for the Work, to the extent they are not stated more explicitly in another element of the Contract Documents. More detailed definitions may be included elsewhere in the Specifications and on the Drawings.

###### B. Approve:

Where used in conjunction with the Owner's response to submittals, requests, applications, inquiries, reports, and claims by Contractor, the meaning of the word "approved" is held to the limitations of the Owner's responsibilities. "Approval" by the Owner does not release the Contractor from the responsibility to fulfill the requirements of the Contract Documents.

###### C. Architect or Engineer: THP Limited Inc.

###### D. Base Contract:

"Base Contract" means the original contract between the Contractor and the Owner for this project. "Base Contract" includes the parts of the Work therein, including Alternates and Unit Prices accepted by the Owner at the time of Contract Award.

###### E. Bid Submission Document:

Document or form that must be completed and submitted with the Bid. These documents and forms are typically identified in Section 001000 by a box across

the top of the first page of the document or form.

F. City: The City of Cincinnati, Ohio.

G. Construction Manager: Messer Construction Co./MBJ Consultants Inc.

H. County: The County of Hamilton, or its authorized agent.

I. Completion, Final:

“Final Completion” refers to the degree of completion at which time the Project, as a whole, is turned over for full use to the Owner and the Work is completed in compliance with the Contract Documents.

J. Completion, Substantial:

“Substantial Completion” means the date of the “Certificate of Substantial Completion” issued by the Owner when construction is sufficiently complete in accordance with the Contract Documents so the Owner may occupy the Work or a portion of the Work for the intended use.

K. Conditions of the Contract:

General Conditions, and the Drawings and Specifications (including Division 01), Addenda, Clarifications, Change Orders, and Field Orders issued as part of the Work.

L. Construction Documents:

“Construction Documents” means the Drawings, Project Manual (including Division 01), Addenda, Clarifications, Change Orders, Field Orders, and related documents that address the Work.

M. Contractor:

The terms “Contractor” and “Trade Contractor” shall have the same meaning. “Contractor” and “Trade Contractor” are used interchangeably.

N. Contract Documents:

“Contract Documents” has the identical meaning as “Conditions of the Contract”.

O. Contract Time, Total:

“Contract Time” has the identical meaning as “Total Contract Time”.

P. Day(s):

Except where stated as meaning business day(s), “day(s)” mean(s) calendar

day(s).

Q. Development Manager: Not applicable in Phase 3B.

R. Directed, Requested, Approved, etc.:

Terms “directed”, “requested”, “authorized”, “approved”, “required”, “accepted”, and “permitted” mean “directed by the Owner”, “requested by the Owner”, and similar phrases. Phrases' meanings do not expand the Owner's responsibility into the Contractor's areas of construction supervision and safety.

S. Furnish:

“Furnish” means to supply and deliver to the project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.

T. Indicated:

“Indicated” is a cross-reference to graphic representations, notes or schedules on Drawings, to other paragraphs or schedules in the Specification, and to similar means of recording requirements in the Contract Documents. Where “shown”, “noted”, “scheduled” and “specified” are used in lieu of “indicated”, it is for the purpose of helping the reader of the Drawings and Specifications locate the cross-reference. “Indicated” does not imply limitation of location except as specifically noted.

U. Install:

“Install” describes operations at the project site, including unloading, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations, as applicable in each instance.

V. Installer:

“Installer” is the entity engaged by a Contractor, Subcontractor, or sub-Subcontractor for performance of a particular unit of work for the project, including installation, erection, application, and similar required operations. It is a general requirement that the entities be expert in the operations they are engaged to perform.

W. Manufacturer's Recommendations:

“Manufacturer's recommendations”, and variations thereon, means manufacturer's recommendations found in publications commonly available to and used by the architectural and engineering professions.

X. Project Site:

“Project Site” is the space available to the Contractor; and refers to the area where the Contractor performs the on-site Work.

Y. Provide:

“Provide” means furnish and install, complete and ready for the intended use.

Z. Regulations:

“Regulations” includes laws, statutes, ordinances, and lawful orders issued by governing authorities; and the rules, conventions, and agreements within the construction industry which control the performance of the Work, regardless of whether or not they are lawfully imposed by governing authority.

AA. Remove:

"Remove" means to remove and legally dispose of indicated items off-site.

BB. Total Contract Time:

“Total Contract Time” is the time period allotted for the Work, subject to limitations described in the Contract Documents.

### 1.3 INDUSTRY STANDARDS

A. General Applicability of Standards:

1. Except to the extent that more explicit or more stringent requirements are in the Contract Documents, applicable standards of the construction industry referenced in the Contract Documents have the same force and effect as if bound directly into the Contract Documents (i.e. are made a part of the Contract Documents by reference).
2. Refer to Contract Documents for resolution of overlapping and conflicting requirements that result from the application of several different industry standards to the same unit of work.
3. Refer to individual unit of work Sections for specialized codes and standards the Contractor must keep at the project site available for reference by the Owner.
4. Referenced standards (referenced directly in the Contract Documents or by governing regulations) have precedence over non-referenced standards which are recognized in the industry and which may be applicable to the Work.
5. Non-referenced standards recognized in the construction industry, except as otherwise limited in the Contract Documents, are applicable to the

Work, and will be enforced for the performance of the Work. Owner will determine if an industry code or standard is applicable to the Work, or which of several standards are applicable to the Work.

B. Publication Dates:

Except as otherwise indicated, where compliance with an industry standard is required, comply with the standard in effect as of the date of the Construction Documents.

C. Copies of Standards:

1. A requirement of the Contract Documents is that each entity performing work be experienced in that part of the Work being performed, and that the entities be familiar with recognized industry standards applicable to the Contractor's parts of the Work. Copies of applicable standards are not bound with the Contract Documents.
2. Where copies of standards are needed for proper performance of the Work, obtain copies directly from the source.
3. Though certain copies of standards needed for enforcement of the requirements may be required submittals, the Owner reserves the right to require the Contractor to submit other copies of the standards as necessary for enforcement of the requirements.

D. Failure to be informed of the requirements of standard specifications is not cause for additional compensation.

E. In case of conflict between the published standard and Project Specifications, the more stringent governs.

F. Where applicable, Construction Document references to technical societies, organizations, and other construction entities is in accordance with the following abbreviations:

AIA..... American Institute of Architects  
ACI..... American Concrete Institute  
AIEE..... American Institute of Electrical Engineers  
AISC ..... American Institute of Steel Construction  
AISI..... American Iron and Steel Institute  
ANSI..... American National Standards Institute  
ASHRAE ..... American Society of Heating, Refrigeration and  
..... Air-Conditioning Engineers  
ASME ..... American Society of Mechanical Engineers  
ASRE ..... American Society of Refrigeration Engineers  
ASTM ..... American Society of Testing Materials  
AASHTO ..... American Association of State Highway  
..... & Transportation Officials



AWSC.....	American Welding Society Code
AWWA .....	American Water Works Association
CCS .....	City of Cincinnati Supplement to ODOT
COBC.....	Cincinnati Ohio Building Code
CRSI .....	Concrete Reinforcing Steel Institute
DOP .....	City of Cincinnati Department of Purchasing
FS .....	Federal Specification
IPCEA .....	Insulated Power Cable Engineers Association
MIL .....	Military Specification
NBFU.....	National Board of Fire Underwriters
NBS .....	National Bureau of Standards
NFPA .....	National Fire Protection Association
NEC .....	National Electric Code
NEMA.....	National Electric Manufacturers Association
ODOT .....	Ohio Department of Transportation
SAE .....	Society of Automotive Engineers
SPR.....	Simplified Practice Recommendation
SSPC .....	Steel Structures Painting Council
SWRI .....	Sealant, Waterproofing & Restoration Institute
UL.....	Underwriter's Laboratories

#### 1.4 REGULATORY REQUIREMENTS

- A. Applicable Codes: The “Cincinnati Ohio Building Code” as administered and modified by the Department of Buildings and Inspections, City of Cincinnati, governs the work in addition to other code authorities.
- B. Adherence to Codes and Regulations:
  - 1. Before proceeding with the Work, review Drawings and Specifications for applicable laws, ordinances, rules, and regulations.
  - 2. Comply with the applicable laws, ordinances, rules, and regulations unless notice is given to the City of Cincinnati, Department of Buildings and Inspections, in writing, of the discrepancy before proceeding with the Work.
- C. Requirements of Regulatory Agencies (Permits, etc):
  - 1. Construction Manager will make application and pay for the City of Cincinnati Demolition Permit, Foundation Permit, and General Building Permit.
  - 2. Each Contractor and Subcontractor is responsible for obtaining other permits and inspections required for their work by laws, ordinances, rules, and regulations, including final certificates, inspections, etc.

D. Inspections by Governing Agencies:

1. Before covering up work required to be inspected, arrange for inspections and tests of the installation, as required by Governing Authorities and by Specifications.
2. Provide necessary tools, equipment, and personnel to conduct the required tests, and notify the City of Cincinnati, Department of Buildings and Inspections, at least three (3) business days in advance of scheduled inspections and tests.
3. Submit approved certificate of inspection from the Governing Authority to Owner and Construction Manager before request for final payment.

PART 2 MATERIALS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

## SECTION 01 45 16 – GROUND PENETRATION REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. The purpose of this procedure is to define minimum utility avoidance requirements for all Contractors, Subcontractors, and other companies engaged in ground penetration activities.
- B. This procedure applies to all personnel associated with excavation, trenching, demolition and other ground penetrating activities including dee stakes, sign posts, fence posts, ground rods, etc. on Contractor projects. The result of this procedure is to:
  - 1. Ensure that all excavation, trenching, and demolition activities and work within excavations / trenches are adequately planned and performed safely.
  - 2. Define the standard work process to avoid any utility strikes during all excavation, trenching and demolition activities.
- C. Excavation means the use of hand tools, powered equipment, or explosives to move earth, rock, or other materials in order to penetrate, bore or drill into the earth, or to demolish any structure whether or not it is intended that the demolition will disturb the earth.

#### 1.2 PROJECT DESCRIPTION AND REQUIREMENTS

- A. Pre-Planning:
  - 1. Subcontractor(s) shall conduct thorough planning prior to the execution of any Excavation/Trenching or Penetration activities. This requires the Subcontractor complete the Ground Penetration / Dig Permit DAILY prior to starting work.
- B. Utility Avoidance:
  - 1. All underground and overhead utilities within the Excavation / Trenching or Penetration work area shall be surveyed and positively identified before excavation work commences. It is the responsibility of every Subcontractor performing an excavation to call the 811 Utility Protection Service in their state to obtain an individual reference / dig number. No Subcontractor shall work under another Subcontractor's ticket number, including the Contractor's.  
  
Since 811 will only mark utilities in the Right-of-Way, a private locating service must also be used to locate any utilities not located by 811 inside the project / excavation area. Obtain as built drawings showing the location of all known / found utilities with in the excavation site and reference the Contract Documents to verify there are no utilities that were not marked by the Locating Service.
  - 2. 811 Procedures:
    - a. Assess the area to be excavated, gather all the information that will needed to complete the locate work order form.
    - b. Premark the location where the excavations will occur in white paint, flags or both.

- c. Contact 811 and provide details of the excavation.
  - d. Obtain reference / ticket number, record the number on the Ground Penetration / Dig Permit and keep it for the duration of the excavation or longer is necessary.
  - e. Utility owners will mark any existing utilities around the excavation site.
  - f. Wait the required amount of time before commencing excavation.
    - 1) Advance notice needed to inform 811 of excavation.
      - a) IND – 2 working days.
      - b) OH – 2 working days
      - c) KY – 2 working days
      - d) TN – 3 working days
      - e) NC – 3 working days
  - g. Protect and preserve the markings of tolerance zones of underground utility facilities until those markings are no longer required for proper and safe excavations. If markings are destroyed or lost do not repaint the markings, contact 811 to remark the found/known utilities. Markings are only valid for the following amount of time before 811 has to be notified again of the excavation.
    - 1) IND – 20 days
    - 2) OH – as long visible
    - 3) KY – 21 days
    - 4) TN – 15 calendar days
    - 5) NC – 15 days
3. Private Property Locating:
- a. ALL excavations/borings/mass excavations/ground penetrating activities must be coordinated with the Contractor and the Owner to have a 3rd Party Locating Service survey the areas of excavation that are not in the right-of-way.
  - b. Subcontractor must coordinate with the Contractor and contact the designated 3rd Party Locating Service prior to any ground penetrating activities to have the service locate the area where the activities occur. Prior to arrival of the 3rd Party Locating Service, the area that needs surveyed should be painted or marked with flags.
  - c. The 3rd Party Locating Service shall mark all found utilities with paint or flags.
  - d. All markings must be protected and preserved so the location of the utility is known at all times.
  - e. Take pictures and keep records of the survey to include with the Excavation Permit.
4. Ground Penetrations:
- a. Prior to any excavation beginning, the scope of work must be reviewed with the Contractor to discuss the process and hazards related to task.
  - b. Subcontractors must complete the Ground Penetration / Dig Permit daily and have it signed by the Contractor's project representative.
  - c. Protect and preserve the markings of utilities until those markings are no longer required for proper and safe excavations.
  - d. The exact location and depth of any known / found utilities within 24" of the excavation must be identified by one of the following means:
    - 1) Hand digging
    - 2) Pot holing
    - 3) Hydro / Vacuum excavation

- e. Maintain a minimum of 24” (tolerance zone) between the utility and the cutting edge or point of powered equipment.
  - f. When approaching and excavating within the tolerance zone of underground utility facilities with powered equipment, the Subcontractor must provide a spotter to visually monitor the excavation activity for any indication of the underground utility.
  - g. Conduct the excavation within the tolerance zone of the utility in a careful, prudent and non-destructive manner such as hand digging, hydro/vacuum excavation. Do not excavate within the tolerance zone with any powered equipment.
  - h. Review area(s) of work to verify there are no power lines/overhead cables in the work area. If there are, a plan must be approved by the Contractor prior to proceeding.
5. Demolition (sub-surface):
- a. When demoing existing utilities, the same procedures listed in section 1.2-B.4 must be followed.
  - b. When demoing existing structures, the Contractor’s demolition checklist must be completed prior to commencement.

1.3 ASSIGNMENT OF RESPONSIBILITY

1. Contractor shall provide all record documents for the Subcontractor to use to locate new / existing utilities.
2. Subcontractor shall include all costs to achieve the requirements listed in this specification section.

**END OF SECTION 01 45 16**

## SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

### PART 1 - GENERAL

#### 1.1 SUMMARY

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

#### 1.2 REGULATIONS

- A. Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to:
  - 1. Building code requirements
  - 2. Health and Safety requirements
  - 3. Utility company requirements
  - 4. Police, fire department and rescue squad rules
  - 5. Environmental protection regulations.
- B. Inspections: Each temporary utility shall be tested prior to use as per the local authority having jurisdiction.

#### 1.3 ASSIGNMENT OF RESPONSIBILITY

- A. The Contractor shall assign specific responsibility for installation, maintenance and removal of certain temporary facilities below.
- B. Items that have no specific responsibility assigned to them shall apply to each and every Subcontractor.
- C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  - 1. Materials and facilities that constitute temporary facilities are property of Subcontractor. Owner reserves right to take possession of Project identification signs.
  - 2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period.

## PART 2 - LISTING OF REQUIREMENTS

### 2.1 TEMPORARY POWER AND LIGHTING

#### A. Summary

1. Each Subcontractor shall provide temporary power and lighting for construction purposes as needed after mobilization, as noted in the project schedule, or as coordinated with the Contractor. The future Electrical Subcontractor in BP#2 shall then extend the temporary power system and provide temporary lighting as the structure is completed. The Electrical Subcontractor shall maintain the same throughout the remainder of the construction period. Temporary systems shall be removed after the permanent systems are in place by the Electrical Subcontractor and with the approval of the Contractor.
2. The Electrical Subcontractor will provide temporary light and power distribution for construction purposes for all trades as describe in the subsequent paragraphs.
3. The Electrical Subcontractor is responsible to maintain the temporary electrical power and lighting system at all times and is to provide off hours service as needed for the same.
4. The Electrical Subcontractor is responsible for all electrical work related to the temporary heating/cooling and ventilation. See appropriate section of this specification for further detail.
5. Until such time as temporary power is established, each Subcontractor shall provide their own generators to provide their own power as required.
6. Non-corded battery powered tools are preferred. However, if corded tools are required each Subcontractor shall provide their own extension cords as necessary. Extension cords, if used, must remain suspended by non-conducting materials 9' above finished floor elevation and relocated as necessary to facilitate the work

#### B. Temporary Electric – General Requirements

1. The Electrical Subcontractor is to provide a submittal detailing the distribution system, power receptacle bank locations and general information on lighting layout for review by the Contractor.
2. Receptacles and panels should be mounted on plywood panels and wood floor stands at all distribution points or an approved alternative. Mobile manufactured receptacle banks can be used for all receptacle bank locations. The Electrical Subcontractor must maintain a log of testing GFCI receptacles as required by OSHA.
3. This service is to consist of panelboards, receptacles, switches, grounding and all other labor and materials necessary to provide a complete and operating system. Label all breakers and the corresponding receptacle and lighting area they feed. This is to be done on the panel directory provided with the panel.
4. The temporary system is to be laid out, balanced, and sized so as to produce a voltage drop of no more than 5% at the extreme end of the line, when operating at full load.
5. Install and maintain a reasonably balanced system and take current readings on the feeders at regular intervals as required. Correct any serious phase unbalance.
6. Protect the installation against weather damage, normal operations of other trades, and other persons on the site.
7. All wiring for the temporary system must be installed a minimum of 9'0" above finished floor and routing shall be coordinated with the Contractor.
8. Maintain the temporary electrical service for the duration of this contract.
9. Removal of all temporary electric material is the responsibility of the Electrical Subcontractor. Damage caused by removing the temporary electric system is the

responsibility of the Electrical Subcontractor. This does not include “normal” patching of drywall where conductors pass through partitions.

C. Temporary Lighting

1. Provide labor and material for the installation and maintenance of temporary lighting for all areas of construction as required for the duration of this contract.
2. Maintain temporary outdoor security lighting around the site to illuminate the entire building perimeter as needed to not leave any dark spaces on the project site. As conditions change provide and install additional security lighting at the direction of the Contractor.
3. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system. Provide switching on each floor level for the purpose of turning lights off during non-work hours. Minimum night lighting levels must be maintained, as required.
4. Temporary general lighting will be provided such that a minimum of 5 foot-candle illumination level is maintained in all areas. As part of the general requirements above the Electrical Subcontractor must submit a temporary lighting plan to the Contractor for approval prior to installation. This plan should include anticipated lighting levels.
5. Fixtures and Lamps are required to be LED type.
6. All wiring for temporary lighting must be installed a minimum of 9’0” above finished floor.
7. Install and maintain a reasonably balanced system and take current readings on the feeders at regular intervals as required. Correct any serious phase unbalance.
8. Protect the installation against weather damage, normal operations of other trades, and other persons on the site.
9. Replace lamps as required for the duration of this contract.
10. The Electrical Subcontractor is responsible for adding any additional lighting as partitions are erected to maintain the required foot-candle level.
11. All temporary lighting will be removed as part of this Contract by the Electrical Subcontractor as directed by the Contractor. The Electrical Subcontractor will remove all components off site and repair the work as directed by the Contractor.
12. Any temporary lighting required by other trades before project wide temporary lighting is available or more stringent than what is describe herein is to be furnished by the trade requiring the lighting at their cost.

- D. Electrical work shall conform to requirement of the National Electrical Code and all federal, state and local requirements. The Electrical Subcontractor shall obtain and pay for applications, permits, and inspection pertaining to this work.

## 2.2 SANITARY FACILITIES

- A. TC-02 shall provide temporary chemical-type toilet facilities for all workers for the duration of the project. Provide number of units as appropriate for number of workers on-site. Hand washing facilities shall also be provided at designated locations.



2.3 TEMPORARY WATER

- A. Each Subcontractor shall provide for their own temporary water required for construction purposes. Taps off of existing fire hydrants or water mains may be considered, provided each Subcontractor wanting to do so coordinates with the local water utility company.
- B. Each Subcontractor shall provide its own drinking water.

2.4 FIELD OFFICES AND SHEDS

- A. Any Subcontractor requiring office or storage trailers or sheds shall request space for such through the Contractor. There will limited areas for materials storage on the project site. Each Subcontractor shall be responsible for installation, maintenance and removal of their storage facilities. Prior approval by CM is required.

2.5 ON-SITE MATERIAL STORAGE

- A. The Contractor shall designate a lay-down area for stored materials. Said areas shall be kept neat and orderly by those subcontractors using it. An area in Lot E will be provided but space will be limited.

2.6 TEMPORARY ROADS AND PAVING

- A. Each Subcontractor shall take measures to minimize mud and debris which might be tracked or fall onto existing roads. Any mud, debris, etc is the responsibility of the contractor responsible.

2.7 TEMPORARY PARKING

- A. Parking is on a paid basis only.

2.8 DEWATERING FACILITIES AND DRAINS

- A. Maintain the site, excavations and construction free of water.
- B. Comply with individual specification section requirements. If none stated in the specification section, comply with Division 2 sections.

2.9 CONSTRUCTION AND PERSONNEL HOISTING

- A. All Subcontractors shall be responsible for providing their own hoisting.

2.10 CONSTRUCTION SIGNAGE

- A. The Contractor will provide jobsite directional signage and project identification signage.

- B. No other signage will be permitted.

#### 2.11 SITE SECURITY

- A. Each Subcontractor shall be responsible for securing their materials, tools, and equipment.
- B. There will not be any security provided after hours.

#### 2.12 TEMPORARY FIRE PROTECTION

- A. Temporary fire protection measures are to be used until permanent fire protection systems are active and have been inspected and approved by local authorities. Each Subcontractor shall be responsible for providing their own fire protection measures.
- B. Install and maintain temporary fire protection facilities to comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding construction, Alterations, and Demolition Operations." They shall be UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- C. Locate fire extinguishers where convenient and effective for intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
- D. Store combustible materials in containers in fire safe locations.
- E. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.
- F. Provide supervision of welding operations, combustion type temporary heating units and similar sources of fire ignition.
- G. In addition to each Subcontractor's own fire extinguisher requirements, the Contractor shall provide fire extinguishers at each floor and near each stair per OSHA regulations.

#### 2.13 CONSTRUCTION DEBRIS HANDLING

- A. TC-02 shall provide dumpster(s) for debris and waste materials generated from construction operations. This dumpster shall be used for disposal of materials from this project site only. It shall be emptied promptly when full.
- B. Each Subcontractor shall be responsible for transporting their own debris and waste materials to the dumpster.
- C. Subcontractors performing demolition activities shall provide their own means for removal of debris and demolished materials from the site. The aforementioned dumpster shall not be used for demolition debris, concrete, or concrete washing.

2.14 BARRICADES, WARNING LIGHTS AND SIGNS

- A. Subcontractors shall erect and maintain barricades, warning lights and signs necessary to protect other personnel, the public and the Work. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Illuminate when used during periods of darkness.
- B. Provide barricades, identification and illumination as required around excavation hazards.

**END OF SECTION 01 50 00**

SECTION 017329

CUTTING AND PATCHING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Requirements for all cutting (including excavation), fitting, and patching required to:
  - 1. Cut and patch at interface of new work at existing construction.
  - 2. Remove and replace portions of the Work to provide for installation of ill-timed work.
  - 3. Remove and replace defective work or work not conforming to requirements of Contract Documents.
  - 4. Remove samples of installed work as specified for testing, and subsequent patching/replacement.
- B. Refer to General Conditions also.

1.2 SUBMITTALS

- A. Requests for Construction Manager's Consent:
  - 1. Prior to cutting that affects structural safety, submit written request to Construction Manager for permission to proceed with cutting.
  - 2. Should conditions of the Work, or schedule, indicate a required change of materials or methods for cutting and patching, so notify Construction Manager and secure written permission from Construction Manager and the required change order prior to proceeding.
- B. Notices to Construction Manager:
  - 1. Prior to cutting and patching performed pursuant to Construction Manager's instructions, submit cost estimate to Construction Manager. Secure Construction Manager's approval of cost estimates and type of reimbursement before proceeding with cutting and patching.
  - 2. Submit written notice to Construction Manager designating the time work will be uncovered, to provide for Construction Manager's observation.

1.3 QUALITY ASSURANCE

- A. Coordinate with work of other Contractors and subcontractors to minimize cutting and patching.
- B. Perform cutting and patching with adequate numbers of skilled workmen who are trained and experienced in the necessary crafts and who are familiar with the specified requirements and methods needed for proper performance of the work.
- C. Patching shall match the adjacent surfaces, shall meet code requirements, and shall be performed by trade specializing in the work requiring patching.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Comply with Sections and standards for each specific product involved.

2.2 PAYMENT FOR COSTS

- A. Perform cutting and patching required by Contract Documents at no additional cost to Owner. Owner will reimburse Contractor for cutting and patching performed pursuant to a written change order.
- B. Any cost caused by defective or ill-timed work shall be borne by the party responsible for the defective or ill-timed work.

PART 3 EXECUTION

3.1 PREPARATION

- A. Inspect existing conditions of the Project Site, including elements subject to damage or movement during cutting and patching.
- B. Provide adequate temporary support as necessary to assure the structural value or integrity of affected portion of work.
- C. Provide devices and methods to protect other portions of the Project from damage.
- D. Provide protection from weather, exposure, etc for that portion of the Project that may be exposed by cutting and patching work.

3.2 INSTALLATION

- A. Execute cutting and demolition by methods that will prevent damage to other work and will provide proper surfaces to receive installation of repairs.

- B. Employ original installer or fabricator to perform cutting and patching for:
  - 1. Weather-exposed or moisture-resistant elements.
  - 2. Exposed-to-view finished surfaces.
- C. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes.
- D. Restore work which has been cut or removed; install new products to provide completed work in accordance with requirements of Contract Documents.
- E. Where new work requires cutting and patching of existing conditions, patch adjacent areas and interface new work with existing to provide a finished construction of like materials, finishes, quality, and function at the existing conditions. Make all repairs, patches, fillings, etc., to the satisfaction of Owner, Construction Manager, and Architect.

END OF SECTION

## SECTION 017700

### CLOSEOUT PROCEDURES AND SUBMITTALS

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Project requirements to be fulfilled near the end of Contract Time in preparation for final acceptance and occupancy of the Work by the Owner.

##### 1.2 RELATED SECTIONS

- A. Section 007200 - General Conditions.
- B. Section 013300 - Submittals.
- C. Section 014000 - Quality Requirements.
- D. Section 015000 - Construction Facilities and Temporary Controls.
- E. Specific additional requirements for individual units of Work are included in the associated Specifications Sections.

##### 1.3 COORDINATION

- A. Each Contractor and subcontractor shall comply with provisions of this Section.
- B. Subcontractors shall make all submittals and requests specified in this Section to Contractor as required. Contractor shall:
  - 1. Keep a log of all submittals and requests.
  - 2. Review all submittals and requests.
  - 3. Transmit submittals and requests to Construction Manager with a cover letter itemizing all submittals and requests being transmitted along with a statement indicating for each item Contractor's best judgment as to the appropriateness of the submittal or request.

##### 1.4 QUALITY ASSURANCE

- A. Prior to requesting inspection, Contractor shall review Work and confirm that the Work is completed in accordance with the specified requirements and is ready for the requested inspection.

##### 1.5 PREREQUISITES TO SUBSTANTIAL COMPLETION

- A. General: Before requesting inspection for Certificate of Substantial Completion, either for all the Work or for portions of the Work, complete the following items. List known exceptions in the request.
1. Items required for Substantial Completion per Section 007200.
  2. In the progress payment request that coincides with, or is the first request following, the date Substantial Completion is claimed, show either 100% completion for the portion of the Work claimed as substantially complete, or list incomplete items, the value of incomplete work, and the reasons for the incomplete work. Include supporting documents for completion that are required by the Contract Documents. Include a statement showing an accounting of changes to the Contract Sum to date.
  3. Advise the Owner and Construction Manager of pending insurance change-over requirements and provisions for continuing the performance bond through the warranty period.
  4. Submit operations, maintenance, and data manuals, and materials, including spare and replacement parts and special maintenance tools, if required by manufacturer for proper maintenance.
  5. Submit specific warranties, guarantees, workmanship/maintenance bonds, maintenance agreements, final certifications, and similar documents for those items whose warranties, guarantees, bonds, etc. commence on the date of Substantial Completion.
  6. Discontinue or change over and remove temporary facilities and services from the Project Site, along with construction tools and facilities, and similar elements.
  7. Complete cleaning requirements.
- B. Inspection Procedures:
1. Upon receipt of Contractor's request for inspection, the Construction Manager and Architect will either proceed with inspection or advise the Contractor of unfilled prerequisites.
  2. Following initial inspection, the Construction Manager and Architect will prepare the Certificate of Substantial Completion or will advise Contractor of Work which must be performed before the Certificate can be issued. Construction Manager and Architect will repeat the inspection when requested and when assured that the Work is substantially complete.
  3. Results of the completed inspection will form the initial punch list for final acceptance.

## 1.6 PREREQUISITES TO FINAL COMPLETION



- A. General: Before requesting final inspection for Certificate of Final Acceptance and final payment, complete the following items. List known exceptions, if any, in the request.
  1. Items required for Final Completion per Section 007200.
  2. Submit the final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required. Include an updated final statement accounting for final additional changes to the Contract Sum.
  3. Submit a copy of the Construction Manager and Architect's final punch list stating that each item is complete or otherwise resolved for acceptance.
  4. Submit consent of Surety.
  5. Submit evidence of final, continuing insurance coverage complying with the insurance requirements of the Conditions of the Contract.
  6. Submit affidavits as required by the Ohio Mechanics lien law.
  7. Submit Prevailing Wage Compliance Certificates.
  8. Submit Record Documents, final project photographs, damage or settlement survey and similar final record information.
- B. Re-inspection Procedure:
  1. Construction Manager and Architect will re-inspect the Work upon receipt of Contractor's notice that the Work, including punch list items resulting from earlier inspections, is complete except for those items whose completion was delayed because of circumstances acceptable to the Owner.
  2. Upon completion of re-inspection, the Construction Manager and Architect will either prepare a certificate of final acceptance, or they will advise Contractor of Work that is incomplete or of obligations not fulfilled, but required, for final acceptance.
  3. If necessary, the re-inspection procedure will be repeated.

## 1.7 PROJECT RECORD DOCUMENTS

- A. Provide Record Documents in electronic format to the Construction Manager for all aspects of the Project.
  1. Show all changes from the Contract Documents made during the Work.

Unless noted otherwise, indicate changes in red notations on pdf's of Construction Documents. Make notations in a neat and legible manner on the pdf's, with additional explanatory drawings or sketches as necessary.

2. Submit Record Documents in electronic formats described in Article 9 of the General Conditions and Section 011100 – Summary of Work.
- B. Record Documents shall be complete and incorporate information from subcontractors. Ensure that Record Documents indicate the following:
1. Correct location of Work items and equipment where it differs from the location shown on Drawings.
  2. Survey information, specifically including new and existing pile locations and new and existing utility documentation.
  3. Specific items and requirements listed in individual specification Sections.
  4. Other information of a pertinent or useful nature.
- C. Submit the completed set of Record Documents as specified in 1.7 above, unless noted otherwise within individual specification Sections.
- D. Refer also to individual specification Sections for specific additional requirements for Record Documents.

#### 1.8 GUARANTEES AND WARRANTIES

- A. Before request for inspection for Substantial Completion, submit to the Construction Manager the certificates of guarantee and warranty required by the Specifications.

#### 1.9 CLOSEOUT PROCEDURES

- A. Except as otherwise indicated or requested by the Construction Manager, remove temporary protection devices and facilities installed during the Work to protect existing or previously completed Work.
- B. Comply with safety standards and governing regulations for cleaning operations. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the Project Site and dispose of in a lawful manner. Where extra materials remain after completion of associated work, dispose of these materials as directed by the Construction Manager.

#### 1.10 PROJECT CLOSEOUT SUBMITTAL CHECKLIST

- A. Each Contractor and subcontractor shall submit to Construction Manager its portion of the following documents, as applicable, in accordance with all requirements of the Contract Documents:

1. Project Record Documents (As-Builts).
2. Operation and maintenance manuals (and materials, where specified for mechanical and electrical equipment). Provide manuals in electronic format, as well as three (3) hard copies of each manual bound in three-ring binders.
3. Operation and maintenance data (in electronic format) and materials for operating items other than mechanical and electrical equipment, where specified.
4. Maintenance materials and spare parts.
5. Maintenance data (in electronic format) and materials for finish materials, where specified.
6. Replacement materials.
7. Special maintenance tools, if required by manufacturer for proper maintenance, or if specified.
8. Guarantees, warranties and bonds.
9. Affidavits.
10. Evidence of compliance with requirements of governing authorities as applicable.
11. Release of liens and other related project closeout data, as indicated in General Conditions.

## PART 2 PRODUCTS

Not used.

## PART 3 EXECUTION

Not used.

END OF SECTION

## SECTION 024100

### DEMOLITION

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Protection for structures, utilities, and other improvements that are to remain.
- B. Selective demolition of designated construction.
- C. Removal of materials from site.
- D. Salvage and storage of removed materials.
- E. Abandonment of utilities.

##### 1.2 RELATED SECTIONS

- A. Section 310000 - Earthwork.

##### 1.3 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of General Conditions and Section 017700.

##### 1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable laws, ordinances, and the Cincinnati - Ohio Building Code for demolition of structures, safety of adjacent structures, dust control, runoff control, and disposal.
- B. Comply with applicable requirements of NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations.
- C. Obtain required permits from authorities (except for any permits that Construction Manager is responsible for obtaining for the Project – refer to Section 014216).
- D. Notify affected utility companies before starting work and comply with their requirements.
- E. Do not close or obstruct roadways, sidewalks, and hydrants without permits.
- F. Do not close or obstruct egress width to any building or site exit.
- G. Do not disable or disrupt fire or life safety systems without three business days

prior written notice to Owner and Construction Manager.

- H. Conform to applicable regulatory procedures when discovering hazardous or contaminated materials.
- I. Comply with ODOT Construction and Material Specifications and City of Cincinnati Supplement to ODOT Construction and Material Specifications.

#### 1.5 SEQUENCING

- A. Coordinate work with the Construction Schedule and Construction Manager.

#### PART 2 PRODUCTS

Not used.

#### PART 3 EXECUTION

##### 3.1 PREPARATION

- A. Provide, erect, and maintain temporary barriers and security devices at locations indicated and as required by regulatory requirements. Prevent spread of dust, odors, and noise. Refer to Erosion Control Plan for additional information.
- B. Protect existing structures, utilities, landscaping, materials, and appurtenances which are not to be demolished.
- C. Prevent movement or settlement of adjacent structures.
- D. Notify affected utility companies before starting work and comply with their regulations. Locate utilities prior to starting Work.

##### 3.2 DEMOLITION REQUIREMENTS

- A. Conduct demolition to minimize interference with adjacent structures and utilities.
- B. Conduct operations with minimum interference to public or private accesses. Maintain protected egress and access at all times.
- C. Sprinkle Work with water to minimize dust. Provide water trucks or hoses and water connections for this purpose.
- D. Notify Construction Manager if asbestos-containing materials are encountered during demolition.

##### 3.3 DEMOLITION

- A. Use only procedures that will not damage existing construction.

- B. Do not remove any part of the work that will leave the remaining work unstable.
- C. If deteriorated materials, not intended for removal, are encountered during demolition, stop all work in that area and notify Construction Manager and Owner immediately.
- D. Demolish and remove existing construction only to the extent indicated. Use methods required to complete Work within limitations of governing regulations and as follows:
  - 1. Proceed with demolition systematically.
  - 2. Remove dangerous or unsuitable materials and promptly dispose of off-site.
  - 3. Dispose of demolished items and materials promptly. On-site storage or sale of removed items is prohibited.
- E. Remove demolished materials from site, frequently and promptly.
- F. Do not burn or bury materials on site. Leave site in clean condition.
- G. Remove temporary work.

#### 3.4 SURVEY AND DOCUMENTATION OF CONDITIONS

- A. Provide the services of a professional surveyor registered in the State of Ohio. As Work progresses, and before excavations are backfilled, surveyor shall survey and record on Record Drawings the location, elevation, orientation, and size of:
  - 1. Utilities, manholes, and catch basins encountered.
  - 2. At ends of removed utilities, where a portion of the existing utility is to remain, survey location, size, and depth/invert of the utility.
  - 3. Existing piles scheduled to remain and new piles.
  - 4. Other features encountered and requested to be recorded by the Construction Manager, Architect, or Owner.

#### 3.5 ABANDONMENT OF UTILITIES

- A. At ends of removed utilities, where a portion of the existing utility is to remain: fill, cap, seal, and abandon utility in accordance with Utility's requirements and recommendations.

END OF SECTION

SECTION 030100  
CONCRETE REPAIRS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. All labor, material, tools, equipment and services to perform concrete repairs at areas indicated on the Drawings and in the Specifications, including but not limited to:
  - 1. Survey existing concrete for damage. Repaired damaged area prior to starting fluid applied water proofing and expansion joints.
  - 2. Concrete slab repairs.
  - 3. Expansion joint blockout repairs.
  - 4. Shallow concrete repairs.

1.2 RELATED SECTIONS

- A. Section 071400 – Fluid Applied Waterproofing.
- B. Section 079000 – Expansion Joints.
- C. Section 079200 - Sealants.

1.3 REFERENCES

- A. American Concrete Institute (ACI):
  - 1. ACI 301 - Specification for Structural Concrete for Buildings.
  - 2. ACI 305R - Hot Weather Concreting.
  - 3. ACI 306R - Cold Weather Concreting.
  - 4. ACI 318 - Building Code Requirements for Reinforced Concrete.
- B. American Society for Testing and Materials (ASTM):
  - 1. ASTM A185 - Specification for Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement.
  - 2. ASTM A615 - Specification for Deformed and Plain-Billet Steel Bars for Concrete Reinforcement.
  - 3. ASTM A775 – Standard Specification for Epoxy-Coated Reinforcing Steel Bars.

4. ASTM C882 – Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete.
  5. ASTM C33 - Concrete Aggregates.
  6. ASTM C39 - Test Method for Compressive Strength of Cylindrical Concrete Specimens.
  7. ASTM C94 - Specification for Ready-Mixed Concrete.
  8. ASTM C143 - Standard Test Method for Slump of Portland Cement Concrete.
  9. ASTM C150 - Specification for Portland Cement Concrete.
  10. ASTM C260 - Specification for Air-entraining Admixtures for Concrete.
  11. ASTM C494 - Specification for Chemical Admixtures for Concrete.
  12. ASTM C881 – Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
  13. ASTM C882 – Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete.
- C. Structural Steel Painting Council (SSPC):
1. Surface Preparation Specification No. 3 (SP3) – Wire Wheel Cleaning.
  2. Surface Preparation Specification No. 6 (SP6) – Commercial Blast Cleaning.
- D. American Association of State Highway and Transportation Officials (AASHTO):  
AASHTO M182 - Specifications for Burlap Cloth Made from Jute or Kenaf.
- E. Keep a copy of the referenced specifications cited in this section in the on-site field office.

#### 1.4 SUBMITTALS

- A. Submit literature for manufactured products, including manufacturer's specifications, test data and installation instructions.
- B. Letter stating this Contractor and supplier are familiar with the referenced standards.
- C. The Owner's review of details and construction operations shall not relieve this Contractor of his responsibility for completing the work successfully in accordance with the Contract Documents.



- D. Submit mix designs and test results conforming to the requirements of Section 4 of ACI 301. Submit request for approval to use admixtures, if any. A complete mix design submittal must be furnished at least three weeks before the planned use of that mix. The Contractor is cautioned to undertake mix design preparation and submittal procedures immediately after authorization to proceed with the project.
  - 1. Submitted mix design shall address weather conditions which are expected to occur during the concrete repair phases. Concrete mixes shall not only be designed for average temperature and humidity conditions, but also for adverse conditions (hot and cold weather), as applicable to this project.
- E. Provide the following in accordance with ACI 301.
  - 1. Mill test for cement.
  - 2. Admixture certification.
  - 3. Aggregate certification.
  - 4. Procedure for adding water to ready-mix at site, including method of measuring water.
  - 5. Method of adding admixtures.
  - 6. Materials and methods for curing.
  - 7. Ready-Mix delivery tickets.
  - 8. Certificate of Conformance for concrete production facilities by NRMCA (National Ready Mix Contractors Association).
  - 9. Field and laboratory tests that are the Contractor's responsibility.
- F. The Owner's review of details and construction operations shall not relieve this Contractor of his responsibility for completing the work successfully in accordance with the Contract Documents.

## 1.5 QUALITY ASSURANCE

- A. The Contractor shall comply with all Federal, State and Municipal laws, codes, ordinances and regulations applicable to the Work in this Contract and also with all requirements of the National Fire Protection Association, the National Electric Code, and the Occupational Safety and Health Administration (OSHA). If the above laws, codes or ordinances conflict with this Specification, then the laws, codes or ordinances shall govern, except in such cases where the Specification exceeds them in quality of materials or labor, then the Specifications shall be followed.

- B. Concrete that does not conform to the specified requirements, including bond to substrate, strength, finish and tolerances shall be subject to removal and replacement, including necessary preparatory work, at no additional cost to the Owner and without extension to the Contract Time.
- C. Contractor shall be responsible for restoration of other components of the Work damaged during placement of concrete or damaged during removal of unsatisfactory concrete.
- D. ACI 301, ACI 305R and ACI 306R are a part of the Contract Documents, are incorporated herein as fully as if here set forth and are referred to as General Concreting Requirements.
- E. Chloride Ion Limitations: Maximum acid-soluble chloride ion concentration, in hardened concrete shall not exceed .10% by weight of cement.
- F. Concrete testing and certification shall be as described in ACI 301, Chapter 16.

#### 1.6 WARRANTY

- A. A warranty period of two (2) years shall be provided for concrete work performed under this Section against defects, as determined by the Owner, including but not limited to debonding, excessive cracking and surface scaling.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. Pre-packed Concrete Materials:
  - 1. Horizontal Application – Typical Repair Areas (Patch Material Type A):
    - Intended for transfer slab repairs*
    - a. MasterEmaco T 310CI by BASF
    - b. SikaQuick 1000 by Sika Corp.
    - c. MasterEmaco T 1060/1061 by BASF
    - d. Planitop 18 ES by Mapei.
  - 2. Vertical and Overhead Repair Areas-Trowel Grade (Patch Material Type B.1):
    - a. MasterEmaco S 488CI by BASF
    - b. SikaQuick VOH by Sika Corp.
    - c. MasterEmaco N 425 by BASF
    - d. Planitop XS by Mapei

- B. Water:
  - 1. Mixing water shall be potable meeting requirements of ASTM C-94.
- C. Bar Coating:
  - 1. Sikadur 32, Hi-Mod LPL by Sika, Inc.
  - 2. MasterEmaco ADH 326 by BASF
- D. Bonding Agent (used for shallow floor patches if the patch is not deep enough for patch anchors; patch material must be placed while epoxy is still wet)
  - 1. Sikadur 32, Hi-Mod LPL by Sika, Inc.
- E. Welded Wire Reinforcement:
  - 1. Conforming to ASTM A185.
- F. Reinforcing Steel:
  - 1. All reinforcing steel shall have a minimum Fy of 60 ksi.
  - 2. Provide epoxy coated steel where shown on Drawings.
- G. Curing Materials:
  - 1. 10 oz. burlap meeting the requirements of AASHTO M-182.
  - 2. Visqueen: 6 mil polyethylene (white).
- H. Curing Compound:
  - 1. VOCOMP-25 by W.R. Meadows.
  - 2. MasterKure CC 1315WB by BASF
  - 3. Liquid membrane forming curing compound shall conform to the requirements of ASTM C1315, Type 1, Class A and have data from an independent laboratory indicating a maximum moisture loss of 0.40 grams per square cm. when applied at a coverage rate of 300 square feet per gallon.
- I. Form Lumber:
  - 1. New fire retardant material, grade and size to adequately form, support and brace concrete and to provide finishes that match adjacent surfaces.
- J. Epoxy Grout:
  - 1. Sikadur 32, Hi-Mod LPL epoxy mixed with silica sand.

K. Patch Anchors:

1. Stainless steel spikes by Powers Rawl.

PART 3 EXECUTIONS

3.1 GENERAL

- A. Prior to the start of work, the Contractor shall survey areas to receive repair concrete to determine locations and approximate quantity of material.
- B. Prior to start of excavations, perform an on-site review of the work areas with the Owner. Provide a minimum of 2 working days notice prior to the requested review day.
- C. Prior to performing operations such as jack hammer work, the Contractor shall make a careful and thorough survey of the underside of the level on which he intends to work and shall remove all loose soffit concrete which may fall as a result of those operations. The Contractor shall also be responsible for posting all signs and erecting all barricades as necessary to prevent pedestrians and vehicles from entering the area below hazardous work.
- D. During concrete removal work, Contractor shall not damage existing mild steel reinforcement. Mild steel reinforcement that is damaged by the Contractor, as determined by the Owner, shall have a new reinforcing bar the same size as the damaged bar lapped to each side of the damaged area. Lap lengths shall be determined by ACI 318. Cost of new reinforcing bar, concrete removal and patching for lap length shall be borne by the Contractor.
- E. It is intended that the existing reinforcement steel exposed during the work shall remain in place (unless noted on Drawing for removal) and undamaged during removal of the unsatisfactory concrete. Tie loose reinforcement bars in place in an approved manner prior to placing patch mix. If the reinforcement is deteriorated, as determined by the Owner, the Owner may direct that it be replaced and spliced in accordance with ACI splice and development requirements for reinforcement bars. Additional concrete removal may be required to expose undamaged reinforcing. If required, compensation will be made in accordance with the established Unit Prices.
- F. Concrete placement for patches or overlays on sloping surfaces shall begin on the low elevation end and proceed upwards to the high elevation end.
- G. Control joints to be either tooled or sawed into concrete slab. Confirm control joint pattern with Owner prior a minimum of 24 hours prior to placement of concrete. Tooled joints are to be cut while concrete is wet. Sawed joints to be cut within 6 hours of slab placement before slab begins to crack.

### 3.2 PROTECTION

- A. Contractor shall protect all open excavations, and reinforcing therein, from damage due to mechanical disturbance, weather conditions or other causes.
- B. Contractor shall protect occupied areas below the work area during all phases of the work including removal, preparation and placement of materials.
- C. Provide barricades to close areas immediately below the work area. Coordinate the time closing of required areas with the Owner.

### 3.3 SHALLOW, DEEP AND FULL DEPTH FLOOR REPAIR PROCEDURE

- A. Refer to the Drawings for repair details. Contractor shall sound the concrete deck using chain drag method and hammer survey to identify the limits of deteriorated concrete within the Work Area. Mark with paint each area to be repaired. Location of paint marks must be approved by the Owner's representative.
- B. Remove floor concrete within the Work Area by conventional chipping methods.
- C. Conventional Chipping Method:
  - 1. Sawcut the concrete deck surface along the perimeter of the paint marks which define the removal area. Do not cut existing reinforcement. Depth of sawcuts shall be 3/4 inch. Cut perimeter of removal area before beginning chipping hammer work. Do not over cut corners of patch area.
  - 2. Perform concrete removal with no larger than 18-pound chipping hammers.
  - 3. Begin concrete removal at the center of the removal area and work towards the sawcut perimeter. Maintain vertical sawcut edge at perimeter. Re-saw if necessary to maintain required edge.
  - 4. Contractor shall use due diligence to perform concrete chipping operation in a manner to avoid punching through slab. Means such as utilizing wide chipping blades and performing chipping procedures on a low angle are recommended.
- D. The surface of the sound, exposed concrete shall be relatively flat with 1/4" amplitude over the repair area for new concrete patches and overlays. Contractor is responsible for insuring that the final concrete repair area is sound.
- E. Within 24 hours of concrete repair material placement, media blast the excavation and the immediately adjacent surface. Reinforcing steel shall be cleaned to a SSPC-SP6 condition unless otherwise indicated.
- F. After completion of all cleaning operations, blow-out excavations with oil-free and water-free compressed air. Previously cleaned excavations that are subjected to contamination must be re-cleaned.

- G. The Owner will inspect excavations prior to coating reinforcing steel. Final touch-up of excavations and reinforcing steel shall be performed before proceeding.
- H. Within 8 hours after cleaning, coat all surfaces of exposed steel with one coat of bar coating. Allow coating to become tack free before proceeding with second coat.
- I. Apply second coat of bar coating to previously coated steel. Do not apply coating to substrate or allow coating to puddle in low areas of excavation.
- J. Thoroughly saturate all concrete surfaces to be in contact with new concrete as necessary to provide a saturated surface dry condition.
- K. Just prior to concrete placement blow-down area with oil-free compressed air to remove standing and puddled water.
- L. Place Patch Material Type A or Type B in the excavations. Vibrate new patch material to ensure consolidation in maximum-depth areas and at the excavations perimeter. Screed material flush with adjacent surfaces and finish with a float or light trowel.
- M. After finishing, fog concrete surfaces with water using approved fog spray device (hose not permitted) to prevent surface drying prior to start of curing.
- N. Cure Patch Material Type A in accordance with manufacturer's written instructions.

#### 3.4 OVERHEAD AND VERTICAL REPAIR PROCEDURE

- A. Refer to the Drawings for repair details. Contractor shall sound overhead and vertical concrete surfaces using hammer sounding techniques to identify the limits of deteriorated concrete within the Work Area. Mark with paint each area to be repaired. Location of paint marks must be approved by the Owner's representative.
- B. Before removal of overhead or vertical concrete within a Work Area, the Contractor and the Owner's representative will record the area bounded by the paint marks. Take measurements to the nearest inch in such a way that results in a total plan area at each location.
- C. Contractor and Owner's representative shall affix their signatures to each measurement sheet completed, attesting to the agreed-upon accuracy of the measurements. Furnish copies of measurement sheets to both parties for their records.
- D. Calculate and sum the total repair area to yield total square feet. Measurements are the sole basis for calculation of final payment, based upon the item's unit price. Refer to Section 012100 and Section 012900. Base unit price on the area of the repair and the depths indicated on the repair details.
- E. Remove concrete within the Work Area by conventional chipping methods.

F. Conventional Chipping Method:

1. Saw cut the concrete surface along the perimeter of the paint marks which define the removal area. Do not cut existing reinforcement. Depth of saw cuts shall be 1/2 inch. Cut perimeter of removal area before beginning chipping hammer work. Do not over cut corners of patch area.
2. Perform concrete removal with no larger than 18-pound chipping hammers.
3. Begin concrete removal at the center of the removal area and work towards the saw cut perimeter. Maintain vertical saw cut edge at perimeter. Resaw if necessary, to maintain required edge.
4. Contractor shall use due diligence to perform concrete chipping operation in a manner to avoid punching through a slab. Means such as utilizing wide chipping blades and performing chipping procedures on a low angle are recommended.

G. The surface of sound, exposed concrete shall be relatively flat with a ¼" amplitude over the repair area. Contractor is responsible for ensuring that the final concrete repair area is sound.

H. Within 24 hours of concrete repair material placement, media blast the excavation and the immediately adjacent surface. Reinforcing steel shall be cleaned to a SSPC-SP6 condition unless otherwise indicated.

I. After completion of all cleaning operations, blow-out excavations with oil-free and water-free compressed air. Previously cleaned excavations that are subjected to contamination must be re-cleaned.

J. The Owner will inspect excavations prior to coating reinforcing steel. Final touch-up of excavations and reinforcing steel shall be performed before proceeding.

K. Within 8 hours after cleaning, coat all surfaces of exposed steel with one coat of bar coating. Allow coating to become tack free before proceeding with second coat.

L. Apply second coat of bar coating to previously coated steel. Do not apply coating to substrate.

M. Maintain all concrete surfaces of repair areas in a wet condition to provide a surface saturated dry condition.

N. Just prior to material placement, blow-down area with oil-free compressed air to remove any standing water near vertical repair locations.

O. Place Patch Material Type B in the excavations per manufacturer's written instructions. Vibrate new patch material at vertical repairs to ensure consolidation in maximum-depth areas. Screed material flush with adjacent surfaces and finish with a light trowel.

P. After finishing, fog concrete surfaces with water using approved fog spray device (hose not permitted) to prevent surface drying prior to start of curing.

Q. Cure Patch Material Type B in accordance with manufacturer's written instructions.

### 3.5 EPOXY GROUT INSTALLATION PROCEDURE

A. Saw cut the concrete deck surface along the perimeter of the paint marks which define the removal area. Do not cut existing reinforcement. Depth of saw cuts shall be  $\frac{3}{4}$  inch. Cut perimeter of removal area before beginning chipping hammer work.

B. Begin concrete removal at the center of the removal area and work towards the saw cut perimeter. Maintain vertical saw cut edge at perimeter. Resaw if necessary, to maintain required edge.

C. Prior to epoxy grout placement, media blast the excavation and the immediately adjacent surface. Reinforcing steel shall be cleaned to a SSPC-SP6 condition unless otherwise indicated.

D. Mix epoxy mortar using 2 parts epoxy and 1 part clean over dried silica sand.

E. Apply neat epoxy worked into substrate for positive adhesion. Immediately follow with application of the epoxy mortar. Follow manufacturer's instructions for mixing and installation.

F. Do not allow traffic on epoxy mortar patch for a minimum of 24 hours.

### 3.6 FIELD QUALITY CONTROL

A. All excavations shall be inspected and approved prior to placing concrete. The Contractor shall notify the Owner 2 working days in advance of required inspection.

B. Notify the Owner at least 2 working days prior to placing concrete.

C. Acceptance of Structure:

1. Acceptance of Structure shall be in accordance with ACI 301 Chapter 18.

2. Contractor shall bear all costs of correcting rejected work, including the cost of Owner's services thereby made necessary.

### 3.7 CLEANING

A. Empty containers shall be removed from the Garage at the end of each working day. Cloths soiled with adhesive materials that might constitute a fire hazard shall be placed in suitable metal safety containers or shall be removed from the building at the end of each working day. Special care shall be taken in storage of disposal of flammable materials. Comply with health, fire and environmental regulations.



The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- B. All spilled materials shall be completely removed from hardware, adjacent floor areas, metal work, etc. Remove spilled coating by approved methods.
- C. Repaint in matching color all curbs, columns, walls, etc., where existing paint was removed during preparation of adhesive materials installations.
- D. All hardware, adjacent floor areas, metal work, etc., and the general premises shall be left clean and free of all construction dust, dirt and debris.

END OF SECTION

SECTION 033000  
CAST-IN-PLACE CONCRETE

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. Section Includes:

- 1. All labor, materials, equipment, special tools and services to complete cast-in-place concrete work required for the Project, as herein specified, and as indicated on the Drawings.

B. Related Sections:

- 1. Section 220504 – Basic Plumbing Materials and Methods: Sleeve Placement Coordination Drawings.
- 2. Section 220507 – Piping Materials & Methods: Sleeve Material & Installation.
- 3. Section 221319 – Drainage Systems Specialties: Drains.
- 4. Section 310000 – Earthwork.

1.3 REFERENCES

- A. A copy of each reference shall be kept in the field office for the duration of the project. The reference standards shall govern the work except as modified herein.
- B. American Concrete Institute (ACI) 301-16 Specifications for Structural Concrete is hereby incorporated as part of this Section. Supplemental requirements and modifications listed herein take precedence over the requirements of ACI 301. All ACI 301 items unless modified by the Contract Documents are incorporated as written. When any part of any item is modified or voided, the unaltered provisions of the part shall apply as written.
- C. ACI 305.1-14 Specification for Hot Weather Concreting.
- D. ACI 306.1-90 Standard Specification for Cold Weather Concreting.
- E. The ACI MNL-15(16) Field Reference Manual.
- F. Other ACI references as noted in this Section.
- G. American Association of State Highway and Transportation Officials (AASHTO) Specifications as noted in this Section.

- H. ASTM International (ASTM) Specifications as noted in this Section.
- I. Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practice, 28<sup>th</sup> Edition.
- J. National Ready Mixed Concrete Association (NRMCA) Quality Control Manual.

#### 1.4 SUBMITTALS

##### A. General.

1. Shop drawings shall be produced by the Contractor and submitted to the Architect/Engineer for review. The Architect/Engineer will endeavor to complete review of a shop drawing submittal within 14 days of receipt of the submittal. Fabrication of material prior to the receipt of approved shop drawings for that material shall be at the Contractor's risk.
2. The Contractor is responsible to furnish field-verified information, coordinate material requirements, and review shop drawings prior to submittal of shop drawings to the Architect/Engineer. Receipt of shop drawings by Architect/Engineer will be an assumption by Architect/Engineer that this has been done.
3. Notations by the Architect/Engineer made on the shop drawings do not authorize additional compensation for the Contractor.
4. The Contract Documents (Drawings and Specifications) govern all concrete work. Errors on shop drawings or discrepancies between shop drawings and Contract Documents shall be governed by the Contract Documents. Even if shop drawings contain errors after review by the Architect/Engineer, no additional compensation is due Contractor to correct work to what is shown on Contract Documents.
5. Architectural and mechanical drawings supplement the structural drawings. Requirements for concrete work may be shown on architectural and mechanical drawings.
6. The Architect's and Engineer's review of details and construction operations shall not relieve the Contractor of responsibility to successfully complete the work in accordance with these Specifications and within the Contract time.
7. Shop drawings may be received and returned electronically. If paper copies are submitted, no more than two copies will be returned to the Contractor or Construction Manager.

- ##### B. Submit mix designs and test results conforming to the requirements of Section 4 of ACI 301. Submit request for approval to use admixtures, if any. A complete mix design submittal must be furnished at least three weeks prior to the planned use of that mix. The Contractor is cautioned to undertake mix design preparation and submittal procedures immediately after authorization to proceed with the Project.

1. The submitted mix designs shall address weather conditions that are expected to occur during the concrete construction phase. Concrete mixes shall not only be designed for average temperature and humidity conditions, but also for adverse conditions (hot and cold weather), as applicable to this project.

- C. Submit letter stating that concrete subcontractors and suppliers are familiar with the reference standards.
- D. Submit a Quality Control Plan in accordance with Section 1 of ACI 301.
- E. Submit reinforcing steel shop drawings in accordance with Section 3 of ACI 301.
- F. Submit formwork shop drawings for record only. For multistory construction submit record calculations of shoring and reshoring loads sealed by a professional engineer licensed in the state where the Project is located. Design and inspection of formwork for structural adequacy is the Contractor's responsibility. Prior to submittal, formwork shop drawings shall be reviewed by the Contractor's registered professional engineer.
- G. For exposed-to-view concrete work submit formwork product data and shop drawings for architectural review of formwork factors affecting appearance of the completed Work, including types of forms, ties, finishes, and joint types and locations. Review is for general architectural applications and features only.
  - 1. Where the finish is to match a reference sample, reproduce a mockup of the sample in a location approved by the Architect. Obtain acceptance of mockup before proceeding with that finish in the locations designated on the Drawings.
- H. Submit procedures and records required in hot and cold weather concreting work.
- I. Submit documentation that epoxy coating applicator is certified under the Concrete Reinforcing Steel Institute's Fusion-Bonded Epoxy Coating Applicator Plant Certification Program.
- J. Submit the following certifications:
  - 1. All coating, floor covering, and surface treatment manufacturers' approvals (in writing) of concrete curing compounds that are not removed prior to the product's installation.
  - 2. Subsequent treatment manufacturers' approvals (in writing) of form release agent.
- K. Submit the following product samples for review:
  - 1. Samples of form(s) to be used for exposed-to-view concrete.
- L. The following submittals shall be provided in accordance with ACI 301 and Division 01 - General Requirements.
  - 1. Contractor's proposed Testing Agency.
  - 2. Field and Laboratory tests that are the Contractor's responsibility.
  - 3. Data and test documentation on proposed materials including but not limited to:
    - a. Cement.
    - b. Aggregates.
    - c. Admixtures.
    - d. Reinforcing.
    - e. Curing materials.
    - f. Related materials for concrete construction specified herein.

- g. Material for repair of surface defects if other than site-mixed portland-cement mortar.
  4. Construction joints not shown on the drawings.
  5. Method of developing bond at joints (except slabs on grade).
  6. Method of adding admixtures.
  7. Procedure for adding water to ready-mixed concrete at site, including method of measuring water.
  8. Method(s) for preserving moisture in the concrete.
  9. Ready-mixed concrete delivery tickets.
  10. Thermal control plan for all mass concrete placements.
- M. Submit Certificate of Conformance for concrete production facilities by NRMCA.
- N. Submit documentation of all flatwork finishers and flatwork supervisors' certifications.

## 1.5 QUALITY ASSURANCE

### A. Regulatory requirements:

1. Comply with applicable laws, ordinances, and the Ohio Building Code (OBC).
2. Comply with the referenced ACI publications, as modified and supplemented in this Section.

### B. Tests and inspections:

1. The Owner will employ a Geotechnical Engineer to inspect and approve foundation bearings and backfill compaction. Do not place concrete until subgrade approvals have been obtained.
2. The Owner will employ a testing and inspection agency to provide the services specified in Section 1.6.3 of ACI 301, including supplemental requirements defined in Article 1.8 of this Specification.
3. The Contractor shall select an independent testing agency, subject to the Architect/Engineer's approval, to perform all testing required by the Contractor for qualification of proposed materials and the establishment of mix designs, for his use in determining concrete strengths for early form removal, and for all other testing services needed or required by the Contractor.

### C. Flatwork finishers certification:

1. All flatwork finishers must be ACI Concrete Flatwork Technician certified.
2. The on-site flatwork supervisor must be ACI Concrete Flatwork Finisher and Technician certified.

### D. Ready-Mixed Plant Certification:

1. All ready-mixed concrete production facilities shall be certified by the NRMCA Program for Certification of Ready-Mixed Concrete Production Facilities.

### E. Pre-concrete construction Meeting:

1. A preconstruction meeting shall be arranged by the Contractor to review concrete pre-placement and placement activities, inspection and testing requirements, formed and unformed concrete finishes, hot and cold weather

concreting procedures, form removal, critical tolerances, and acceptance procedures for architectural concrete.

2. The meeting shall be held three weeks or more before the first non-foundation concrete placement.
3. Ready-mix supplier, Contractor, concrete finishers, Construction Manager, Owner's concrete testing agency, and Architect/Engineer shall attend.

#### 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver reinforcement to the project site bundled, tagged, and marked. Use durable tags indicating bar size, lengths, etc., and other information corresponding to markings shown on placing drawings.
- B. All reinforcement at the site shall be stored off the ground and protected from damage, accumulation of dirt, and excessive rust.
- C. Comply with CRSI "Field Handling Techniques for Epoxy-Coated Rebar at the Job Site" and as modified by this Section.
- D. All formwork at the site shall be stored in a clean, dry location off the ground, covered and protected from damage and accumulation of dirt, etc.

#### 1.7 SUBSTITUTIONS

- A. Requests for product substitutions must be submitted for review and approval, with all necessary documentation, a minimum of 10 days before bids are due. Product substitutions will only be permitted if incorporated into the bid documents by addendum.

#### 1.8 SUPPLEMENTAL REQUIREMENTS AND MODIFICATIONS TO ACI 301-16

- A. The following statements modify and supplement ACI 301. All unaltered parts of ACI 301 shall apply as written.
- B. The Section and paragraph numbers correspond to those in ACI 301. Note that each technical section of ACI 301 includes General requirements, Products, and Execution per the Three-Part Section Format of the Construction Specification Institute.

##### Section 1 (ACI 301) - General Requirements

- 1.5.3.1 The Contractor shall submit a quality control plan that addresses the following.
  - (a) Control and maintenance of project documents.
  - (b) Subcontractor/supplier services and verification of purchased products and materials.
  - (c) Concrete production inspection and testing.
  - (d) Pre-placement inspection including formwork, reinforcing, and embedments.

- (e) Placement inspection including consolidation, finishing and initial curing of concrete.
  - (f) Post-placement inspection including monitoring of moist curing and curing temperatures, verification of in-place strength before removal of shoring, and protection of exposed surfaces.
- 1.6.2.2(c) The Contractor is required to arrange for all testing, giving the Owner's testing agency at least 24 hours advance notice.
- 1.6.2.2(d)1 The Contractor shall provide curing boxes as required by ASTM C31. Coordinate quantity and location with the Construction Manager and Testing Agency.
- 1.6.3.1(c) The Owner's testing agency shall report in writing all test results to Architect/Engineer, Contractor, Construction Manager, and concrete supplier within three (3) working days after the tests are performed. Report by phone or email the results of early break cylinders to Contractor and Construction Manager. Reports of strength tests shall contain the name of the project, date and time of placement, location of placement, placement method, water added at site, sample location, weather conditions, batch ticket number, batch size, mix identification, specified strength, breaking strength and type of break, specimen diameter and weight, types of admixtures, percentage of entrained air, slump, concrete temperature, and detailed information of storage and curing of specimens before testing.
- 1.6.3.2(d)1 Unless noted otherwise concrete shall have at least one strength test for each 150 cubic yards, or fraction thereof, placed in any one day, nor less than one test for each 5000 square feet of surface area of slabs or walls, or fraction thereof. Strength tests are not required for backfill concrete.
- 1.6.3.2(d)2 Determine the slump (ASTM C143) for each batch of concrete that high-range water-reducer (superplasticizer) is added to in the field. Test and report slump both before and after superplasticizer is added.
- 1.6.3.2(e)1 When 6 by 12 in. cylinders are used make four test specimens for each sample (five required for mixes requiring 56-day strength tests). When 4 by 8 in. cylinders are used make five test specimens for each sample (six required for mixes requiring 56-day strength tests). One specimen shall be a hold specimen, to be tested only if a defective specimen is found.
- 1.6.3.2(e)2 Age of concrete for acceptance shall be 28 days unless otherwise shown in TABLE 4.2.2.8.b. Concrete mixes with strength specified at 56 days shall have one cylinder tested at 7 days, one at 28 days, and two 6 by 12 in. cylinders or three 4 by 8 in. cylinders at 56 days.

- 1.6.3.2(f) Air content tests shall be conducted on the first three batches in each placement of all mixes in which air entrainment is specified and until three consecutive batches have air contents within the range specified, at which time every third batch shall be tested. This test frequency shall be maintained until a batch is not within the range specified, at which time testing of each batch will be resumed until three consecutive batches have air contents within the specified range.
1. For pumped concrete the second or third batch in the placement, and periodically throughout the placement but not less than once for each 100 cubic yards, shall have air content checked at both the end of the truck discharge and at the end of the hose.
  2. Concrete that does not satisfy air entrainment requirements shall be rejected.
- 1.6.3.2(g) Testing services provide the basis for acceptance or rejection of concrete furnished by this contract. Therefore, it is necessary that testing for air content and slump not only be done after all adjustments have been made, but before the concrete is discharged.
- 1.6.3.3(f) The Owner will employ an inspection agency to visually inspect the placement of reinforcing steel. Reference OBC 1704.4. Do not place concrete until all outstanding issues cited in the inspection reports have been corrected. Inspection of reinforcing steel to include, but not limited to:
1. Size, spacing, and quantity of bars.
  2. Bar splices.
  3. Embedments.
  4. Concrete cover.
  5. Support and securement.
  6. Coatings.
- 1.6.3.3(g) The Owner will employ an inspection agency to inspect concrete operations including, but not limited to:
1. Use of proper concrete mix.
  2. Consolidation.
  3. Finish and finishing operations.
  4. Curing methods, materials, and procedures.
  5. Shoring removal and reshoring operations.
  6. Formwork materials.
- 1.6.4.1(a) Contractor shall be responsible for costs of tests on hardened concrete performed by Owner's testing agency if the tests are required to verify the strength or air content of the concrete because representative concrete cylinder tests or air content tests failed to meet acceptance criteria. Owner will be responsible for costs of tests on hardened concrete performed by Owner's testing agency if the tests are at the Owner's



request and representative concrete cylinder and air content tests meet acceptance criteria.

- 1.6.8.4 Concrete which fails to meet the requirements of this Specification shall be rejected.
- 1.7.1.6 The Contractor shall bear all costs of correcting rejected work, including the cost of the Architect's and Engineer's additional services thereby made necessary.
- 1.8.4 Masonry shall not be placed on or supported off of structural floors until the concrete is at least 28 days old and all shoring has been removed.

## Section 2 (ACI 301) - Formwork and Formwork Accessories

- 2.1.2.1(g) Form tie configuration and spacing for all exposed-to-view concrete shall be submitted for review and approval of the Architect.
- 2.2.1.3 Form release agent shall be a commercial formulation form coating compound that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces. The form release agent manufacturer shall certify that the form release agent is chemically and physically compatible with all subsequent treatments of concrete surfaces. Furthermore, the form release agent shall be approved in writing by the manufacturers of all subsequent treatments.
- 2.2.1.4 Preformed Expansion Joint Filler: Non-impregnated type, closed cell resilient polyethylene foam, 1/2 in. thick unless otherwise noted on the Drawings.
- 2.2.1.5(a) Waterstops:
  - 1. Bentonite rope joint sealant (1¼" x ½" minimum) shall be installed in all vertical and horizontal **construction joints** in concrete walls below and exposed to grade, including slab/wall construction joints, unless otherwise noted. Secure with manufacturer's adhesive and mechanical fasteners as required for a secure installation. Construction joint shall be clean and dry. Prior approved products: Volclay Waterstop-RX 101T, HYPER STOP DB-2515, QUELLMAX 18x24.
- 2.2.1.5(b) Embedded items shall not be made of aluminum.
- 2.2.2.1 Design and engineering of formwork shall be the responsibility of the Contractor. Design of formwork and preparation of formwork drawings shall be under the supervision of a licensed design engineer registered in the state where the Project is located. Formwork drawings shall be sealed by the licensed design engineer responsible for the design of the formwork.

- 2.2.2.3 Footings, pile caps, and grade beams shall be poured neat unless approved in writing by the Owner's Geotechnical Engineer and Structural Engineer prior to placement of concrete.
- 2.2.2.5(e) Construction joints shall be located such that the maximum placement length of a continuous concrete wall will not exceed 100 feet in any one day.
- 2.2.3.2 Form ties for exposed-to-view concrete walls shall leave a 1-1/4 in. diameter cone hole. This hole will be left open or epoxy mortared (fully or partially) at the discretion of the Architect.
- The ties shall be one of the following:
- (a) Stainless steel "snap-ties" with a 1 in. break back.
  - (b) Galvanized "coil-bolt" type tie.
  - (c) "She-bolt" tie with the inner male unit galvanized.
  - (d) Other removable type tie with approval of the Architect.
- 2.3.1.2(a) Exposed edges of columns, walls, slabs and beams shall have 3/4 in. bevels, unless otherwise noted.
- 2.3.1.5(a) Concrete construction tolerances, even portions above 100 feet in elevation, shall be in accordance with ACI 117 with the following exceptions:
- 1. Variation in concrete edges supporting masonry/stone and surfaces behind masonry/stone and glass curtain wall shall not exceed plus or minus 1/2 in. from theoretical plan dimension.
  - 2. Variation of beam soffit supporting masonry shall not exceed plus or minus 1/2 in. from theoretical elevation.
  - 3. The class of surface for offset between adjacent pieces of formwork facing material shall be Class A for all surfaces exposed to view, and class C for all surfaces not exposed to view (when the project is complete). Refer to 5.3.3.7 for ribbed slabs formed with metal pans.
  - 4. Tolerances for placing anchor bolts and other embedded items for structural steel work (Section 05 12 00) shall be in accordance with the AISC Code of Standard Practice for Steel Buildings and Bridges.
- 2.3.1.5(b) A preconstruction meeting shall be arranged by the Contractor for the purpose of reviewing critical tolerances, methods of making measurements, and the basis for acceptance or rejection of completed work to avoid misunderstandings at the time of final acceptance.
- 2.3.1.6(a) If required, retighten forms and bracing after concrete placement, but before concrete has taken its initial set, to eliminate mortar leaks and maintain proper alignment.

- 2.3.1.12(a) All sleeves, inserts and embedded items required by plumbing scope of work shall be furnished and placed by the plumbing subcontractor. All other sleeves, inserts, reglets, dovetail anchor slots, anchors and embedded items shall be furnished and placed by the Contractor performing the work of this Section and as directed by Construction Manager.
- 2.3.1.12(b) Sleeves, inserts, anchors, and embedded items not shown on structural drawings must be approved by Architect/Engineer, as a Contractor-prepared shop drawing and coordination drawing submittal. Submit drawing at least 14 days before placement of concrete.
- 2.3.1.14(a) Remove chips, wood, sawdust, dirt, and debris just before concrete is placed.
- 2.3.1.18 Provisions for Other Trades: Provide openings in concrete and concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms. Size and location of openings, recesses, and chases not shown on structural drawings must be approved by Architect/Engineer, as a Contractor-prepared shop drawing and coordination drawing submittal, before placement of concrete.
- 2.3.2.4(a) Forms may be removed when the in-place concrete reaches the specified 28-day compression strength, or when the concrete reaches 75% of the specified 28-day compression strength and is no less than 7 days old. The 7-day minimum age requirement may be waived pending review of the proposed mix designs, forming systems, reshoring procedures and in-place concrete strengths.
- 2.3.3.4(a) Reshoring is required for multistory construction. The Architect/Engineer has the prerogative of disallowing any specific procedures that he may consider to be deleterious to the performance of the structure in its completed form.
- 2.3.3.4(b) The attention of the Contractor is directed to the following:
1. Live load and superimposed dead load capacities of each level are noted on the Drawings. Live loads are typically reduced per the building code for the design of beams and girders.
  2. In general, the weight of newly placed concrete for a level, plus adequate construction load allowance, will exceed the combined live and superimposed dead load capacity of the level below.
  3. When shores or reshores must extend to the ground to provide the required load-carrying capacity, the floors above the ground shall not be considered to be contributory to the shoring and reshoring capacity.

- 2.3.4.2(b)1 When Windsor Probe tests are used to evaluate the in-place strength of the concrete for form removal, the tests shall be performed by an approved testing agency in accordance with ASTM C803, with at least one test for each 1800 square feet of elevated structure. Windsor Probe tests shall be correlated to laboratory cured cylinders or drilled cores of the same material and mix-design to be tested.
- 2.3.4.3 Forms may not be removed until the actual in-place strength of the concrete is demonstrated by field-cured test cylinders, Windsor Probes, pullout tests, or the maturity method (ASTM C1074), regardless of the results of tests on laboratory-cured cylinders. These additional test cylinders or other tests must be arranged and paid for by the Contractor.

### Section 3 (ACI 301) - Reinforcement and Reinforcement Supports

- 3.1.3.1(a) Protect reinforcement surfaces from contact with soil, oil, formwork release agent, or other materials that decrease bond to concrete.
- 3.2.1.1(a) All reinforcing steel shall have a minimum  $F_y$  of 60 ksi. In addition, all reinforcing steel to be welded shall meet ASTM A706 and have a maximum carbon equivalent of 0.45%.
- 3.2.1.2(b)1 All reinforcement in structured stairs and landings, all columns, and other locations noted on the Drawings, shall be epoxy coated.
- 3.2.1.2(b)2 Epoxy coating shall be applied in plants certified in accordance with the CRSI Epoxy Coating Plant Certification Program.
- 3.2.1.2(b)3 Since the epoxy coating is flammable, the coated bars shall not be exposed to any fire or flame. Cutting coated bars by burning will not be permitted.
- 3.2.1.2(b)4 Repairs of coatings on epoxy coated bars and coated accessories shall be made at all breaks, abrasions, etc. exceeding an area of 0.01 sq. in., and at cut ends.
- 3.2.1.2(b)5 Every reasonable effort shall be made to repair all damaged areas of epoxy-coated reinforcing steel and accessories before any rusting occurs. If infrequent and small damaged areas do rust, the rust shall be thoroughly removed by media blasting or other approved method before the areas are repaired. The Contractor shall exercise care to ensure that coated bars, when incorporated into the work, are free from dirt, paint, oil, grease, or other foreign substances. The Architect/Engineer reserves the right to require cleaning of the reinforcement without additional compensation due the Contractor. It is the intent of this specification that an entirely rust-free and completely coated steel reinforcement system be provided before the concrete is placed. Placing of concrete shall be performed with methods and equipment that will not damage the coated materials.

- 3.2.1.7(a)1 Welded wire reinforcement shall be in accordance with ASTM A1064 (smooth wire) unless noted otherwise on the Drawings. Furnish in flat sheets.
- 3.2.1.9(a) All clips, chairs, bars, bar supports, and other metallic materials used for installation or support of epoxy-coated reinforcing shall be entirely coated with epoxy or another polymer approved by the epoxy coating manufacturer.
- 3.2.1.9(b) Bar supports touching the forms of exposed-to-view concrete, exterior or interior, shall be stainless steel, except use plastic or epoxy coated bar supports where bars are epoxy coated. Provide bar spacers for reinforcement in all walls.
- 3.2.1.10(a) Mechanical and welded splices of reinforcing steel shall be in accordance with ACI 318 and ACI 439.3R and approved by the Architect/Engineer.
- 3.2.1.11 Tie wire for holding reinforcing steel in position for Architectural Concrete shall be stainless steel except where bars are epoxy coated. Tie wire for all epoxy-coated bars shall be mylar or plastic-coated. Typically, ends of tie wire must have a minimum of 1 in. clear distance to face of concrete.
- 3.2.2.2(a)1 Welding of reinforcing steel and welded wire reinforcement is not permitted without the approval of the Architect/Engineer.
- 3.3.2.8(e) Bending of reinforcing steel partially embedded in concrete is not permitted, unless otherwise detailed on the Contract Documents.
- 3.3.2.11 Placement of bars shall also be in accordance with the detailed recommendations given in the Concrete Reinforcing Steel Institute's "Placing Reinforcing Bars", 9<sup>th</sup> Edition.
- 3.3.2.12 Provide material and placement of contingency reinforcement as noted on the drawings. Bars are to be cut, bent, and placed as directed by the Architect/Engineer as extra reinforcement without additional cost.

#### Section 4 (ACI 301) - Concrete Mixtures

- 4.1.1.1 The ready-mix concrete producer is completely and solely responsible for the design, production, and delivery of the concrete mixes to satisfy this Specification. The Contractor shall coordinate the review of the mix designs between the Ready-Mix Producer, Forming Contractor, and Placing/Finishing Contractor. The Contractor is responsible for informing the Ready-Mix Producer of the conditions at the job site, such as methods being used for placing concrete. Adjustments required to facilitate placing and achieve the desired results shall fall within the criteria of this Specification and shall be at no additional cost to the Owner. All mix designs and proposed adjustments to the same shall be submitted to the Architect/Engineer for review.

- 4.2.1.1(a)1 Cement for all concrete shall be ASTM C150, Type I or Type II unless otherwise noted. Air-entrained cement shall not be used. Air requirements shall be met by use of separate admixtures.
- 4.2.1.1(d)1 Class C and Class F fly ashes shall comply with ASTM C618, except that in addition to the requirements of ASTM C618, Type F fly ash shall have a maximum Loss on Ignition of 3%, with a maximum variation of 1%. Contractor's mix design submittal for mixes which include fly ash must be accompanied by complete chemical and physical analyses and quality control records for the proposed fly ash source for at least two years immediately prior to the proposed use on this project.
- 4.2.1.1(d)2 When fly ash is used, the ratio of fly ash to total cementitious materials shall be not less than 15% and no greater than 25%.
- 4.2.1.1(e)1 Ground granulated blast-furnace slag shall be Grade 100 or Grade 120 per ASTM C989.
- 4.2.1.1(e)2 When ground granulated blast-furnace slag is used, the maximum amount shall be limited to 40% by weight of the total cementitious materials.
- 4.2.1.2(a) All normal weight aggregates shall be graded, a mix of fine, intermediate, and coarse aggregates, and shall also conform to Ohio Department of Transportation (ODOT) 703.02 as required for superstructures.
1. Aggregate certification submittal shall include copies of test reports on the fine, intermediate, and coarse aggregates proposed to be used, made by a testing laboratory acceptable to the Architect/Engineer, showing source of the materials and conformance with specification requirements. Date of test shall not be more than six months prior to date of submittal. Contractor shall furnish similar copies, of current date, when there is a change in source of material and at any time upon demand by the Architect/Engineer.
- 4.2.1.3(a) Concrete mixer washout water shall not be used in any concrete except Backfill Concrete.
- 4.2.1.4.2(a) Calcium chloride, or admixtures containing more than .05% calcium chloride ions are not permitted. Written conformance to this requirement and the chloride content is required from the admixture manufacturer prior to mix design review.
- 4.2.1.4.3 High-range water-reducing admixture (superplasticizer) conforming to ASTM C494, Type F or G shall be used in all concrete with a specified maximum water-cementitious materials ratio below 0.42. The admixture may also be used at Contractor's option in other mixes, with the written approval of the Architect/Engineer, at no additional cost to the owner.

- 4.2.1.4.4 Water-reducing, non-chloride, non-corrosive, accelerating admixture conforming to ASTM C494, Type C or E, shall be used when early initial set is required. The admixture must have non-corrosive test data of a year's duration from an independent testing laboratory using an acceptable, accelerated corrosion test method such as that using electrical potential measures.
- 4.2.1.4.5 Water-reducing, retarding admixture conforming to ASTM C494, Type D shall be used when delay of the setting time for concrete is required.
- 4.2.1.4.6 Extended set-control admixtures, if used shall be added to the concrete during or immediately after the batching process. The dosage rate for each Mix Type shall be pre-determined by trial mixtures in which the admixture is added to a minimum 8 cu. yd. batch.
- 4.2.1.4.7 All admixtures shall be approved by the cement manufacturer.
- 4.2.1.4.8 Corrosion Inhibitor Admixture: Contractor has option of using one of the following. Refer to Table 4.2.2.8(b) for dosage.
  - (a) Calcium Nitrite ( $\text{Ca}(\text{NO}_2)_2$ ); 30% (+/-2%) by weight of solution complying with ASTM C494, Type C. Acceptable manufacturers are W.R. Grace and BASF Corporation. Other manufacturers shall submit qualifications and test results for review and approval by Architect/Engineer.
  - (b) Migrating Corrosion Inhibitor; Pre-approved product is MCI-2005 NS manufactured by Cortec Corporation. Other manufacturers shall submit qualifications and test results for review and approval by Architect/Engineer.
- 4.2.1.6(a) Materials used for exposed concrete shall be furnished from the same source throughout the project unless otherwise approved by the Architect/Engineer.
- 4.2.2.2(a) Concrete shall be produced to have a maximum slump at the point of placement of 4 inches with a tolerance of one inch. This maximum slump may not be exceeded except by the job site addition of high-range water-reducer (superplasticizer). In those portions of the structure where member dimensions or congestion due to reinforcing steel prevent the proper placement and consolidation of the concrete at the maximum slump specified, superplasticizer shall be used by the Contractor in lieu of increasing the slump of non-superplasticized concrete by the addition of water. Approved mix designs, with smaller size aggregates, may also be used in congested areas to facilitate concrete placement.
  - 1. When superplasticizer is used, the maximum pre-adjusted slump shall be 4", and the maximum superplasticized slump shall be 8".

- 4.2.2.4(c)1 For pumped concrete, air content shall be periodically tested at both the truck discharge and end of hose. The required air content for acceptance at the truck discharge shall be adjusted, if necessary, to account for loss of air content during pumping.
- 4.2.2.4(d)1 Tolerance on air content for slabs that receive a trowel finish shall be +0.5%, -1.5%.
- 4.2.2.5(b) Maximum concrete temperature at time of discharge shall not exceed 95 °F. If necessary, use nitrogen cooling to maintain concrete temperature.
- 4.2.2.7(d)1 Chloride ion concentration - Maximum water-soluble chloride ion concentrations in hardened concrete at an age of 28 to 42 days contributed from all ingredients, including water, aggregates, cementitious materials, and admixtures shall not exceed the limits indicated in Table 4.2.2.8(b). Immediately after receipt of contract, Contractor shall test proposed individual concrete ingredients for total chloride ion content. If the total chloride ion content calculated on the basis of the proposed concrete mix proportions exceeds the specified limits, it will be necessary to test hardened concrete samples of the proposed mix for water-soluble chloride ion content. If these test results exceed the specified limits, it will be necessary to vary ingredients and material sources and retest until specified limits are met.
- a. Testing shall be performed by an independent testing laboratory employed and paid by the Contractor following ASTM C1218 test procedures.
- 4.2.2.8(b) Strength - Minimum concrete strengths shall be in accordance with Table 4.2.2.8(b). Note that some mixes may be specified with compressive strength requirements at other than 28 days.



Table 4.2.2.8(b) - Mixes and Locations

MIX TYPE	LOCATION	SPECIFIED STRENGTH (psi at days) (1)	MIN. PORTLAND CEMENT (lb. / cu. yd.) (2)	MAX % OF CHLORIDE BY WEIGHT OF CEMENT	MAX W/CM RATIO	AIR % (1,3)	AGG. SIZE (4)
A	Foundations: Footings, pile caps, grade beams	4500 at 28	565	0.30	0.50	-	No. 57, 1 in.
B	Slab on grade, Podium slab, walls, rails, exterior topping slabs, and other exterior exposure	5000 at 28	600 (5)	0.15	0.40	6 +/- 1.5	No. 57, 1 in.
C	Columns and Shear Walls	5000 at 28	658 (5)(6)	0.06	0.40	6 +/- 1.5	No. 57, 1 in.
D	Backfill concrete	1500 at 28	280	1.0	-	-	No. 57, 1 in.

NOTES:

1. Concrete which is placed and does not meet strength or air content requirements shall be removed and replaced at no cost to the Owner.
2. Including fly ash or ground granulated blast-furnace (GGBF) slag in mixes where permitted. Not applicable if a specified minimum amount of fly ash or GGBF slag is listed with the mix. The minimum cement requirement may be met by substituting 1.33 lb. of fly ash for each 1.0 lb. of portland cement replaced, or 1.0 lb. of GGBF slag for each 1.0 lb. of portland cement replaced. The ratio of fly ash to total cementitious materials shall be no less than 15% and no greater than 25%; the ratio of GGBF slag to total cementitious materials shall be no greater than 40%; and the total of fly ash and GGBF slag shall be no greater than 50% of total cementitious materials.
3. Tolerance on entrained air content shall be as delivered.
4. Normal weight aggregate.
5. Fly ash not permitted in this mix.
6. Provide corrosion inhibitor in this mix per 4.2.1.4.8. Dosage to be 3 gallons per cu. yd. of Calcium Nitrite solution or 1-1/2 pints per cu. yd. of Migrating Corrosion Inhibitor.
7. The maximum ratio of GGBF slag to total cementitious materials in Mix Type B shall be limited to 25%.

4.2.3.5(a) Mix designs incorporating superplasticizer must be accompanied by test results from cylinders made from trial batches or field test data in which the superplasticizer was added to a minimum 8 cu. yd. batch in a truck mixer.

4.3.1.1(a) Site produced concrete is prohibited.

4.3.1.4 When a high-range water-reducer (superplasticizer) is added at the site it shall be premeasured and added in accordance with the manufacturer's written instructions and specifications, using truck-mounted power

injection equipment capable of rapidly and uniformly distributing the admixture to the concrete. The concrete shall be mixed for a minimum of six minutes after addition of the superplasticizer prior to discharge.

- 4.3.2.1(a) Slump adjustment: When concrete arrives at the project with slump below that suitable for placing, and below the slump specified, water may be added only if neither the maximum water-cementitious materials ratio nor the maximum slump is exceeded, provided that:
1. The approved mix design has allowed for the addition of water on site.
  2. The amount of water added at the site is accurately measured to plus or minus 1 gallon of the desired added amount.
  3. The water addition is followed by 3 minutes of mixing at mixing speed prior to discharge.
  4. Standard cylinder samples as required by these Specifications are taken after addition of water.
  5. The person authorized to add water shall be mutually approved by Architect/Engineer, Contractor, Construction Manager and Ready-Mix Producer.
- 4.3.2.1(b) Do not add water to concrete after high-range water-reducing admixtures have been added.
- 4.3.2.1(c) The maximum water-cementitious materials ratio is defined as that of the mix design furnished by the ready-mix producer. (Not to exceed values noted in Table 4.2.2.8(b)).
- 4.3.2.1(d) Concrete arriving at the site above the maximum slump shall be rejected.
- 4.3.2.1(e) Addition of cement, except as part of initial batching at the plant in accordance with an approved mix design, is prohibited.
- 4.3.2.2(a) The concrete must be discharged from the ready-mix trucks within 1-1/2 hours after the introduction of mixing water to the cement and aggregates.
1. During hot weather or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C94 may be required. When air temperature is between 85 °F (30 °C) and 90 °F (32 °C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 °F (32 °C) reduce mixing and delivery time to 60 minutes.
- 4.3.2.3 Furnish to the Project Superintendent 2 delivery tickets with each load of concrete. Tickets shall contain the following information.
- (a) Date.
  - (b) Producer and plant.
  - (c) Job.
  - (d) Contractor.

- (e) Truck No. and time dispatched.
- (f) Concrete designation and cement type.
- (g) Admixture(s) description and content.
- (h) Time discharge started and completed.
- (i) Amount of concrete in load.
- (j) Amount of water in mix at plant.
- (k) Amount of any material added at the site and authorized signature.

#### Section 5 (ACI 301) - Handling, Placing and Constructing

- 5.1.2.1(d)1 Notify the Architect/Engineer at least two working days prior to placing concrete.
- 5.1.2.1(d)2 No concrete shall be placed without Owner's Testing Agency being present. Give due notice to the Architect/Engineer and all Contractors affected before placing concrete. Allow adequate time for installation of all necessary parts.
- 5.2.1.1(a) Water used for curing exposed surfaces shall be free of substances that will stain or discolor concrete.
- 5.2.1.2 Curing Compounds:
  - (a) Curing Compound for unformed surfaces that will not receive a coating or bonded floor covering shall conform to the requirements of ASTM C1315, Type I, Class A.
  - (b) Curing Compound for formed surfaces, and unformed surfaces that will receive a coating or bonded floor covering, shall be a dissipating or removable curing compound that conforms to ASTM C309. Furthermore, the curing compound shall be approved in writing by the manufacturers of all coatings, floor coverings, and surface treatments used on the project. Confirm types and locations of coatings, flooring, and surface treatments with Architect.
  - (c) Curing compound for exposed vertical work (columns and walls) shall be clear, non-residual, water-based, and VOC compliant. Prior accepted products are:
    - 1. L&M 'Cure'.
    - 2. Or approved equal.
  - (d) Curing compound(s) shall comply with all applicable environmental and clean air regulations for the community in which this Project is located.

- (e) Curing compound for the parking area slabs-on-grade shall meet ASTM C1315, Type 1 and AASHTO M148 and contain a fugitive dye. Prior accepted products are:
  - 1. Euclid Chemical Company 'Super Rez-Seal' or 'Super Aqua-Cure VOX'.
  - 2. L&M 'Dress & Seal 30' or 'Dress & Seal WB 30'.
  - 3. Master Builders MasterKure CC 300 SB or CC 1315WB.
  
- 5.2.1.3 Waterproof curing sheets shall comply with ASTM C171. Prior approved materials:
  - (a) Orange Label Sisalkraft paper manufactured by the Fortifiber Building Systems Group.
  - (b) Polyethylene film, minimum 8 mils thickness. Except, do not use on surfaces that will be left exposed to view when the project is complete.
  - (c) BurLene curing blankets manufactured by the Max Katz Bag Company, Inc.
  
- 5.2.1.7(a) Epoxy bonding agent shall comply with ASTM C881, Type V, Grade 2, with Class corresponding to temperature at time of pour.
- 5.2.1.7(b) Latex bonding agent shall comply with ASTM C1059, Type II.
- 5.2.1.10 Related materials for concrete construction shall be as follows:
  - 5.2.1.10(a) Non-slip Aggregate used as the abrasive aggregate for a non-slip floor finish shall be fused aluminum oxide grits, or crushed emery. Emery aggregate shall contain not less than 40% aluminum oxide nor less than 24% ferric oxide. Use material that is factory-graded, packaged, rustproof and non-glazing, and is unaffected by freezing, moisture and cleaning materials.
  - 5.2.1.10(b) Non-shrink grout shall have a minimum compression strength of 7000 psi at 28 days and be a non-shrink, non-metallic, non-staining, non-corrosive, premixed grout. Comply with ASTM C1107.  
Prior approved grouts:
    - 1. Dayton Superior Sure-Grip High Performance Grout
    - 2. Euclid Hi Flow or NS Grout
    - 3. Master Builders MasterFlow 713 or MasterFlow 928 grout
  - 5.2.1.10(c) Neoprene bearing pads shown on drawings shall be 100% virgin chloroprene (Neoprene) and shall meet AASHTO specifications. Shore "A" hardness shall be 60 unless otherwise noted. Submit certification and test reports for the actual production run of these pads as part of the shop drawing submittal procedure.
  - 5.2.1.10(d) Construction and Control Joint Sealant:

Performance and physical properties shall be comparable to the following pre-approved products.

1. Epolith-P or Epolith-G epoxy joint fillers by BASF Constuction Chemicals, LLC.
2. EUCO 700 or 800 by The Euclid Chemical Company.
3. MM-80 by Metzger/McGuire Company.

5.2.1.10(e) Epoxy Adhesive:

1. Two-component, high modulus, high strength, structural epoxy adhesive for use in installing reinforcing steel dowels into hardened concrete.
2. ASTM C 881, Type IV, Grade 3 with class corresponding to temperature at time of placement.

5.3.1.3(d) Verify position and securement of embedded items before placing concrete.

5.3.1.4(a)1 Following approval of prepared subgrades by Geotechnical Engineer, spread and compact granular base course to 100% maximum dry density as determined by standard Proctor Method ASTM D698.

5.3.1.4(c) Do not place vapor retarder under garage slabs-on-grade.

5.3.1.5(a) Make provisions in advance for wind-breaks, shading, fogging, sprinkling, ponding, or wet curing as dictated by conditions at time of concrete placement.

5.3.1.7 Discharge of concrete from ready-mix trucks shall not begin until testing agency has made preliminary checks of slump (and air content - if required).

5.3.2.1(a)1 Adequate protection against rain, sleet, or snow shall be defined as protection that prevents any and all adverse affects of the rain, sleet, or snow on the appearance, strength, or durability of the concrete.

5.3.2.1(b)1 Placement of concrete in cold weather shall also comply with Article 1.9 of this specification, titled Cold Weather Concreting.

5.3.2.1(c)1 Placement of concrete in hot weather shall also comply with Article 1.10 of this specification, titled Hot Weather Concreting.

5.3.2.1(d) Evaporation Retarder - When low humidity and/or dry winds create conditions suitable for plastic cracking, evaporation retarder may be required to be applied by spray one or more times during the finishing operation. Evaporation retarder shall not be used as a finishing aid.

5.3.2.3(c)1 Pumping pipes and hoses shall be supported above in-place reinforcing on plywood or tires to cushion impacts, prevent abrasions of epoxy coatings and prevent displacement of reinforcement.

- 5.3.2.4(i) Where concrete is placed on metal deck, assume 1/2 in. average extra concrete will be required to account for deflection of metal deck.
- 5.3.2.4(j) Concrete is not permitted to be placed in standing water or under water without approval of Architect/Engineer.
- 5.3.2.6(d) Bond is required for vertical construction joints in horizontal members, except for slabs on grade.
- 5.3.3.3(a) *Surface finish-1.0 (SF-1.0):*
1. No formwork facing material is specified.
  2. Patch voids larger than 1-1/2 in. wide or 1/2 in. deep.
  3. Remove projections larger than 1/2 in.
  4. Tie holes need not be patched.
  5. Surface tolerance Class C as specified in ACI 117.
  6. Mockup not required.
- 5.3.3.3(b) *Surface finish-2.0 (SF-2.0):*
1. Patch voids larger than 3/4 in. wide or 1/2 in. deep.
  2. Remove projections larger than 1/8 in.
  3. Patch tie holes unless indicated otherwise in Contract Documents.
  4. Surface tolerance Class A as specified in ACI 117.
  5. Mockup not required.
- 5.3.3.3(c) *Surface finish-3.0 (SF-3.0):*
1. Patch voids larger than 3/4 in. wide or 1/2 in. deep.
  2. Remove projections larger than 1/8 in.
  3. Patch tie holes unless indicated otherwise in Contract Documents.
  4. Surface tolerance Class A as specified in ACI 117.
  5. Provide mockup of concrete surface appearance and texture.
- 5.3.3.4(b)1 Where a grout-cleaned rubbed finish is indicated, grout color shall match color of concrete surface to which the grout is applied. When the color of the grout lightens due to drying, rub the surface and keep the surface damp for 36 hours afterward.
- 5.3.3.4(c)1 Where a cork-floated finish is specified, grout color shall match color of concrete surface to which the grout is applied.
- 5.3.3.7 Specified Finishes of Formed Surfaces:
- (a) NON-EXPOSED SURFACES shall be SF-1.0 per 5.3.3.3(a). This includes all non-exposed flat surface and ribbed slabs. Metal pans shall be new or factory reconditioned, with stiffeners to support concrete without sags and bulges in order to satisfy a Class D surface tolerance per ACI 117.
- (b) EXPOSED SURFACES:

1. SMOOTH FORM FINISH: All exposed-to-view formed surfaces in the garage shall be Surface Finish 2.0 (SF-2.0) per 5.3.3.3.b. Provide formwork with a non-porous finished surface (HDO, or approved equal). **Exposed-to-view vertical walls in the garage (basement walls, shearwalls, etc) shall include the following supplemental requirements also:**
  - a. Form material and layout must be approved by Architect prior to placing concrete. Note that modular handset-type forms (such as Symons Steel-Ply, etc.), which create ridges at form/panel edges, are not acceptable and shall not be used.
  - b. Formwork for exposed surfaces shall be in approximately 8-foot lengths and 4-foot widths; orient vertically, unless noted otherwise. Apply impermeable coating to wood rustications or chamfers. Seal form joints and around all ties, reveals, etc. by taping or with non-absorbent caulking (ASTM C 920, Type a, Grade NS, or C 834). Clean taper ties and she-bolts and lubricate with a nonstaining grease or form release agent before each use. Keep form face clean until concrete is placed. Clean forms after each use and discard damaged forms. Refer to paragraph 2.3.1.5.a.3 for form panel offset tolerance requirements.
  - c. Form ties for exposed-to-view concrete walls shall leave a 1-1/4" diameter cone hole. This hole will be partially filled, unless otherwise noted. The tie pattern shall be a regular pattern and aligned at consistent elevations throughout the project. Submit tie pattern for Architect's review and approval. The ties shall be one of the following:
    1. Stainless steel "snap-ties" with a 1" to 1-1/2" breakback.
    2. Galvanized "coil-bolt" type tie.
    3. "She-bolt" tie with the inner male unit galvanized.
    4. Other removable type tie with approval of the Architect.
  - d. During placement, take precautions to minimize mortar splatter on form faces. Deposit concrete in the final position without segregation or loss of material. Do not move concrete horizontally. Place concrete in uniform horizontal layers not more than 36" high for consolidation. Place concrete continuously without exceeding rate of placement used in design of forms. Vibrate placed concrete for maximum consolidation of concrete. Overlap the zones of influence a minimum of 50 percent. Withdraw internal vibrator at a rate of 3 inches per second. Keep internal vibrators 2 inches from form face.

- e. Contractor shall strip forms for exposed-surface concrete at the same age of concrete throughout the project for uniform, consistent color and finish. Refer to 6.1.1.1.a also.
- f. **NO PORTIONS OF EXPOSED TO VIEW SURFACES SHALL BE GROUND WITH MECHANICAL GRINDERS.**
- g. Repairs – refer to 6.1.1.1.a. Where repairs are required, all voids, damaged areas, fins, projections, and honeycomb areas, shall be removed down to sound concrete and shall be repaired immediately after form removal. All patching and repairs shall have prior approval of the Architect as to method and procedure. Any concrete which has not been formed as shown on the Contract Drawings or indicates a defective or unsound surface, and which can't be repaired acceptably, shall be removed and replaced. Permission to patch or attempt a correction shall not be construed to be a waiver of the Owner's right to require complete removal of the defective work should the patching or correction prove to be, in the opinion of the Owner and Architect, unsatisfactory either as to structure or appearance.

5.3.3.8 In the case of disagreement regarding use of damaged or worn formwork impairing the concrete surface the Architect's decision shall be final.

5.3.4.2.1 Slabs shall be finished in accordance with 5.3.4.2(i) 'Unspecified unformed surface finishes' (as described in ACI 301), unless indicated otherwise on the architectural drawings or in 5.3.4.2(j).

5.3.4.2(c)1 Do not apply a 'hard-troweled' finish to air-entrained concrete specified to receive a 'trowel' finish.

5.3.4.2(c)2 Rider-operated floats and trowels shall not be used on air-entrained concrete specified to receive a trowel finish.

5.3.4.2(j) Specified Finishes of Unformed Surfaces:

Type A Exterior and garage areas exposed to vehicular or pedestrian traffic to receive a floated or light broom finish per the Architect's direction. Finish slabs to a manual straightedge 'conventional' tolerance per ACI 117 (1/2 in. in 10 feet) and provide positive drainage with no "ponds" greater than 6 in. in diameter. Do not "over finish" slabs.

Type B Building interior slabs-on-grade and supported decks and all other slabs not specifically indicated shall receive a steel trowel finish in accordance with 5.3.4.2(c). Finish slabs to a 'flat'



tolerance ( $SOF_F=35$ ,  $MLF_F= 28$ ,  $SOF_L=25$ ,  $MLF_L=20$ ) in accordance with ACI 117. Measure floor finish tolerance within 72 hours after floor finishing and before removal of supporting formwork or shoring. Levelness tolerance ( $SOF_L$ ) is not applicable to un-shored suspended floors.

Type C Slabs to receive future waterproofing membrane or insulation with topping slabs shall have a floated finish in accordance with 5.3.4.2(b).

Type D Slabs to receive future topping slabs bonded to base slab shall be finished in accordance with 5.3.4.2(f).

Type E Stair treads and landings, interior or exterior, shall receive a light broom finish, finished to a manual straightedge 'flat' tolerance per ACI 117 (1/4 in. in 10 feet).

5.3.5.1 Where not otherwise shown on Drawings, provide control joints in slabs on grade at column centerlines and at the following maximum spacing:

- (a) Slabs less than 5 in. thick – 12 ft. c/c
- (b) Slabs 5 in. to 8 in. thick – 16 ft. c/c
- (c) Topping slabs – 8 ft. c/c
- (d) Maximum panel width-to-length ratio: 1.5.

5.3.6.4(a) When forms are removed prior to 7 days, apply one coat of liquid curing compound to all formed surfaces within an hour of formwork removal.

5.3.6.5(e)1 A thin layer of water shall be applied to the slab surface just prior to placement of the waterproof sheet. The sheet shall remain in place for a minimum of 7 days. All edges and laps of the waterproof sheet shall be weighted down. All tears in the sheet shall be immediately repaired and the concrete surface re-wetted so that no portion of the concrete surface remains uncovered and all portions of the concrete surface remain continuously moist.

5.3.6.5(f)1 Apply curing compound to flatwork in two coats at right angles to each other per manufacturer's recommendations. Total application rate shall be in accordance with manufacturer's recommendations, but not less than 1 gal./200 ft<sup>2</sup>. For rough surfaces, such as broom or scratch finishes, increase application rate per manufacturer's recommendations, but by not less than 50%.

- a. Correct coverage shall be maintained by the applicator and determined through accurate measurement of the material and the number of square feet to which it is applied.
- b. Curing compound shall also be applied to formed surfaces, including beam and slab soffits, per manufacturer's recommendations when forms are removed sooner than 7 days after concrete is cast.

- 5.3.6.5(g) Unless otherwise noted, preservation of moisture in concrete shall be by application of a curing compound satisfying the requirements of 5.2.1.2. Apply the curing compound in accordance with 5.3.6.5(f)1.
- 5.3.6.5(h) Where curing compound will not be compatible with applied finishes or is not permitted because of proximate occupancy, application of water-retention sheeting materials per 5.3.6.5(e) or a continuous wet cure per 5.3.6.5(a), 5.3.6.5(b), 5.3.6.5(c) or 5.3.6.5(d) is required. Apply water-retention sheeting materials or wet cure all slabs to receive a bonded topping or bonded waterproof membrane. Wet cure slabs shown on the architectural drawings as requiring a wet cure.
- 5.3.7.1(a) All voids, damaged places, fins, projections, and honeycomb areas shall be removed down to sound concrete and repaired immediately after form removal. Any concrete that is not formed as shown on the contract drawings, is out of alignment or level, or indicates a defective surface or unsoundness of any nature shall be removed and replaced to the limits required by the Architect/Engineer unless permission is granted to patch or otherwise correct the defective work. Permission to patch or attempt the correction shall not be construed as a waiver of the Architect/Engineer's right to require complete removal of the defective work should the patching or correction prove to be, in the opinion of the Architect/Engineer, unsatisfactory either as to structure or appearance.
- 5.3.7.2(a) Grout tie holes with non-shrink grout in below-grade walls. Coat the applied area with the specified bonding agent per the manufacturer's instructions. **Do not grout tie holes in exposed-to-view walls unless otherwise noted.**
- 5.3.7.5(a) Repair materials other than site-mixed portland-cement mortar shall be submitted for approval.
- 5.3.7.7 All patching materials shall be proportioned to match color of surrounding material after patch material has cured. Prior to starting patching operation, test different techniques, grout mixes, and curing procedures on concealed areas to best match cast concrete. Obtain approval from the Architect/Engineer of patching material and methods prior to proceeding with patching.

#### Section 6 (ACI 301) – Architectural Concrete

- 6.1.1.1.1 Surfaces designated as Architectural Concrete on the Drawings shall comply with section 6 of ACI 301.
- 6.1.1.1.a There is no concrete work designated as Architectural Concrete. However, for exposed concrete that does not receive paint or other finish,

comply with 6.3.8 “Formwork Removal” and 6.3.9 “Repair of tie holes and surface defects” of this Section.

Section 8 (ACI 301) – Mass Concrete

8.1.1.1 Concrete which is thicker than 4 feet in its minimum dimension for foundation concrete and thicker than 3 feet in its minimum dimension for concrete above grade, shall be subject to the provisions of this section.

8.2.1.2 Where necessary, use a retarding admixture conforming to ASTM C494, pretested with project materials under project conditions, to prevent cold joints or to help reduce the maximum temperature and rate of temperature rise of the concrete.

8.2.1.3 Do not use accelerating admixtures in mass concrete.

Section 9 (ACI 301) – Post-Tensioned Concrete

9.1.1 Delete this section of ACI 301.

Section 10 (ACI 301) – Shrinkage-Compensating Concrete for Interior Slabs

10.1.1 Delete this section of ACI 301.

Section 11 (ACI 301) – Industrial Floor Slabs

11.1.1 Delete this section of ACI 301.

Section 12 (ACI 301) – Tilt-Up Construction

12.1.1 Delete this section of ACI 301.

Section 13 (ACI 301) – Precast Structural Concrete

13.1.1 Delete this section of ACI 301.

Section 14 (ACI 301) – Precast Architectural Concrete

14.1.1 Delete this section of ACI 301.

END OF FOREGOING PARAGRAPH 1.8 ENTITLED “SUPPLEMENTAL REQUIREMENTS AND MODIFICATIONS TO ACI 301-16”.

END OF SECTION

SECTION 042000

UNIT MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete masonry construction.
- B. Mortar and grout.
- C. Reinforcing.
- D. Anchors, ties, flashing, and accessories.

1.2 RELATED SECTIONS

- A. Section 033000 - Cast-in-Place Concrete.
- B. Section 055000 - Metal Fabrications.
- C. Section 079200 – Sealants.
- D. Section 081100 – Steel Doors and Frames.

1.3 REFERENCES

- A. American National Standards Institute (ANSI) A41.1 Building Code Requirements for Masonry.
- B. American Concrete Institute (ACI) 530.1 Specifications for Masonry Structures.
- C. ACI 530 - Building Code Requirements for Masonry Structures.
- D. Brick Institute of America (BIA) Technical Notes.
- E. National Concrete Masonry Association (NCMA) Technical Notes and Bulletins.

1.4 SUBMITTALS

- A. Product Data: For each type of masonry unit, accessory, and other manufactured products, including certifications that each type complies with specified requirements.
- B. Shop Drawings: Indicate sizes, spacing, bending details, and type of all reinforcing placed in masonry walls.

- C. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
  - 1. Include test reports per ASTM C780 for mortar mixes required to comply with property specifications.
  - 2. Include test reports per ASTM C1019 for grout mixes required to comply with compressive strength requirements.
- D. If requested by the Owner or Architect, submit strength test reports conducted by an independent testing agency for each type of masonry unit.
- E. Samples:
  - 1. Full-size units for each different exposed masonry unit required, showing full range of exposed colors, textures, and dimensions.
  - 2. Accessories embedded in masonry.

#### 1.5 QUALITY ASSURANCE

- A. Single-Source Responsibility for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one source and by a single manufacturer for each different product required.
- B. Single-Source Responsibility for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.
- C. Perform testing of all masonry materials and accessories. Comply with referenced standards.
  - 1. Sample and test grout compressive strength according to ASTM C1019 and the following:
    - a. Compression test sample: One set of three standard cube specimens for each compressive strength test, unless otherwise directed. Mold and store cubes for laboratory-cured test specimens except when field-cured test specimens are required.
    - b. Compressive-strength tests: One sample for each day's grouting. One specimen tested at 7 days, one specimen tested at 28 days, and one specimen retained in reserve for later testing if required.
- D. Regulatory Requirements:
  - 1. Comply with applicable laws, ordinances, and the Ohio Building Code.
  - 2. Comply with the referenced standards in Article 1.3 above.

3. Where fire-resistance ratings are indicated for masonry work, provide materials and construction which are identical to those of assemblies whose fire endurance has been determined by testing in compliance with ASTM E119 by a recognized testing and inspecting organization or by another means, as acceptable to authority having jurisdiction.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect masonry materials during storage and construction from wetting by rain, snow or groundwater, and from soiling with dirt or other materials.
- B. Store all reinforcement and accessories off the ground and protected from damage, accumulation of dirt and excessive rust.

## 1.7 PROJECT CONDITIONS

- A. Cold Weather Protection:
  1. Do not lay masonry units which are wet or frozen.
  2. Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to the touch.
  3. Remove all masonry determined to be damaged by freezing conditions.
  4. Perform the following construction procedures while masonry work is progressing. Temperature ranges indicated below apply to air temperatures existing at time of installation except for grout. For grout, temperature ranges apply to anticipated minimum night temperatures. In heating mortar and grout materials, maintain mixing temperature selected within 10° F (6° C).
    - a. 40° F (4° C) to 32° F (0°C):
      1. Mortar: Heat mixing water to produce mortar temperature between 40° F (4° C) and 120° F (49° C).
      2. Grout: Follow normal masonry procedures.
    - b. 32° F (0° C) to 25° F (-4° C):
      1. Mortar: Heat mixing water and sand to produce mortar temperatures between 40° F (4° C) and 120° F (49° C); maintain temperature of mortar on boards above freezing.
      2. Grout: Heat grout materials to 90° F (32° C) to produce in-place grout temperature of 70° F (21° C) at end of work day.

## PART 2 PRODUCTS

### 2.1 CONCRETE MASONRY UNITS

- A. Minimum Compressive Strength of Masonry:  $f'm = 1900$  PSI.
- B. All Concrete Masonry: Load-bearing normal weight units, produced from sand and gravel aggregates complying with ASTM C331.
  - 1. One hundred percent solid units shall comply with ASTM C145.
  - 2. Hollow units shall comply with ASTM C90; Grade N and Type I.
  - 3. Fire rated masonry: Provide fire rated units meeting requirements of Building Code and meeting hourly ratings indicated on drawings.
  - 4. Size: Nominal face dimension 16" long x 8" high, unless shown otherwise. Width as shown on drawings. Split-face units 4" high.
  - 5. Cores: Two-core blocks where grouting is specified or shown.
  - 6. Exposed-to-View Faces: Split-face units unscored; other units smooth unscored.
- C. Provide all lintels, control joints, bond beams, and similar special shapes required.
- D. Limit moisture absorption during delivery and until time of installation to the maximum percentage specified for Type I units for the average annual relative humidity at the Project site.

## 2.2 MORTAR

- A. Mortar Materials:
  - 1. Portland Cement: ASTM C150, Type I, natural color.
  - 2. Hydrated Lime: ASTM C207, Type S.
  - 3. Aggregates: ASTM C144 for mortar. Grading to comply with BIA-M1.
- B. Mortar Mixes:
  - 1. Comply with ASTM C270, Proportion Specifications. Limit materials to those specified above. No masonry cement permitted.
  - 2. Provide Type S mortar for all work, per BIA-M1.
  - 3. Air content of mortar shall not exceed 12 percent.
- C. Admixtures:
  - 1. Do not lower freezing point of mortar or grout by use of admixtures or anti-freeze agents.

2. Under no circumstances will chloride-containing additives be permitted.

## 2.3 HORIZONTAL JOINT REINFORCING

### A. Truss type reinforcing with diagonal cross rods:

1. Fabricate from 9-gauge cold-drawn steel wire complying with ASTM A82, with deformed side and cross rods.
2. Provide in prefabricated straight lengths of not less than 10 feet, with matching corner ("L") and intersecting ("T") units.
3. Widths approximately 2" less than nominal width of walls, veneers, or partitions as required to position side rods for full embedment in mortar with mortar coverage of not less than 5/8 inch on joint faces exposed to exterior and not less than 1/2 inch elsewhere.
4. Hot dip galvanize after fabrication to comply with ASTM A153, Class B-2 coating (1.5 oz.).

### B. Acceptable Products:

1. Durowall Truss Masonry Wall Reinforcement.
2. Blok-Trus, by AA Wire Products.
3. TrusTy, by Ty-Wall.

## 2.4 REINFORCING BARS

- A. ASTM A615, A616, or A617 deformed bars, Grade 60.

## 2.5 MISCELLANEOUS ANCHORS

- A. Dovetail Anchors: Triangular shaped wire tie, sized to extend within 1" of masonry face made from 0.1875 inch diameter, hot-dipped galvanized steel wire.
- B. Dovetail Slots: 20 gage, foam filled, hot-dipped galvanized.
- C. Provide straps, plates, shapes, bars, bolts, rods and similar items as detailed, or if not detailed, as required to securely anchor masonry work to substrates.

## 2.6 REINFORCED MASONRY GROUT

- A. Grout materials to comply with ASTM C476 as follows:

1. Portland Cement: ASTM C150, Type I.



2. Hydrated Lime: ASTM C207, Type S.
  3. Aggregates: ASTM C404, 3/8 inch maximum aggregate size.
- B. Grout Mix:
1. Slump: 8" ± 1".
  2. Strength: 3000 psi minimum at 7 days, 4000 psi minimum at 28 days.

## 2.7 ACCESSORIES

- A. Preformed Control Joints: Neoprene material. Provide with corner and tee accessories; heat or cement fused joints.
- B. Joint Filler: Closed cell polyurethane per Section 079200.

## 2.8 MASONRY CLEANER

- A. Job-mixed detergent solution of 1/2 cup dry measure tetrasodium polyphosphate and 1/2 cup dry measure laundry detergent dissolved in 1 gallon of water.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and conditions where concrete masonry is to be placed. Notify Construction Manager of conditions detrimental to proper and timely completion of Work.
- B. Starting of work constitutes acceptance of substrates.

### 3.2 GENERAL INSTALLATION

- A. Cut masonry units with motor-driven saw designed to cut masonry with clean sharp, unchipped edges. Cut units as required to provide pattern shown and to fit adjoining work neatly. Use full unit without cutting wherever possible. Use dry cutting saws to cut concrete masonry units.
- B. Pattern Bond: Running bond with head joints in alternating courses aligned, *unless otherwise noted on drawings*.
- C. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to properly locate openings, movement type joints, returns and offsets. Avoid the use of less-than-half size units at corners, jambs and wherever possible at other locations.

- D. Lay-up walls plumb and with courses level, accurately spaced and coordinated with other work.
- E. 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. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
  - 3. Grout masonry units solid where noted on Drawings.
- F. During construction, cover top of work with waterproof sheeting at end of each day's work. Extend cover down face of work and hold securely in place.
- G. Build non-load-bearing interior partitions full height of story to underside of structure above unless otherwise indicated.
  - 1. Fasten lateral bracing angles to structure above and build into top of partition as indicated on Drawings.
  - 2. Provide space at top for soft joint for non-bearing partitions, and install compressible joint filler materials.
  - 3. At fire-rated partitions, gap at top of non-bearing partitions to be filled with firestopping.
- H. Prevent mortar or soil from staining face of masonry to be left exposed. Immediately remove mortar in contact with such masonry. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface. Protect sills, ledges and projections from mortar droppings.

### 3.3 MORTAR BEDDING AND JOINTING

- A. Measure and batch materials either by volume or weight, such that the required proportions for mortar can be accurately controlled and maintained. Measurement of sand exclusively by shovel will not be permitted.
- B. Mix mortars to provide maximum tensile bond strength within capacity of the mortar.
- C. Mix mortar ingredients for a minimum of 5 minutes in mechanical batch mixer. Use potable water. Do not use mortar which has begun to set, or if more than 2-1/2 hours has elapsed since initial mixing. Re-temper mortar during 2-1/2 hour period as required to restore workability.
- D. Lay units with completely filled bed, collar, and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not slush collar or head joints.

- E. Lay hollow units with full mortar coverage on horizontal and vertical face shells with head joints, shove per (D) above. Bed webs in mortar in starting courses, and in courses where adjacent to cells or cavities to be reinforced or filled with grout.
- F. Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not otherwise indicated, lay walls with 3/8-inch joints. Tool exposed joints dense and slightly concave using a jointer larger than joint thickness. Rake interior joints of mortar in preparation for application of joint sealant where noted on the Drawings.
- G. Remove masonry units disturbed after laying; clean and reset in units which have been set in position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.
- H. Rack back 1/2 unit length in each course; do not tooth unless otherwise shown on Drawings. Clean exposed surfaces of set masonry, wet units lightly (if required) and remove loose masonry units and mortar prior to laying fresh masonry.
- I. Provide interlocking masonry unit bond in each course at corners, unless otherwise shown.
- J. Remove masonry units disturbed after laying; clean and relay in fresh 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.
- K. Provide weep holes in head joint immediately above flashing, and where indicated on Drawings.
- L. Note on Drawings where soft joints are called out at jambs and heads. Coordinate with cast-in-place concrete work.
- M. Control Joints:
  - 1. Construct control joints in concrete masonry minimum 3/8 inch wide.
  - 2. Do not continue joint reinforcement across control joint.
  - 3. At bond beams, stop control joint at bottom of bed joint supporting bond beams; rake bed joint 3/4 inch deep for caulking in Section 079200.
  - 4. Control joint fillers in concrete masonry: Install pre-molded joint filler in jamb sash concrete masonry unit.
  - 5. Provide slip plane at formed-in-place concrete masonry lintels at control joints as follows:
    - a. Place metal slip-plane plate directly on masonry course below lintel; hold plate back 1/2 inch from opening, face of wall, and end of lintel.
    - b. Place bond breaker against masonry at end of lintel; hold bond breaker 1/2 inch from face of wall.

- c. Place lintel on full bed of mortar on top of slip-plane plate to assure uniform bearing.
  - d. Fill joint at end of lintel with mortar against bond breaker.
  - e. When mortar has hardened sufficiently, rake joint  $\frac{3}{4}$  inch deep at end of and under lintel for caulking in Section 079200.
  - f. Lay first course of masonry above lintel in full mortar bed.
6. Unless otherwise indicated on Drawings, locate control joints in concrete masonry 30'-0" apart and at the following locations:
    - a. Near corners.
    - b. At building expansion joints.
    - c. At piers, columns, changes in wall height of adjacent portions of walls, and at changes in wall thickness.
  7. Extend control joints full height of CMU.

### 3.4 JOINT REINFORCING AND BUILT-IN WORK

- A. Provide continuous horizontal joint reinforcing in all concrete masonry construction at 16" o.c. vertical spacing maximum, or as noted on Drawings.
  1. Fully embed longitudinal side rods in mortar for their entire length with a minimum cover of 1" on exterior side of walls and 1/2-inch at other locations.
  2. Lap reinforcement minimum of 6" past each cross rod.
  3. Cut and bend units as recommended by manufacturers for continuity at returns, offsets, reveals and other special conditions.
  4. Do not bridge control and expansion joints with reinforcing, unless otherwise indicated.
  5. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections.
- B. Reinforce masonry openings greater than 1'-0" wide with horizontal joint reinforcing placed in 2 horizontal joints approximately 8" apart, both immediately above lintels and below sills. Extend reinforcing a minimum of 2'-0" beyond jambs of openings.
- C. Reinforcing rods within masonry: Comply with ACI 530.1 and the following, unless noted otherwise:
  1. Epoxy set reinforcing in concrete structure at base of CMU walls as indicated on Drawings.
  2. Vertical bars to be continuous through bond beams unless noted otherwise.
  3. Lap splice all vertical and horizontal bars 48 bar diameters unless otherwise shown.

- D. Bearing support at filled masonry: Unless otherwise detailed, fill hollow masonry units with grout under wall supported beams or lintels a minimum of 3 courses vertically and 24 inches horizontally each side of bearing, and where else required. Grout as specified under Article 3.6 below.
- E. Built-in work: Coordinate work with other Sections so that all connecting work is properly located and installed.
  - 1. Build in panel boxes, access panels, anchors, grounds, waterproofing, flashing, flashing receivers, reglets, expansion joints and other incidental work.
  - 2. Bed window sills, door sills, copings, steel lintels, etc. firmly and solidly in mortar.
  - 3. Provide required bedding and grouting for metal windows and stools.
  - 4. Grout in solid with mortar behind metal door frames in masonry.
  - 5. Provide caulking spaces of  $\frac{1}{4}$  inch wide by  $\frac{3}{4}$  inch deep around wall openings or as indicated on Drawings.
  - 6. Maintain fire rating with masonry at built-in work in fire-rated walls.

### 3.5 ANCHORING OF MASONRY WORK

- A. Provide anchoring devices of the type indicated. If not indicated, provide standard type for facing and back-up involved, complying with code requirements.
- B. Portions of anchors extending into masonry shall be completely embedded in mortar.

### 3.6 GROUTING OF CONCRETE MASONRY CONSTRUCTION

- A. Comply with requirements of referenced standards for grouting unless otherwise specified herein or indicated on Drawings.
- B. Grout voids in masonry indicated on Drawings and specified herein. Grout CMU walls full height at Lower Level.
- C. Align vertical cells to be filled with grout to provide a continuous unobstructed opening for placement of reinforcement and grout.
- D. Prior to grouting, inspect and clean grout spaces. Remove dust, dirt, mortar droppings, loose pieces of masonry and other foreign materials from grout spaces. Clean reinforcing and adjust to proper position. Clean top surface of structural members supporting masonry to ensure bond.
- E. Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist displacement of masonry units and breaking of mortar bond. After

construction of masonry and before grouting, brace walls against wind forces and other construction hazards until walls have been tied to the structure providing lateral support.

- F. Use steel spacer ties or other adequate device to position and hold reinforcing steel to prevent displacement during grouting.
- G. Allow mortar to cure before grouting. Place grout by pumping into grout spaces. Consolidate grout in place by vibration or other method which ensures complete filling of cells and cavities.
- H. At Contractor's option, use either low-lift or high-lift grouting techniques in conformance with standards listed in paragraph 3.6.A above.
- I. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

### 3.7 TOLERANCES

- A. Variation From Plumb: For vertical lines and surfaces of walls do not exceed 1/4-inch in 10 feet, or 3/8-inch in a story height not to exceed 20 feet. For external corners, expansion joints, control joints and other conspicuous lines, do not exceed 1/4-inch in any story or 20 feet maximum.
- B. Variation From Level: For lines of exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines, do not exceed 1/4-inch in any bay or 20 feet maximum, nor 3/4-inch in 40 feet or more.
- C. Variation of Linear Building Line: For position shown in plan and related portion of columns, walls and partitions, do not exceed 1/2-inch in any bay or 20 feet maximum, nor 3/4-inch in 40 feet or more.

### 3.8 REPAIR, POINTING AND CLEANING

- A. Repair:
  - 1. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended.
  - 2. Provide new units to match adjoining units and install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing:
  - 1. During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar.
  - 2. Point-up all joints at corners, openings and adjacent work to provide a neat,

uniform appearance, properly prepared for application of sealants.

C. Cleaning:

1. For exposed concrete masonry, wipe off excess mortar as the work progresses. Dry brush at the end of each day's work.
2. After mortar is thoroughly set and cured, dry clean to remove large particles of mortar using wood paddles and scrapers. Use chisel or wire brush if required.
3. Final Cleaning:
  - a. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
  - b. Protect adjacent non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
  - c. Wet wall surfaces with water prior to application of cleaner; remove cleaner promptly by rinsing thoroughly with clear water.
  - d. Clean brick by bucket and brush hand-cleaning method described in BIA Technical Note No. 20 Revised.
  - e. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain present on exposed surface.
4. For work that is not to be painted, remove all visible mortar stains. For any surfaces to be painted, remove all material that would be visible through the paint coating or would be detrimental to paint bond.
5. Remove all surplus materials and rubbish from the premises.

END OF SECTION

SECTION 044213  
DIMENSIONAL STONE CLADDING

PART 1 GENERAL

1.1 WORK INCLUDED

1. Exterior dimensional granite cladding and sandstone cladding work, as indicated on the Drawings and as specified herein.

1.2 RELATED SECTIONS

- A. Section 033000 - Cast-In-Place Concrete.
- B. Section 044302 – Solid Granite.
- C. Section 055000 - Metal Fabrications.
- D. Section 057000 – Ornamental Metals.
- E. Section 071400 – Fluid Applied Waterproofing.
- F. Section 079200 - Sealants.
- G. Section 321440 – Granite Unit Paving.

1.3 REFERENCES

- A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirement shall govern.

1. American Society for Testing and Materials (ASTM):

A 36	Structural Steel
C 119	Standard Terminology Relating to Dimension Stone
C 144	Aggregate for Masonry Mortar
C 150	Portland Cement
C 207	Hydrated Lime for Masonry Purposes
C 270	Mortar for Unit Masonry
C 615	Structural Granite
C 616	Sandstone Building Stone
C 1242	Standard Guide for Selection, Design, and Installation of Dimension Stone Attachment Systems
D 1752	Preformed Sponge Rubber and Cork Expansion Joint Fillers for



Concrete Paving and Structural Construction

E 699 Criteria for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating Building Components in Accordance with Test Methods Promulgated by ASTM Committee E-6.

2. National Building Granite Quarries Association, Inc. (NBGQA): Specifications for Architectural Granite

1.4 DEFINITIONS

- A. Definitions contained in ASTM C 119 apply to this Section.
- B. Dimension Stone Cladding System: An exterior wall covering system consisting of dimension stone panels together with the anchors, backup structure, mortar, fasteners, and sealants used to secure the stone to the structure and to produce a weather-resistant covering.

1.5 PERFORMANCE REQUIREMENTS

- A. General: Design stone anchors and anchoring systems according to ASTM C 1242.
- B. Structural Performance: Provide dimension stone cladding system capable of withstanding the effects of gravity loads and the following loads.
  1. Wind Loads: Determine loads based on Code requirements.
- C. Thermal Movements: Provide dimension stone cladding system that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing displacement of stone, opening of joints, overstressing of components, failure of joint sealants and connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime sky heat loss. Temperature Change (Range): 120 deg F ambient; 180 deg F material surfaces.
- D. Safety Factors for Stone: Design dimension stone cladding system to withstand loads indicated without exceeding allowable working stress of stone determined by dividing stone's average ultimate strength, as established by testing, by the following safety factors:
  1. Safety Factors for Granite: 3 for uniform loads and 4 for concentrated loads.
  2. Safety Factors for Quartz-Based Stone (Sandstone): 8 for uniform loads and 10 for concentrated loads.
- E. Design stone anchors to withstand loads indicated without exceeding allowable working stresses established by the following:
  1. Structural Steel: AISC S335, "Specification for Structural Steel Buildings Allowable Stress Design and Plastic Design with Commentary."
  2. Cast-in-Place and Post-installed Fasteners in Concrete: One-fourth of tested capacity when installed in concrete with compressive strength indicated.
  3. Post-Installed Fasteners in Masonry: One-sixth of tested capacity when installed in masonry units indicated.

- F. Control of Corrosion and Staining: Prevent galvanic and other forms of corrosion as well as staining by isolating metals and other materials from direct contact with incompatible materials. Use materials that do not stain exposed surfaces of stone and joint materials.

1.6 SUBMITTALS

- A. Product Data: For each variety of stone, stone accessory, and other manufactured products indicated, including, but not limited to:
  - 1. Stone Cladding (Granite & Sandstone).
  - 2. Stone anchors.
  - 3. Mortar materials, including additives, coloring, etc.
  - 4. Joint filler(s).
- B. Shop Drawings: Show details of fabrication and installation of dimension stone cladding system, including dimensions and profiles of stone units, as well as:
  - 1. Show locations and details of joints.
  - 2. Include details of mortar joints, sealant joints, and mortar joints pointed with sealant.
  - 3. Show locations and details of anchors and backup structure.
  - 4. Indicate locations of inserts for stone anchors and supports, and locations and dimensions of cut-outs, holes, openings, and other provisions required for the work of other trades.
  - 5. Indicate the setting number of each piece.
  - 6. **Note: Stone shop drawing preparation (excluding engineering) for this Bid Package has already been bought by the Owner. Refer to Contractor Scope-of-Work (in Section 011100) for additional information.**
- C. Material Test Reports: From a qualified independent testing agency indicating and interpreting test results of the following for compliance with requirements indicated.
  - 1. Stone Test Reports: For each stone variety proposed for use on Project, provide test data indicating compliance with required physical properties including those specified by reference to ASTM standards. Include test data for flexural strength based on testing according to ASTM C 880, performed on specimens representative of minimum thickness and finish of installed stone, in both wet and dry conditions. Base reports on testing done within previous five years.
  - 2. Anchorage Test Reports: For each stone variety, finish and anchor type, based on testing according to ASTM C 1354, performed on specimens representative of minimum thickness and finish of installed stone.
  - 3. Sealant Compatibility and Adhesion Test Report: From sealant manufacturer complying with requirements in Section 079200 - Sealants. Include interpretation of test results and recommendations for primers and substrate preparation needed for adhesion.

4. Preconstruction Sealant Field Test Report: From Installer, complying with requirements in Section 079200 - Sealants.
- D. Samples: Submit representative samples of products to be provided under this Section to Architect for selection and approval, as follows. Delivered materials shall closely match the approved samples.
1. Granite Veneer Facing: Sufficient 12 in. by 12 in. samples to show the full range of color, texture, and finish of granite proposed for use.
  2. Granite Veneer Accessories: Samples of anchors, cramps, dowels, and other accessories to be provided.
  3. Sandstone Veneer Facing: Sufficient 12 in. by 12 in. samples to show the full range of color, texture, and finish of sandstone proposed for use.
  4. Sandstone Veneer Accessories: Samples of anchors, cramps, dowels, and other accessories to be provided.
- E. Qualification Data: For firms and persons specified in “Quality Assurance” Article to demonstrate their capabilities and experience. Include lists of completed projects (including project name and address) with names and addresses of architects and owners, and other information.
- F. Contractor's Review: Before commencing work, submit written statement signed by the Contractor stating that the Contract Documents have been reviewed with a qualified representative of the stone supplier, and that the selected materials and construction are proper, compatible with adjacent materials, and adequate for the application shown.

#### 1.7 SAMPLE INSTALLATIONS

- A. Install at least one sample granite veneer installation and one sample sandstone veneer installation, each conforming to typical project construction.
- B. Sample installations shall each be approximately 50 sq. ft. in area, located as directed by Architect, and shall show the proposed stone type, color, and finish, anchorage/setting system, joint sealing (by other trade), and other pertinent details of installation.
- C. Replace sample installation as many times as necessary until Architect's approval of the installation has been obtained. Upon Architect's approval, construct all subsequent stone veneer work to conform to approved sample installation.

#### 1.8 COORDINATION

- A. The work of this Section shall be coordinated with that of other trades affecting, or affected by, this work.
- B. Do all cutting and drilling of stone cladding to accommodate the work of other trades to ensure the proper completion of the Work.

1.9 DELIVERY, HANDLING, AND STORAGE

- A. Pack and band shipment. Following shipping store stone cladding on wood skids or pallets, covered with non-staining, waterproof membrane, and protected from the weather. Place and stack pallets to evenly distribute the weight of the stone materials and prevent damage to stone cladding pieces.
- B. Handle stone to prevent chipping, breakage, soiling, staining, or other damage.
- C. Stone damaged in any manner will be rejected and shall be replaced with new materials at no additional cost to the Owner.

1.10 PROTECTION OF FINISHED SURFACES

- A. Finished surfaces adjacent to the stonework shall be adequately protected from soiling, staining, and other damage.

1.11 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed dimension stone cladding systems similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
  - 1. Installer's responsibilities include engineering, detailing, fabricating, and installing dimension stone cladding system.
  - 2. Responsibility: Preparation/Review of Shop Drawings (see 1.6.B.6 above) and comprehensive engineering analysis by a qualified structural engineer.
- B. Structural Engineer Qualifications: A structural engineer who is licensed to practice in the State of Ohio, and experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of dimension stone cladding systems that are similar to those indicated for this Project in material, design, and extent, including anchors, attachments and coordination with building structural system.
- C. Source Limitations for Stone: Obtain each variety of stone, regardless of finish, from a single quarry with resources to provide materials of consistent quality in appearance and physical properties.
- D. Source Limitations for Mortar Materials: Obtain mortar ingredients of uniform quality for each cementitious component from a single manufacturer and each aggregate from one source or producer.
- E. Source Limitations for Other Materials: Obtain each type of stone accessory, sealant, and other material from a single manufacturer for each product.
- F. Welding Standards: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel"; and AWS D1.3, "Structural Welding Code--Sheet Steel."

## 1.12 PROJECT CONDITIONS

- A. Cold-Weather Construction: Do not use frozen materials or materials mixed or coated with ice or frost. Remove and replace dimension stone cladding damaged by frost or freezing conditions. When ambient temperature is within limits indicated, use the following procedures:
1. At 40 deg F and below, produce mortar temperatures between 40 and 120 deg F by heating mixing water and, at temperatures of 32 deg F and below, sand. In heating mortar materials, maintain mixing temperatures within 10 deg F do not heat water to above 160 deg F. Maintain temperature of mortar on boards above freezing. Do not apply mortar to stone units or substrates below 32 deg F.
  2. At 25 to 20 deg F heat both sides of walls under construction. Use windbreaks or enclosures when wind velocity exceeds 15 mph.
  3. Below 20 deg F: Provide enclosure and auxiliary heat to maintain air temperature above 32 deg F within enclosure. Heat stone so it is above 40 deg F at time of installation.
- B. Cold-Weather Protection: When mean daily temperature is within limits indicated, provide the following protection:
1. 40 to 25 Deg F : Cover dimension stone cladding with a weather-resistant membrane for 48 hours after construction.
  2. 25 to 20 Deg F: Cover dimension stone cladding with insulating blankets or provide enclosure and heat to maintain air temperature above 32 deg F within enclosure for 48 hours after construction. Use windbreaks or enclosures when wind velocity exceeds 15 mph.
  3. Below 20 Deg F: Provide enclosure and heat to maintain air temperature above 32 deg F within enclosure for 48 hours after construction.

## PART 2 PRODUCTS

### 2.1 GRANITE CLADDING

- A. General Standards: Refer to Section 044302 2.1
- B. Granite shall be of the sizes and dimensions indicated on the Drawings.
- C. Use only one source of granite throughout the entire project. Acceptable sources of granite are specified below; other sources will be reviewed according to substitution requirements specified in the Conditions of the Contract.
1. Granite Types and Sources:
    - a. "Prairie Brown" and "Mesabi Black" granite by Coldspring Granite, or approved equal.
    - b. Finish: Diamond 10 (Prairie Brown), Rock Face (Prairie Brown), and Antique (Mesabi Black), as indicated on the Drawings, to match Architect's sample.

- D. Flatness Tolerances: Variation from true plane, on flat surfaces, shall be determined by use of a 4 ft. long straightedge applied in any direction on the surface. Such variations at the bed and joint arris lines shall not exceed 3/64 inch, or 1/6 of the specified joint width, whichever is greater. Variations from true plane on other parts of the face surfaces shall not exceed 3/64 in.
- E. Beds and Joints: Pieces shall be bedded and jointed as shown on the approved shop drawings.
- F. Back of granite which will be concealed in the finished work shall be sawn to approximately true planes. Maximum variation in thickness shall be 3/16 in.
- G. All faces, shall be at right angles to the plane of the top, unless noted otherwise.
- H. Granite shall be accurately cut to required shape and dimensions.
- I. Holes, cut-outs, sinkages and openings in granite work for anchors, cramps, dowels, supports, and lifting devices, shall be accurately cut or drilled to required dimensions, as shown on the approved shop drawings, and as necessary to secure granite in place. Setting beds shall be shaped to fit supports.
- J. Arrises shall be cut sharp and true to square, and continuous with adjoining arrises. Where exposed, arrises shall be eased.

## 2.2 SANDSTONE CLADDING

- A. "Pleasant Hill Buff - Chat Sawn", supplied by The Briar Hill Stone Company, 12470 State Route 520, P.O. Box 457, Glenmont, OH 44628.
- B. Sandstone shall be sound, durable, properly quarried, free from reeds, rifts, seams, laminations and minerals which by weathering would cause discolorations or deterioration. They shall be of a size, quality and color acceptable to the Architect. Stones shall be so quarried that the stratification will be radial or parallel to bed when set in place except where split face or seam face finish is shown on the Drawings.
  - 1. Sandstone shall comply with ASTM C 616. Classification II.
  - 2. Color of stone shall be "Light".
  - 3. Finish: Chat Sawn.
- C. Sandstone units shall have the following properties:
  - 1. A minimum average compressive strength of 10,000 psi when dry and 7,500 psi when wet as determined by ASTM C 170. Average values will be based upon the test results of at least 5 samples from each proposed source of stone. The Architect may require additional tests, if in his opinion, the quality of stone changes as work proceeds.
  - 2. Maximum percentage of wear, Los Angeles Abrasion Test (ASTM C 535): 40 percent by weight.
  - 3. Maximum loss, Magnesium Sulfate Soundness Test, 5 cycles (ASTM C 88): 15 percent by weight.
  - 4. Maximum absorption by weight, (ASTM C 97): 3 percent.

5. Minimum density (ASTM C 97): 150 lb./ft.<sup>3</sup>
4. Minimum abrasion resistance (ASTM C 241): 8

D. Sandstone shall be cut to exact dimensions prior to shipment to the project site.

### 2.3 STONE FABRICATION

- A. General: Fabricate stone units in sizes and shapes required to comply with requirements indicated, including details on Drawings and Shop Drawings.
  1. For granite, comply with recommendations in NBGQA's "Specifications for Architectural Granite."
- B. Control depth of stone and back check to maintain minimum clearance indicated between backs of stone units and surfaces of backup walls, and other work behind stone.
- C. Dress joints (bed and vertical) straight and at right angle to face, unless otherwise indicated. Shape beds to fit supports.
- D. Cut and drill sinkages and holes in stone for anchors, fasteners, supports, and lifting devices as indicated or as needed to set stone securely in place.
- E. Finish exposed faces and edges of stone to comply with requirements indicated for finish and to match approved samples and mockups.
- F. Cut stone to produce uniform joints 3/8 inch (10 mm) wide and in locations indicated.
- G. Contiguous Work: Provide chases, reveals, reglets, openings, and similar features as required to accommodate contiguous work.
- H. Clean backs of stone to remove rust stains, iron particles, and stone dust.
- I. Inspect finished stone units at fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units.
  1. Grade and mark stone for overall uniform appearance when assembled in place. Natural variations in appearance are acceptable if installed stone units match range of colors and other appearance characteristics represented in approved samples and mockups.

### 2.4 ANCHORS AND SUPPORT STRUCTURE

- A. Fabricate anchors, including shelf angles, from stainless steel, ASTM A 666, Type 316, temper as required to support loads imposed without exceeding allowable design stresses.
  1. Fasteners for Stainless-Steel Anchors: Annealed stainless-steel bolts, nuts, and washers; ASTM F 593 for bolts and ASTM F 594 for nuts, Alloy Group 2.
  2. Hydrogen Embrittlement: Coat anchors to prevent hydrogen embrittlement.
- B. Cast-in-Place and Post-Installed Fasteners for Concrete and Masonry: Type indicated below, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed, for masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

1. Adjustable Inserts Embedded in Concrete: Steel, cast iron, or malleable iron, with bolts, nuts, washers, and shims; all hot-dip galvanized or mechanically zinc coated.
2. Post-installed Fasteners for Concrete and Masonry: Chemical anchors made from stainless-steel components complying with ASTM F 593 and ASTM F 594, Alloy Group or 2 for bolts and nuts; ASTM A 666 or ASTM A 276, Type 316, for anchors.

## 2.5 JOINT SEALANT

- A. Provide high-performance silicone sealant. Refer to Section 079200 – Sealants.

## 2.6 STONE ACCESSORIES

- A. Setting Buttons: Resilient plastic buttons, non-staining to stone, sized to suit joint thicknesses and bed depths of stone units without intruding into required depths of joint sealants or causing third-side adhesion between sealant and setting button.
- B. Setting Shims: Strips of resilient plastic non-staining to stone, sized to suit joint thicknesses and depths of stone supports without intruding into required depths of joint sealants or causing third-side adhesion between sealant and setting shims.
- C. Concealed Sheet Metal Flashing: Stainless steel or zinc coated copper.
- D. Weep and Vent Tubes: Rectangular, cellular, polypropylene or clear butyrate extrusion, 3/8 by 1-1/2 inches and of length required to extend from exterior face of stone to cavity behind.
- E. Plastic Weep Hole/Vent: One-piece, flexible extrusion manufactured from ultraviolet- resistant polypropylene copolymer, designed to weep moisture in masonry cavity to exterior, in color selected from manufacturer's standard.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and conditions under which work is to be installed. Do not proceed with the work until unsatisfactory conditions have been corrected.

### 3.2 SETTING DIMENSION STONE CLADDING, GENERAL

- A. Execute dimension stone cladding installation by skilled mechanics and employ skilled stone fitters at Project site to do necessary field cutting as stone is set.
  1. Use power saws with diamond blades to cut stone. Produce lines cut straight and true, with edges eased slightly to prevent snipping.
- B. Set stone to comply with requirements indicated on Drawings and Shop Drawings. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure dimension stone cladding in place. Shim and adjust anchors, supports, and accessories to set stone accurately in locations indicated with uniform joints of widths indicated and with edges and faces aligned according to established relationships and indicated tolerances.
- C. Provide expansion, control, and pressure-relieving joints of widths and at locations indicated.



1. Seal expansion and other joints as specified in Section 079200 – Sealants.
  2. Keep expansion joints free of mortar and other rigid materials.
- D. Install concealed flashing at continuous shelf angles, lintels, ledges, and similar obstructions to downward flow of water to divert water to building exterior.
- E. Keep cavities open where unfilled space is indicated between back of stone units and backup wall; do not fill cavities with mortar or grout.
- F. Place weep holes and vents in joints where moisture may accumulate, including base of cavity walls, above shelf angles, and flashing. Locate weep holes and vents at intervals not exceeding 24 inches and for those serving as vents only, at intervals not exceeding 60 inches horizontally and 20 feet vertically.

### 3.3 INSTALLATION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces of walls, do not exceed 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch in 40 feet or more. For external corners, corners and jambs within 20 feet of an entrance, expansion joints, and other conspicuous lines, do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 3/8 inch in 40 feet or more.
- B. Variation from Level: For lintels, sills, horizontal bands, horizontal grooves, and other conspicuous lines, do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 3/8 inch maximum.
- C. Variation of Linear Building Line: For positions shown in plan and related portions of walls and partitions, do not exceed 1/4 inch in 20 feet or 1/2 inch in 40 feet or more.
- D. Variation in Cross-Sectional Dimensions: For thickness of walls from dimensions indicated, do not exceed plus or minus 1/4 inch.
- E. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches or a quarter of nominal joint width, whichever is less.
- F. Variation in Plane between Adjacent Stone Units (Lipping): Do not exceed 1/16-inch difference between planes of adjacent units.

### 3.4 SETTING MECHANICALLY ANCHORED DIMENSION STONE CLADDING

- A. Attach anchors securely to stone and to backup surfaces. Comply with recommendations in ASTM C 1242.
- B. Attach framing for stone support system to structural frame of building, at connection points indicated, by welding or bolting to comply with the following:
1. Weld connections to comply with AWS D1.1, "Structural Welding Code--Steel."
  2. Fabricate joints to exclude water or to permit its escape to building exterior, at locations where water could accumulate because of condensation or other causes.
  3. For galvanized surfaces, clean welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.
- C. Fill anchor holes with sealant.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

1. Where dowel holes occur at pressure-relieving joints, provide compressible material at ends of dowels.
- D. Set stone supported on clip or continuous angles on resilient setting shims. Use material of thickness required to maintain uniform joint widths. Hold shims back from face of stone a distance at least equal to width of joint.
- 3.5 CLEANING
- A. Upon completion of stone work, surfaces shall be left in a clean, unsoiled condition, acceptable to the Architect.
  - B. Remove and replace broken, chipped, stained, or otherwise damaged stone, defective joints, and dimension stone cladding that does not match approved samples and mockups. Damaged stone may be repaired if Architect approves methods and results.
  - C. Replace in a manner that results in dimension stone cladding that matches approved samples and mockups, complies with other requirements, and shows no evidence of replacement.
  - D. In-Progress Cleaning: Clean dimension stone cladding as work progresses.
  - E. Clean dimension stone cladding no fewer than six days after completion of sealing. Use clean water and stiff-bristle fiber brushes. Do not use wire brushes, acid-type cleaning agents, cleaning agents containing caustic compounds or abrasives, or other materials or methods that could damage stone.
1. Expansion joints and other joints to receive sealant shall be cleaned of all mortar and left ready for sealing of joints.

END OF SECTION

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

SECTION 044302

SOLID GRANITE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Solid granite seating, capstones, copings, curbs, and stair treads, as indicated on the Drawings as specified herein.

1.2 RELATED SECTIONS

- 1. Section 033000 - Cast-in-Place Concrete.
- 2. Section 044213 – Dimensional Stone Cladding.
- 3. Section 057000 - Ornamental Metals.
- 4. Section 071400 - Fluid Applied Waterproofing.
- 5. Section 079000 - Expansion Joints.
- 6. Section 079200 – Sealants.
- 7. Section 321440 - Granite Unit Paving.

1.3 REFERENCES

- A. Comply with requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirement shall govern.
  - 1. American Society for Testing and Materials (ASTM):
    - C 144 Aggregate for Masonry Mortar
    - C 150 Portland Cement
    - A 167 Stainless and Heat Resisting Chromium-Nickel Steel
    - C 207 Hydrated Lime for Masonry Purposes
    - C 279 Mortar for Unit Masonry
    - C 615 Structural Granite
    - D 1752 Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
  - 2. National Building Granite Quarries Association, Inc. (NBGQA), Specifications for Architectural Granite.

1.4 SUBMITTALS

- A. Product Data:

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

1. Granite.
  2. Anchors and fasteners.
  3. Mortar materials, including additives, coloring, etc.
  4. Joint filler(s).
  5. Skateboard deterrent.
- B. Shop Drawings: Cutting and setting drawings of granite pieces.
1. Indicate sizes, dimensions, layout, finishes, edging, radius edges, arrangement and provisions for jointing, anchoring, cut-out and holes, and other necessary details for reception of other work.
  2. Indicate locations of inserts for stone anchors and supports which are to be built into concrete, and locations and dimensions of cut-outs, holes, openings, and other provisions required for the work of other trades.
  3. Indicate the connections from stone to stone creating a monolithic granite bench and granite steps.
  4. Indicate the setting number of each piece with each piece bearing the corresponding number in a non-staining paint.
  5. **Note: Stone shop drawing preparation (excluding engineering) for this Bid Package has already been bought by the Owner. Refer to Contractor Scope-of-Work (in Section 011100) for additional information.**
- C. Samples: Granite samples shall demonstrate color, shade, veining, texture, range, and finish. Samples of the following shall be submitted:

<u>Item</u>	<u>Quantity and Size</u>
Granite Capstone	One section required, full thickness x full width x 2 ft. long, specified color and finish.
Granite Coping	One section required, full thickness x full width x 2 ft. long, specified color and finish.
Granite Curb	One 4 ft. long section required, full height x full width, specified color and finish.
Granite Stair Tread	One section required, full thickness x full width x 4ft. long specified color and finish.
Dowels	One each of each size, 4in. length
Mortar	Cured sample, 2 in. x 2 in. of selected color.
Skateboard Deterrent	Three (one set within a piece of black granite).

- D. Qualification Data: For firms and persons specified in “Quality Assurance” Article to demonstrate their capabilities and experience. Include lists of completed projects (including project name and address) with names and addresses of architects and owners, and other information.
- E. Contractor’s Review: Before commencing work, submit signed statement that Contract Documents have been reviewed with a qualified representative of granite supplier, and that selected materials and construction are proper, compatible, and adequate for application shown.
- F. Test Report: Submit reports from tests conforming to ASTM C 67 methods indicating:
  - 1. Compressive strength, psi. (ASTM C 170)
  - 2. Density, lbs./c.f. (ASTM C 97)
  - 3. Absorption by weight, % (ASTM C 97)
  - 4. Abrasion resistance (ASTM C 241)
  - 5. Flexural strength psi, (MPa) (ASTM C 880)
  - 6. Modulus of Rupture (ASTM C 99).

#### 1.5 SAMPLE INSTALLATIONS

- A. Provide sample seating installation. Sample shall show the proposed granite type, color, and finish, setting system, relationship to paving, jointing and other pertinent details of installation.
- B. Replace sample installation as many times as necessary until Architect’s approval of the installation has been obtained. Upon Architect’s approval, construct all subsequent granite work to conform to approved sample installation.

#### 1.6 COORDINATION

- A. Coordinate work with that of other sections affected by this work.
- B. Perform cutting and drilling to accommodate work of other sections, as indicated or implied from Contract Drawings and Specifications, for the proper completion of the work.

#### 1.7 DELIVERY, HANDLING, AND STORAGE

- A. Pack and band shipment. Following shipping store granite on wood skids or pallets, covered with non-staining, waterproof membrane and protected from the weather. Place and stack pallets to evenly distribute the weight of the granite materials and prevent damage to granite pieces.
- B. Store to allow air to circulate around the granite material. Do not place in contact with the ground during storage.
- C. Handle to prevent chipping, breakage, soiling, or other damage. Granite units shall be lifted with wide-belt type slings wherever possible. Do not use wire rope or ropes containing tar or other substances which might cause staining or damage to granite finish.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- D. Granite damaged in any manner will be rejected and shall be replaced with new materials at no additional cost to the Owner.

#### 1.8 PROTECTION OF FINISHED SURFACES

- A. Finished surfaces adjacent to the granite work shall be adequately protected from soiling, staining, and other damage.

#### 1.9 QUALITY ASSURANCE

- A. Granite shall conform to the requirements of ASTM C 615, Architectural Grade and NBCQA Specifications, except as modified herein.
- B. Installer Qualifications: An experienced installer who has completed solid granite systems similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
  - a. Installer's responsibilities include engineering, detailing, fabricating, and installing solid granite system.
  - b. Responsibility: Preparation/Review of Shop Drawings (see 1.4.B.5 above) and comprehensive engineering analysis by a qualified structural engineer.
- C. Structural Engineer Qualifications: A structural engineer who is licensed to practice in the State of Ohio, and experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of solid granite systems that are similar to those indicated for this Project in material, design, and extent, including anchors, attachments and coordination with building structural system.
- D. Source Limitations for Stone: Obtain each variety of stone, regardless of finish, from a single quarry with resources to provide materials of consistent quality in appearance and physical properties.
- E. Source Limitations for Mortar Materials: Obtain mortar ingredients of uniform quality for each cementitious component from a single manufacturer and each aggregate from one source or producer.
- F. Source Limitations for Other Materials: Obtain each type of stone accessory, sealant, and other material from a single manufacturer for each product.
- G. Welding Standards: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel"; and AWS D1.3, "Structural Welding Code--Sheet Steel."

#### 1.10 JOB CONDITIONS

- A. Cold Weather Protection:
  - 1. Remove any ice or snow formed on granite or concrete bed by carefully applying heat until top surface is dry to touch.
  - 2. Remove granite work determined to be damaged by freezing conditions.
  - 3. Perform the following construction procedures while work is progressing.

<u>Air Temperature</u>	<u>Procedures</u>
40° – 32°F.	Heat sand to produce mortar temperatures between 40° and 120 F.
32° – 25°F.	Heat sand to produce mortar temperatures between 40° and 120 F. Maintain temperature of mortar on boards above freezing.
25° – 20°F.	Heat sand to produce mortar temperatures between 40° and 120 F. Maintain temperature of mortar on boards above freezing. Use wind breaks when wind is in the excess of 15 mph.
20° – below	Heat sand to produce mortar temperatures between 40° and 120 F. Provide enclosures and auxiliary heat to maintain air temperature above 32°F. Do not lay units which have a surface temperature below 20°F.

4. Latex admixture shall be kept at 40°F. minimum.

B. Cold Weather Protection for Completed Granite Work:

<u>Mean Daily Air Temperature</u>	<u>Procedures</u>
40° – 32°F.	Protect granite work from rain or snow for at least 24 hours by covering with weather-resistive membrane.
32° – 25°F.	Completely cover granite work with weather-resistive membrane for at least 24 hours.
25° – 20°F.	Completely cover granite work with insulating blankets or similar protection for at least 24 hours.
20° – below	Maintain granite work at temperature above 32°F. for 24 hours using enclosures and supplemental heat.

1. Do not use frozen materials or materials mixed or coated with ice or frost. Do not lower the freezing point of mortar by use of admixtures or antifreeze agents, and do not use calcium chloride in mortar or grout.
2. Do not build on frozen work; remove and replace granite work damaged by frost or freezing.
3. During all seasons, protect partially completed granite work against weather when work is not in progress.

PART 2 PRODUCTS

2.1 GENERAL STANDARDS

A. Quarrying Supervision:

1. Supervise and coordinate quarry work by the granite fabricator to ensure that the as-quarried block orientations yields finished material with characteristics as described herein.

2. Granite shall be cut from matched blocks. Matched blocks shall mean blocks extracted from a single bed of stratum in the quarry. The use of blocks chosen at random, though similar in general character and color to that of the approved granite will not be permitted.

B. Examinations

1. Examination at the Quarry: Quarried blocks shall be made available for inspection by the Architect at its request.
2. Examination at the Fabrication Plant: Production units shall be made available for inspection by the Architect at his request. Advise the Architect when production has begun and of the earliest possible opportunity to inspect a representative sampling of production work.

C. Criteria for Granite

1. Visual: All examinations, selections, and approvals shall be for the purpose of achieving a final appearance of granite with greatest possible uniformity, and will be based upon the following criteria:
  - a. Granite shall be of sound stock and uniform texture, and shall be free from holes, seams, shakes, clay pockets, spalls, stains, starts, and other defects which would impair the strength, durability and appearance of the work, as determined by the Architect.
  - b. Inherent variations characteristic of the granite and the quarry from which the granite is to be obtained shall be brought to the attention of the Architect at the time the samples are submitted for approval, and shall be subject to approval of the Architect.
  - c. Select granite for background color, veining, marking and matching, shall run in even shades, and set accordingly.

- D. Granite materials rejected for non-compliance with these standards shall be replaced at no additional cost to the Owner.

2.2 GRANITE

- A. Granite shall conform to the requirements of ASTM C 615, Architectural Grade and NBGQA Specifications.

1. Granite shall be sound and uniform in quality, texture, and strength, and shall be free of any flaws, reeds, rifts, laminations, seams, or defects which would impair its strength, durability, or appearance.
  - a. Absorption by weight shall not exceed 0.4%.
  - b. Compressive strength of not less than 19,000 psi.
  - c. Minimum density of 160 pcf.
2. Granite Types and Sources:
  - a. "Prairie Brown" and "Mesabi Black" granite by Coldspring Granite, or approved equal.



- b. Finish: Diamond 10 (Prairie Brown) and Antique (Mesabi Black), as indicated on Drawings, to match Architect's sample.

- B. Granite shall be of the sizes and dimensions indicated on the Drawings.
- C. All faces shall be at right angles to the plane of the top, unless noted otherwise.
- D. Granite shall be cut accurately to required shapes and dimensions.

### 2.3 STONE FABRICATION

- A. General: Fabricate stone units in sizes and shapes required to comply with requirements indicated, including details on Drawings and Shop Drawing.
  - 1. Comply with recommendations in NBGQA's "Specifications for Architectural Granite."
- B. Cut and drill sinkages and holes in stone for anchors, fasteners, supports, and lifting devices as indicated or needed to set stone securely in place; shape beds to fit supports.
- C. Cut stone to produce pieces of thickness, size, and shape indicated. Comply with specified fabrication and construction tolerances for faces, edges, beds, and backs.
- D. Contiguous Work: Provide chases, reveals, reglets, openings, and similar features as required to accommodate contiguous work.
- E. Finish exposed faces and edges of stone, except sawed reveals, to comply with requirements indicated for finish and to match approved samples and mockups.
- F. Inspect finished stone units at fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units.
  - 1. Grade and mark stone for overall uniform appearance when assembled in place. Natural variations in appearance are acceptable if installed stone units match range of colors or appearance characteristics represented in approved samples and mockups.
- G. Flatness Tolerance: Variation from true plane, or flat surfaces, shall be determined by use of a 4 ft. long straightedge, applied in any direction on the surface. Variations on polished, honed and fine rubbed surfaces at the bed and joint arris lines shall not exceed 3/64 of an inch or 1/16 of the specified joint width, whichever is greater. On surfaces having other finishes the maximum variation from true plane shall not exceed 1/4 of the specified joint width.
- H. Variations from true plane on other parts of face surfaces shall not exceed the following:
  - 1. 4-cut and sawn finishes. 1/8 in.
  - 2. Thermal and coarse stippled sandblasted finishes. 3/16 in.
- I. Backs and pieces shall be sawn or roughly dressed to approximate true planes. Maximum variation in thickness from the specified shall not exceed the following:
  - 1. 1/2 in. on pieces above 3 in. modular thick.

#### 2.4 MORTAR BED

- A. Mortar bed shall consist of thick set latex modified bed with high strength latex modified bond coat.
- B. Thick Set Mortar bed: Setting bed mortar shall conform to ASTM C 270, Type S, except that latex polymer additive shall be mixed with cementitious materials and aggregate in lieu of water.
  - 1. Cement shall conform to ASTM C 150, Type I, complying with the staining requirements of ASTM C 91 for not more than 0.03% water soluble alkali. Furnish Type I, except Type III may be used for setting granite in cold weather.
  - 2. Sand shall conform to ASTM C 144.
  - 3. Hydrated lime shall conform the ASTM C 207.
  - 4. Latex polymer additive shall be equal to “Laticrete 3701” mortar admix, manufactured by Laticrete International, Inc. Mix according to manufacturer’s instructions.
- C. High Strength Bond Coat: High strength bond coat between concrete base slab and setting bed mortar, and between setting bed mortar and granite shall be equal to “Laticrete 4237 Latex Additive”, a specially designed latex additive for use with Laticrete 211 Powder to make high strength latex slurry bond coat for mortar bed, manufactured by Laticrete International, Inc., or approved equal. Mix according to manufacturer’s instructions.

#### 2.5 JOINT SEALANT

- A. Provide high-performance silicone sealant. Refer to Section 079200 - Sealants.

#### 2.6 SKATEBOARD DETERRENT

- A. Basis of Design: GrinderMinder 1” diameter solid stainless steel ball deterrent system by Grind to a Halt, Inc.
  - 1. Finish: Solid stainless steel with Brushed Finish.
  - 2. Installation: Space 3’ to 4’ on center on edges of seating, low planter seatwalls, and other low elements susceptible to skateboard use/abuse.

#### 2.7 EXPANSION JOINT FILLER

- A. Performed expansion joint filler shall be a non-extruding, resilient, non-bituminous type, conforming to ASTM D 1752, Type II.

#### 2.8 ANCHORAGE AND SETTING MATERIALS

- A. Pins, Dowels, Anchor Bolts, Nuts, Washers, and Shims: Fabricate from AISI Type 302/304 stainless steel.
- B. Stone Anchors: Dovetail slots, anchors, dowels, shims, and other metal items required for the support and anchorage of the granite work shall be furnished under this Section for type and size required to securely anchor and fasten stonework in place. Fabricate anchors and dowels from Type 302/304 stainless steel.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- C. Epoxy adhesive for fastening stainless steel dowels into adjoining granite pieces and/or concrete foundations shall be two-component, 100% solids, moisture-insensitive, high-modulus, high strength, structural, epoxy paste adhesive conforming to ASTM C 881, similar to “Sikadur 31, Hi-Mod Gel”, manufactured by Sika, or approved equal.
- D. Provide plastic setting buttons sized to maintain uniform joints.

### PART 3 EXECUTION

#### 3.1 ACCEPTABILITY OF EXISTING CONDITIONS

- A. Contractor shall examine the existing conditions to determine its adequacy to receive granite unit and mortar setting bed. Evidence of inadequate condition shall be brought to the immediate attention of the Construction Manager.

#### 3.2 SETTING (LAYOUT, MORTAR BED, JOINTS, ETC)

- A. The grades need to be staked, elevations confirmed and reviewed by the construction Manager and Architect before granite is to be set.
- B. Granite units with chips, cracks, stains, or other defects which might be visible in the finished work shall not be used.
- C. Before setting, granite shall be clean and free of dirt, and foreign matter on all sides. Granite shall be dry before setting.
- D. Granite shall be set true to the required lines and grades. Joints shall be uniform in thickness. Unless otherwise indicated on the Drawings, all joints shall be 3/8” wide. Direct bearing contact between granite pieces shall be prohibited.
- E. Before setting, the back of each granite piece shall be dampened and shall receive a slurry of mortar to ensure maximum contact with mortar bed.
- F. Each piece shall be carefully bedded in a full bed of mortar and tapped home with a rawhide mallet to a full and solid bearing.
- G. Exposed surfaces shall be kept free from mortar at all times. Any mortar smears shall be immediately removed with a clean sponge and clean water before latex modified mortar can set.
- H. Holes, slots, and other sinkages for anchors, and dowels, shall be completely filled with mortar during setting of granite.
- I. All joints shall be sealed with joint sealant to be uniform in appearance, texture, and color. Refer to Section 079200 – Sealants.
- J. Granite sections shall be set according to the details and locations indicated on the Drawings.
- K. Expansion joints shall be located as indicated on the Drawings. Expansion joint shall be 3/8 in. wide, unless noted otherwise. Preformed joint filler shall be installed between granite units at expansion joint locations. Expansion joints shall be sealed in accordance with Section 079200 – Sealants.

### 3.3 ADJUSTMENT AND CLEANING

- A. Replace granite pieces which are broken, chipped, stained, or otherwise damaged.
- B. Remove and replace units which are misaligned or not to grade or do not match adjoining stone work.
- C. Provide new matching units, installed as specified, to eliminate evidence of replacement. Repair defective and unsatisfactory joints as required to provide a neat, uniform appearance.
- D. Exposed surfaces shall be kept free from mortar at all times. Any mortar smears shall be immediately removed with a clean sponge and clean water before mortar can set.
- E. Final Cleaning: After mortar is thoroughly set and cured but not longer than 14 days, clean stone as recommended by the stone quarrier and fabricator.
  - 1. Large mortar smears should have been removed as part of the daily in progress cleaning; only dust and light staining should remain for the final cleaning.
  - 2. Test cleaning method on an inconspicuous area of the site wall. Obtain Architect's approval of sample cleaning before proceeding.
  - 3. Protect adjacent surfaces from contact with cleaning solution.
  - 4. Wet wall surfaces with water before application of cleaners. Clean stone by bucket and brush hand cleaning method described in BIA Technical Note No. 20 (August 2018) using job-mixed detergent solution. After appropriate "dwell time", remove cleaning agent by rinsing thoroughly with clean water.
  - 5. The use of muriatic acid is prohibited.
- F. Upon completion of granite work, surfaces shall be left in a clean, unsoiled condition, acceptable to the Architect.

### 3.4 PROTECTION

- A. Protected Granite work until final acceptance by the Owner.
- B. After the granite work has been installed, it shall be properly and adequately protected from damage. Boxing or other suitable protection shall be provided by Contractor wherever required. However, no lumber which may stain or deface the granite shall be used. Nails shall be high-quality galvanized or non-rusting.

END OF SECTION

SECTION 055000

METAL FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Stainless steel tube frames (for support of stone cladding).
- B. Galvanized bent plate pipe guards.
- C. Galvanized lateral support angles (at tops of CMU walls).
- D. Other steel, non-structural fabrication items indicated on Drawings.
- E. All accessories, attachment, anchors, and rough hardware for miscellaneous metal work.

1.2 RELATED SECTIONS

- A. Section 033000 - Cast-in-Place Concrete.
- B. Section 042000 – Unit Masonry.
- C. Section 044213 – Dimensional Stone Cladding.
- D. Section 044302 – Solid Granite.
- E. Division 22 – Plumbing.

1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design stainless steel tube frames, including comprehensive engineering analysis, by a qualified professional engineer using performance requirements and design criteria indicated.
- B. Structural Performance:
  - 1. Stainless steel tube frames:
    - a. Coordinate structural requirements with stone cladding engineer.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 degree Fahrenheit, ambient; 180 degree Fahrenheit, material surfaces.
- D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

#### 1.4 REFERENCES

- A. The following codes and standards are hereby incorporated as part of the Project Specifications. These codes and standards, including all supplements, apply to all structural steel and miscellaneous metals work as if fully reproduced herein. Modifications in this Specification, when more stringent than the referenced codes and standards, shall take precedence over the referenced codes and standards.
1. Ohio Building Code – 2017, including all subsequent updates.
  2. American Institute of Steel Construction (AISC) 303-16: "Code of Standard Practice for Steel Buildings and Bridges," June 15, 2016, as modified by the project drawings and this specification; and modifications in Part 4 at the end of this section.
  3. ANSI/AISC 360-16: "Specification for Structural Steel Buildings" and including the "Commentary on the Specification for Structural Steel Buildings", July 7, 2016
  4. American Welding Society (AWS) Structural Welding Code - Steel, ANSI/AWS.
  5. ASTM A6 - General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use.
  6. ASTM A123 - Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip.
  7. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  8. ASTM A386 - Zinc Coating (Hot-Dip) on Assembled Steel Products.

#### 1.5 SUBMITTALS

- A. Submit shop drawings of all miscellaneous metal items indicating fabrication, assembly and erection detail, member sizes, fastenings, supports and anchors, clearances, coating, and all necessary connections to adjacent work.
1. Field measure as required prior to preparation and submittal of shop drawings.
  2. Submit setting drawings, templates, and directions for installation of anchorage items.

3. Submit product data for manufactured and proprietary products specified herein.
4. For expansion bolts, submit manufacturer's certificate of performance.

#### 1.6 QUALITY ASSURANCE

- A. All welds, welding operators, tackers and inspectors shall be fully qualified in accordance with the requirements of the American Welding Society for the type of work they are to perform. Copies of certification shall be submitted prior to performing that work.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Material Storage: Protect miscellaneous metal and packaged materials from corrosion and deterioration. Store off ground and pitched to drain off water.
- B. Do not store materials on the structure in a manner that might cause distortion or damage to the members or the supporting structures. Repair or replace damaged materials or structures as directed.

#### 1.8 PROJECT CONDITIONS

- A. Field measure as required for work fabricated to fit job conditions. Allow for trimming and fitting wherever fabrication might delay work.
- B. Determine correct detailing and design to anticipate deflection and curing of concrete and masonry structures to be attached.

#### 1.9 COORDINATION AND SCHEDULING

- A. Coordinate installation of anchorages for stainless steel tube frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- B. Schedule installation so wall attachments are made only to completed walls. Do not support stainless steel tube frames temporarily by any means that do not satisfy structural performance requirements.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. Stainless Steel:
  1. Tubing: ASTM A554, Grade 316L.
  2. Plate and Flat Bar: ASTM A666, Grade 316L.

3. Fasteners: Type 316 stainless steel.
- B. Rolled Steel Plates, Shapes and Bars: ASTM A36 unless otherwise noted on Drawings.
- C. Steel Pipe: ASTM A53, Type E or S, Grade B.
- D. Steel Tube: ASTM A500, Grade B.
- E. Threaded Fasteners: ASTM A325, high strength, unless otherwise indicated. Provide hexagonal heads and nuts with washers.
- F. Galvanizing Repair Paint: ZRC Chemical Products Company "ZRC Cold Galvanizing Compound."
- G. Adhesive Anchors: Hilti-HY 200-A Adhesive Anchor System as manufactured by the Hilti Corporation. Anchors and hardware to be stainless steel unless otherwise noted.
- H. Expansion Anchors: Stainless steel, by WEJ-IT or REDHEAD.
- I. Grout Under Steel Bearing Plates: Pre-mixed, factory-packaged, nonmetallic, nonshrink, non-staining, noncorrosive, nongaseous grout complying with CRD-621 and ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- J. Pipe Guards: ¼" thick x 12" wide galvanized bent steel plate; fit flat against wall or column at both ends; fit around pipe with 2" clearance between pipe and guard. Drill each end for anchor bolts.

## 2.2 FABRICATION

- A. General:
  1. Fabricate items in accordance with this Specification, referenced codes and standards, Contract Drawings and final shop drawings.
  2. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.
  3. Complete shop assembly, including connections and welding of units, before start of galvanizing operations.
- B. Connections:
  1. Provide welded shop connections unless otherwise shown.



2. Provide bolted field connections unless otherwise shown.
  3. Provide A325 high strength bolts unless noted otherwise.
  4. Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work.
  5. Welding: Contractor shall determine appropriate welding materials and procedures for the base metals involved for all welding. Materials and procedures to be in accordance with AWS requirements.
- C. Surface Preparation: Prepare ferrous metal surfaces prior to galvanizing to comply with minimum requirements of SSPC-SP6 "Commercial Blast Cleaning." Refer to Specification Section 099100 for additional requirements.
- D. Galvanized Finish:
1. ASTM A153 for galvanizing iron and steel hardware.
  2. ASTM A123 for galvanizing rolled, pressed and forged steel shapes, plates, bars and strip 1/8" thick and heavier.
  3. ASTM A385 and A386 for galvanizing assembled steel products.

### PART 3 EXECUTION

#### 3.1 PREPARATION

- A. Examine the areas and conditions under which miscellaneous work is to be installed and notify Construction Manager and Architect in writing of conditions detrimental to the proper and timely completion of the work.
1. Do not proceed with the work until satisfactory conditions have been corrected.
- B. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication.

#### 3.2 ERECTION & INSTALLATION

- A. Comply with this Specification, referenced codes and standards, Drawings, and final shop drawings.
- B. Install work in conformance with approved shop drawings and manufacturer's recommendations.
- C. Grind coating prior to field welding galvanized materials.

- D. Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- E. Install supporting members, fastenings, hangers, bracing, brackets, straps, bolts, angles, and other required accessories to set work. Except where otherwise specified, secure to concrete with adhesive anchors.
- F. Stainless Steel Tube Frames:
  - 1. Coordinate installation with Stone Contractor/Installer.
  - 2. Coordinate anchorages with Substrate (Concrete) Contractor.
  - 3. Install in compliance with approved shop drawings.
  - 4. Set level and plumb. Set tube frames accurately in location, alignment, and elevation; measured from established lines and levels, and free of rack.
- G. Pipe Guards: Bolt to wall or column with adhesive or expansion anchors, using (4) 1/2" anchors per guard, unless noted otherwise. Mount with top edge 26" above driving surface.

### 3.3 CLEANING AND FIELD TOUCHUP

- A. Following erection, thoroughly clean all steel work of all mud and dirt accumulated during erection.
- B. For galvanized finishes, touch up with Cold-Galvanizing Compound by ZRC Products Co.

END OF SECTION

SECTION 057000

ORNAMENTAL METALS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Stainless steel guardrail with stainless steel top rail.
- B. Stainless steel guardrail with aluminum top rail.
- C. Stainless steel guardrail with glass infill.
- D. Stainless steel handrails.
- E. Stainless steel bollards.
- F. Stainless steel paver transition strip.
- G. All accessories, attachment, anchors, and rough hardware for ornamental metal work.

1.2 RELATED SECTIONS

- A. Section 033000 - Cast-in-Place Concrete.
- B. Section 044213 – Dimensional Stone Cladding
- C. Section 044302 – Solid Granite
- D. Section 055000 – Metal Fabrications.
- E. Section 071400 – Fluid Applied Waterproofing
- F. Section 321440 – Granite Unit Paving

1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design handrails and guardrails, including comprehensive engineering analysis, by a professional engineer, registered in the State of Ohio, in accordance with the performance requirements and design criteria indicated.
- B. Structural Performance:
  - 1. Guardrails: Conform to ASTM E 985 for design and engineering performance based on testing performed in accordance with ASTM E 894 and ASTM E 935.
  - 2. Handrails and Top Rails of Guardrails:
    - a. Uniform load of 50 lb/ft. applied in any direction.

- b. Concentrated load of 200 lb. applied in any direction.
    - c. Uniform and concentrated loads need not be assumed to act concurrently.
  - 3. Infill of Guardrails:
    - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
    - b. Infill load and other loads need not be assumed to act concurrently.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
  - 1. Temperature Change: 120 degree Fahrenheit, ambient; 180 degree Fahrenheit, material surfaces.
- D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

#### 1.4 REFERENCES

- A. The following codes and standards are hereby incorporated as part of the Project Specifications. Modifications in this Specification, when more stringent than the referenced codes and standards, shall take precedence over the referenced codes and standards.
  - 1. Ohio Building Code – 2017, including all subsequent updates.
  - 2. American Institute of Steel Construction (AISC) 303-16: "Code of Standard Practice for Steel Buildings and Bridges".
  - 3. ANSI/AISC 360-16: "Specification for Structural Steel Buildings" and including the "Commentary on the Specification for Structural Steel Buildings".
  - 4. American Welding Society (AWS):
    - a. D1.1 Structural Welding Code - Steel
    - b. D1.2 Structural Welding Code – Aluminum
    - c. D1.6 Structural Welding Code – Stainless Steel.

#### 1.5 SUBMITTALS

- A. Product data for all manufactured or proprietary products specified herein.
- B. Shop drawings indicating fabrication, assembly and erection detail, member sizes, fastenings, supports and anchors, clearances, coating, and all necessary connections to adjacent work. Shop drawings shall bear the stamp of a Professional

Engineer registered in the State of Ohio, who performed design calculations for members and connections.

- C. Setting drawings, templates, and directions for installation of anchorage items.
- D. For expansion bolts, submit manufacturer's certificate of performance.
- E. Samples:
  - 1. For each type of railing: railing components (full-size, 2' long) including top rail, post, handrail, and infill. Show method of finishing members at intersections.
  - 2. Bollard (one of each type).
  - 3. Paver transition strip (4' length).

#### 1.6 QUALITY ASSURANCE

- A. **All stainless steel fabrications shall occur in a 'clean' shop/facility dedicated only to stainless steel fabrication and finishing.**
- B. All welds, welding operators, tackers and inspectors shall be fully qualified in accordance with the requirements of the American Welding Society for the type of work they are to perform.

#### 1.7 MOCKUPS:

- A. Guardrail (each type): Full-height mockup with posts, top rail, infill rods, base plates and anchors. Mockup shall include each post type (end-post, intermediate/splice post, corner post, etc). Each top rail detail to be included, including end cap, splice, and mitered corners.
- B. Handrails: Full-height, full-length section of handrail. Mockup to include proposed connections, posts, rails, and accommodation of other trades.
- C. Paver Transition Strip: 20' long, in-situ mockup, placed during first phase of paver installation.
- D. Mockups will be reviewed by the Owner and Architect. Accepted mockup sections will be the standard for the entire project and shall remain undisturbed until Substantial Completion. Mockups not accepted shall be removed and another mockup installed at no additional cost to the Owner.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Material Storage: Protect miscellaneous metal and packaged materials from corrosion and deterioration. Store off ground and pitched to drain off water.
- B. Do not store materials on the structure in a manner that might cause distortion or damage to the members or the supporting structures. Repair or replace damaged materials or structures as directed.

1.9 PROJECT CONDITIONS

- A. Field measure as required for work fabricated to fit job conditions. Allow for trimming and fitting wherever fabrication might delay work.
- B. Determine correct detailing and design to anticipate deflection and curing of concrete and masonry structures to be attached.

1.10 COORDINATION AND SCHEDULING

- A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- B. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Stainless Steel: ASTM A167.
  - 1. Tubing: ASTM A554, Grade 316L.
  - 2. Pipe: ASTM A312, Grade 316L.
  - 3. Castings: ASTM A743, Grade CF 8 or CF 3.
  - 4. Plate, Flat Bar, and Sheet: ASTM A666, Type 316L.
  - 5. Shapes: ASTM A276, Type 316L.
  - 6. Fasteners: Type 316 stainless steel.
  - 7. Welding Rod and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
  - 8. Guardrail Infill Rods: TriPyramid medium strength stainless rod, ¼ inch diameter, #A03-0250, with adjustable turnbuckle and adjustable nipple, manufactured by TriPyramid Structures, Inc., or approved equal.
- B. Aluminum:
  - 1. Provide alloy and temper recommended by the aluminum producer and finisher for type of use, exposure, specified finish, and strength properties, but not less than the alloy and temper designations below.

2. Extruded Bars and Shapes: ASTM B221, Alloy 6063-T5/T52, yield strength of 15 KSI to 16 KSI.
  3. Drawn Seamless Tubing: ASTM B210 or ASTM B483, Alloy 6063-TY832.
  4. Plate and Sheet: ASTM B209, Alloy 6061-T6.
  5. Fasteners: Tamper resistant, alloy and temper as recommended by the aluminum producer and finisher for type of use and finish indicated.
- C. Glass (infill): ½” Clear Tempered Glass.
- D. Concrete (bollard fill at Garage Bollards): Provide rounded (not angular) aggregate, in sizes ranging from ½” to 1” diameter, and with a range of colors (Architect to provide reference photo as guide).
- E. Grout Under Steel Bearing Plates: Pre-mixed, factory-packaged, nonmetallic, non-shrink, non-staining, noncorrosive, nongaseous grout complying with CRD-621 and ASTM C1107. Provide grout specifically recommended by manufacturer for exterior applications.
- F. Adhesive Anchors: Hilti-HY 200-A Adhesive Anchor System by Hilti Corp. Anchors and hardware to be stainless steel, unless otherwise noted.

## 2.2 FABRICATION

- A. General:
1. Fabricate items in accordance with this Specification, referenced codes and standards, Contract Drawings, and final shop drawings.
  2. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.
  3. Coordinate with the work of other trades to ensure proper interface with other work.
- B. Connections:
1. Welded joints:
    - a. Cope components at connections to provide close fit, or use fittings designed for this purpose. Continuously weld or spot weld as specified. Dress face of welds flush and smooth.
    - b. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
    - c. Obtain fusion without undercut or overlap.
    - d. At exposed connections, finish exposed surfaces smooth and blended so

no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

2. Make jointing where least conspicuous.
3. All accessories to be stainless steel.
4. Cutting and drilling: Carefully execute all necessary cutting, drilling, tapping, and fitting. Fit work at job before finishing.
5. Riveting, bolting, screwing:
  - a. Use flat countersunk heads in exposed faces of work.
  - b. Cut off bolts, screws, etc., where exposed, flush with nuts or other adjacent metal.
  - c. Weld or rivet shop-assembled connections.
  - d. Rivet, bolt, or machine-screw field connections.
  - e. Exposed fastenings: Same material, color, and finish as metal to which they apply.
  - f. Make up threaded connections tightly so that threads will be entirely concealed by fitting.

C. Railings:

1. Assemble in the 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 reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
2. Guardrail and handrail posts to be custom fabricated and shop welded to base plates. Refer to Drawings for rail details.
3. Form changes in direction of members as detailed.
4. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required. Maintain profile of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of railing components.
5. Provide wall brackets, flanges, miscellaneous fittings, and anchors as indicated to connect railing members to other work.
6. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices to withstand loads imposed by railings. Coordinate anchorage devices with supporting structure.
7. Shear punch metal cleanly and accurately. Remove burrs from exposed cut



edges.

8. Ease exposed edges to a radius of approximately 1/32" unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the work.
9. Cut, reinforce, drill, and tap components as indicated, to receive finish hardware, screws, and similar items.
10. Close exposed ends of railing members with prefabricated end fitting or welded end cap.
11. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns.

D. Stainless Steel Finish:

1. Typical finish: Brushed Satin #4.
2. Remove or blend tool and die marks and stretch lines, or blend into finish.
3. Grind and polish surfaces to produce uniform, directional, textured finish indicated, free of cross scratches. Run grain of directionally textured finishes with long dimension of each piece.
4. When polishing is complete, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

E. Aluminum Finish:

1. Class I Clear Anodized Finish: AA-M32C22A41, medium satin directional textured mechanical finish; chemical etch, medium matte, 0.7 mil minimum clear anodic coating.

PART 3 EXECUTION

3.1 PREPARATION

- A. Examine the areas and conditions under which work is to be installed. Notify the Construction Manager and Architect in writing of conditions detrimental to the proper and timely completion of the work.
  1. Do not proceed with the work until satisfactory conditions have been corrected.
- B. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication.

3.2 INSTALLATION

- A. Install work in conformance with approved shop drawings and manufacturer's

recommendations.

- B. Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- C. Install supporting members, fastenings, hangers, bracing, brackets, straps, bolts, angles, and other required accessories to set work.
- D. Except where otherwise specified, secure railings, bollards, and other components to concrete with stainless steel adhesive anchors.
- E. Bollards: Coordinate exact location and orientation of bollards with Architect prior to installation.
- F. Railings
  - 1. General:
    - a. Install in compliance with approved shop drawings, and requirements of Ohio Building Code.
    - b. Fit exposed connections together to form tight hairline joints.
    - c. Perform cutting, drilling, and fitting required for installation.
    - d. Set railings accurately in location, alignment, and elevation; measured from established lines and levels, and free of rack.
    - e. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
    - f. Set posts plumb within a tolerance of 1/16" in 3 feet.
    - g. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed ¼" in 12 feet.
    - h. Adjust railings before anchoring to ensure matching proper alignment.
  - 2. Non-welded connections:
    - a. Use mechanical tamper resistant fasteners for permanently connecting railing components.
    - b. Use wood blocks and padding to prevent damage to railing members and fittings.
    - c. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.

- 3 Welded connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in Article 2.2.B above.
4. Expansion joints:
  - a. Install at locations indicated but not farther apart than required to accommodate thermal movement.
  - b. Provide slip-joint internal sleeve extending 2" beyond joint on either side; fasten internal sleeve securely to one side, and locate joint within 6" of post.

### 3.3 TOLERANCES

- A. Variation from true plumb: +/- 1/8 inch in 20.0 feet.
- B. Variation from level: +/- 1/8 inch in 20.0 feet.
- C. Variation from true line: +/- 1/8 inch in 20.0 feet.

### 3.4 INSPECTION AND ACCEPTANCE

- A. Ornamental work will be rejected for any of the following deficiencies:
  1. Finish of exposed-to-view stainless steel, aluminum, and glass surfaces with color and appearance outside the range of the approved samples.
  2. Ornamental metal items that are stained, discolored, abraded, or otherwise damaged that cannot be removed by cleaning.
  3. Metal materials found in contact with dissimilar materials without protection.

### 3.5 CLEANING AND FIELD TOUCHUP

- A. Following erection, thoroughly clean all ornamental metal work of all mud and dirt accumulated during erection. Touch-up all marred areas to match specified finish.

END OF SECTION

SECTION 071400  
FLUID APPLIED WATERPROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Hot-applied waterproofing system.

1.2 RELATED SECTIONS

- A. Section 030100 - Concrete Repair.
- B. Section 079000 - Expansion Joints.
- C. Section 079200 – Sealants.

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  1. ASTM D-1621: Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
  2. ASTM D-4491: Standard Test Method for Water Permeability of Geotextiles by Permittivity.
  3. ASTM D-4632: Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
  4. ASTM D-4716: Standard Test Method for Determining the (in-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of Geosynthetic Using a Constant Head.
  5. ASTM D-4751: Standard Test Method for Determining Apparent Opening Size of a Geotextile.
  6. ASTM D-4833: Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products.

1.4 DEFINITIONS

- A. The term "manufacturer's recommendations," or variations thereon shall mean "manufacturer's recommendations which are found in publications available to and commonly used by the general architectural and consulting professions."
- B. The term "membrane" or variations thereon used in the waterproofing documents shall mean "the entire hot fluid-applied waterproofing system" which includes components listed in this Specification Section and detailed in the Construction Documents.
- C. The term "provide" means furnish and install, complete and ready for intended use, as

applicable in each instance.

#### 1.5 SUBMITTALS

- A. Literature for manufactured products, including manufacturer's specifications, test data, installation instructions and applicator's manual.
- B. Letter of applicator approval from the manufacturer per Paragraph 1.6.B.
- C. Letters of experience per Paragraph 1.6.C.
- D. Letter from manufacturer stating their system as specified is suitable for use in this project.
- E. Material Safety Data Sheets on all materials.
- F. Upon completion of the work and before final payment provide fully executed warranties.
- G. Materials and procedures to be used in the repair of the existing waterproofing membrane and expansion joint flashing.

#### 1.6 QUALITY ASSURANCE

- A. Applicable Codes:
  - 1. The Contractor shall comply with all Federal, State and Municipal laws, codes, ordinances and regulations applicable to the Work in this Contract and also with all requirements of the National Fire Protection Association, the National Electric Code, and the Occupational Safety and Health Administration (OSHA). If the above laws, codes or ordinances conflict with this Specification, then the laws, codes or ordinances shall govern, except in such cases where the Specification exceeds them in quality of materials or labor, then the Specifications shall be followed.
  - 2. If the above laws, codes or ordinances conflict with the Specification, then the laws, codes or ordinances shall govern, except in such cases where the Specification exceeds them in quality of materials or labor, then the Specifications shall be followed.
- B. The membrane system applicator shall be approved by the manufacturer prior to the start of work.
- C. Membrane applicator's lead personnel (field superintendent and foreman) in charge of the work shall each have the following experience:
  - 1. Three (3) verifiable years of experience supervising the application of the membrane system being provided on this project.

2. Successfully installed three (3) membrane projects of similar size, type and using the same membrane system being provided on this project.
- D. Membrane applicator's lead personnel shall be present for all field operation pertaining to this waterproofing system installation.
- E. The Owner reserves the right to request different lead personnel if, in the Owner's opinion, those assigned to the project are not qualified by way of experience or ability to perform the Work. Comply with the Owner's request at no additional cost.
- F. Substrate Compatibility:
  1. The manufacturer and contractor shall:
    - a. Jointly review and inspect the substrate materials to which the new waterproofing membrane is intended to be applied.
    - b. Perform tests as necessary to ensure compatibility and verify the absence of materials - visible and invisible - detrimental to the application or performance of the waterproofing membrane.
    - c. Review materials specified elsewhere in the Construction Documents to which the waterproofing membrane is intended to be applied.
  2. If inspections, tests or review of materials and substrate reveal conflicts of compatibility with the intended waterproofing membrane provide written evidence of the compatibility conflict to the Owner prior to ordering of materials.
  3. By beginning the waterproofing system (including substrate preparation), the Contractor accepts the responsibility for ensuring the performance of the waterproofing system.
  4. If the Contractor fails to submit proof of incompatible materials, and if failure of the waterproofing system is a result of chemical or physical incompatibilities with existing or specified products or materials, the Contractor is responsible for all costs related to correcting the deficient work and for all direct and indirect costs to the Owner.
- G. Single Source – All waterproofing system components should be supplied from single-source manufacture.
- H. Testing:
  1. The Owner may perform tests to ensure compliance with the Contract Documents and manufacturer's requirements.
  2. If tests reveal noncompliance, correct deficiencies in a manner approved by the Owner and the manufacturer at no additional cost.
  3. Except as otherwise specified, the Owner will pay the cost of the tests, including

repair and patching of test areas.

4. Where tests reveal deficiencies in the membrane materials or installation, the costs of the tests, and repair and patching of the test areas shall be borne by the Contractor.

- I. Air compressors shall be equipped with functional oil and water separators.

#### 1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to job site in sealed, undamaged containers. Identify each container with the material's name, lot number and date of manufacture.
- B. Store membrane materials in a place specifically assigned for that purpose and which is well ventilated, lighted and not subject to direct sunlight.
- C. Heat or cool the storage area to maintain temperatures within the range recommended by the membrane manufacturer.
- D. Keep membrane materials sealed in original containers when not in use.
- E. Keep storage area neat and clean.
- F. Do not overload or otherwise distress the structure.
- G. Handle membrane system materials in strict accordance with safety and weather limitations required by product literature or as modified by applicable rules and regulations of Local, State and Federal authorities having jurisdiction.
- H. When using toxic or flammable solvents, take necessary precautions as recommended by the manufacturer. The handling and use of toxic or flammable solvents, including adequate ventilation and personal protective equipment, shall conform to the requirements of the applicable safety regulatory agencies.

#### 1.8 EXISTING CONDITIONS

- A. Existing buried waterproofing at Lot 23 and Lot 27 is Henry 790-11 system.

#### 1.9 JOB CONDITIONS – WEIGHT RESTRICTIONS AND MOVEMENT

- A. The Contractor shall use equipment for membrane installation on structured concrete slab areas with the following weight restrictions:
  1. The maximum wheel load shall not exceed 2,000 lbs.
  2. The maximum distributed load shall not exceed 90 psf.
  3. Wheelbase of loaded equipment shall not exceed 5 feet.
  4. Equipment positioning, movement and orientation is subject to Engineer and Owner review.

## 1.10 WARRANTY

- A. The completed installation shall be warranted by the manufacturer against defects of materials, and by the Contractor for defects in workmanship for a period of ten (10) years, beginning with the date of substantial completion for the Project.
- B. The warranty shall not require the signature of the Owner.

## PART 2 PRODUCTS

### 2.1 MEMBRANE MATERIALS

- A. Hot applied reinforced waterproofing membrane, continuously reinforced system of 215 dry mils total membrane thickness with coverage modifications to account for existing surface roughness. Membrane must be fertilizer compatible.
  - 1. 790-11 by Henry Company (basis of design).
- B. Primer: Required. Product as recommended by the waterproofing membrane manufacturer.
  - 1. HE 910 - Asphalt Primer by Henry Company
- C. Flashing/reinforcing sheet: Spunbonded polyester fabric as recommended by the membrane manufacturer. Use uncured neoprene reinforcement sheet where required by the waterproofing manufacturer and at all membrane penetrations.
  - 1. Grab Tensile Strength – 25 lbs.
  - 2. Trapezoid Tear – 13 lbs./in.
  - 3. Grab Tensile Elongation – 31%.
  - 4. Mullen Burst - 17 PSI.
  - 5. Thickness – 8 mils.
  - 6. Basis of Design: Polyester Fabric Reinforcing Sheet by Henry Company.
- D. Protection Course: Required. Product as recommended by the waterproofing membrane manufacturer.
  - 1. Plaza Protection Course:
    - a. G100s/s by Henry Company.
  - 2. Tree Pit and Planting Area Protection Course:
    - a. RootBloc 20 and G100s/s by Henry Company.



E. Drainage Board:

1. Profile – Dimple board with high impact polystyrene core and woven filter fabric bonded to individual dimples.
  1. Base of Design:
    - a. Henry DB 650HN
2. Board Thickness – 0.44 inches.
3. Board Compressive Strength – Minimum 18,000 psf.
4. Board Flow Rate – 21 gallons/min./sq.ft at 3600 psf and hydraulic gradient 1.0 per ASTM D-4716.
5. Fabric opening size – US standard sieve 80 per ASTM D-4751.
6. Fabric Tensile Strength – 205 lbs. per ASTM D-4632.
7. Fabric Flow Rate – 100 gallons/sq.ft. per ASTM D-4491.

F. Filter Fabric: Non - Woven drainage fabric with the following characteristics:

1. Tensile Strength – 80 lbs. per ASTM D-4632.
2. Tensile Elongation – 50% per ASTM D-4632.
3. Mullen Burst - 160 PSI per ASTM D-3786
4. Tensile Puncture Strength – 45 lbs. per ASTM D-4833.
5. Permittivity – 2.2 sec per ASTM D-4491.
6. Water Flow Rate – 160 g/m/sqft.
7. Basis of Design: Filter Fabric N03 by Henry Company.

G. Neoprene Flashing Sheet: Fabric reinforced, minimum 60 mil thick material as recommended by waterproofing membrane manufacturer.

1. HE850AA by Henry Company.

H. Root Barriers:

1. 160 mil thick polyester reinforced, modified asphalt sheet with granular surface and root inhibiting additive. Root barrier must be rated for intensive and extensive planting conditions. Tensile strength to be >50 lbs. /in. (machine and cross direction at 73°F.). Root barrier may act as protection sheet if approved by membrane manufacturer in writing.

2. Water based liquid latex root inhibitor coating for application at all sheet lap edges of root barrier sheet. Adhesives and Sealants: As recommended and approved by the membrane manufacturer.

1. HE925 BES Sealant by Henry Company

- I. Termination Bar: 1" wide stainless-steel termination bar. Bar to be pre-punched at 6" o.c. to receive 1/4" diameter anchors.
- J. Anchors for Termination bar: 1/4" diameter x 1 1/4" lg. low profile mushroom head nail-in anchor consisting of a stainless-steel drive pin and aluminum/zinc alloy expanding metal body.

## 2.2 SEALANT

As specified in Section 07 92 00 JOINT SEALANTS.

## 2.3 SEALANT PRIMER

As specified in Section 07 92 00 JOINT SEALANTS.

## 2.4 BACKING MATERIAL

Remolded, closed-cell, polyethylene, or polyurethane foam rod having a diameter 25 percent larger than joint width before being compressed into joint. Provide bond breaker of polyethylene film or other suitable material between backing material and sealant.

## PART 3 EXECUTION

### 3.1 PROTECTION

- A. Do not allow construction equipment or other trades on prepared concrete substrate or existing waterproofing system.
- B. Do not store materials or equipment on prepared concrete substrate or existing waterproofing system.
- C. Do not allow construction traffic personnel to traverse across prepared concrete substrate or existing waterproofing system.

### 3.2 PREPARATION

- A. General:
  1. Perform surface preparation and cleaning procedures in accordance with this Section unless the waterproofing system manufacturer has more stringent requirements. Apply membrane to clean, dry, prepared surfaces.
  2. Patch or detail voids and other surface defects as required providing a uniform,

smooth substrate for the membrane application. Follow the membrane manufacturer's written recommendations. Clean substrate surfaces to the standard of cleanliness required by the membrane manufacturer.

3. Clean substrate surfaces free of oil, grease, loose concrete, dirt, and any other debris that will inhibit bond or be detrimental to the system. Leave the prepared surface with a uniform texture and no more than 1% of the total surface area in noncompliance.
4. Do not use acids for surface preparation.
5. Do not use water (high pressure or low pressure) for surface preparation.

B. New Concrete:

1. Do not prepare substrate surfaces until the new concrete has reached adequate cure. Verify in writing the acceptable cure time from the membrane manufacturer.
2. Immediately prior to waterproofing installation, mechanically sweep and blush surfaces to loosen laitance and debris. Blow clean with oil-water free compressed air.

C. Existing Concrete:

1. Hand scrape to remove all remaining remnants of the previous waterproofing membrane not removed during demolition.
2. Shotblast with vacuum process or grind and vacuum surfaces to remove previous membrane residue from the concrete surfaces.
3. Immediately prior to waterproofing installation, clean surfaces to remove laitance and debris per manufacturer's requirements.

D. Metals:

1. Sandblast metal surfaces that will be in contact with membrane system.

### 3.3 APPLICATION OF NEW MEMBRANE SYSTEM

A. General:

1. Provide a total membrane system which the manufacturer recommends for this project. This Section specifies the minimum membrane mil thickness and system installation specifics required for the work.
2. Heat and apply the membrane in accordance with the manufacturer's instructions. Use materials and application techniques to prevent pinholing and blistering.
3. Terminate membrane on vertical surfaces 1/2" below the top of finish surfaces or grade which will be installed after the work of this Section.

4. Mask vertical surfaces as required to protect the adjacent surface finishes. Use temporary steel sleeves to protect newly installed reinforcing dowels, rods and tree tie-down eyelets during membrane installation.
5. Provide surface condition or primers on substrate as required by the membrane manufacturer.
6. Ensure specified application rates of liquid products on vertical and steeply sloped surfaces by using multiple applications of material over previous applications which are fully cured.

B. Detailing/Flashing

1. All detailing and flashing shall be done in accordance with the manufacturer's standard guideline details.
2. All detailing and flashing shall be completed before installing the membrane over the field of the substrate.
3. Roof substrate board joints shall be pre-detailed with membrane and fabric reinforcing prior to full fabric reinforced membrane application.
4. All liquid-applied, resin flashings shall be applied over properly completed membrane flashing details in accordance with the manufacturer's standard guideline details.

C. Reinforced Membrane Waterproofing:

1. In general floor areas, provide a minimum 90 dry mil membrane detail coat and continuous reinforcement sheet as required by the membrane manufacturer.
2. Provide a minimum 90 dry mil membrane detail coat and reinforcement sheet at interior and exterior corners and other changes in the substrate direction.
3. Provide a minimum 90 dry mil membrane detail coat and reinforcement sheet on all unit masonry walls, continuous with detail coat at adjacent wall to floor intersections.
4. Provide a minimum 90 dry mil membrane coat and uncured neoprene flashing sheet around drains and other slab penetrations at interior corners where slabs meet perimeter retaining walls, and at metal angles at expansion joints.
5. While membrane is hot, install reinforcing fabric and completely embed into liquid membrane.
6. Provide a minimum 125 dry mils second coating of membrane, for a total reinforced membrane thickness including the detailing of 215 dry mils. Modify coverage to account for existing surface roughness.
7. Otherwise refer to requirements of paragraph 3.3.A.

D. Protection Course:

1. Soon as possible following second coating of membrane, provide protection board on the membrane in compliance with the membrane manufacturer's recommendations.
2. Install no piece less than ten (10) square feet in size.
3. Ensure the protection board lays flat and in contact with the membrane.

E. Drainage Board:

1. Provide drainage board on all surfaces, including vertical surfaces, as indicated.
2. Begin installation at low point of deck area and proceed to high point. Panels shall be butted tightly.
3. Overlap drainage fabric in shingle fashion between abutting panels. Minimum overlap of fabric onto adjoining panel shall be 2".
4. Seal fabric overlap to abutting panel fabric with mastic as approved by the drainage board manufacturer. Install a minimum 1/4" wide continuous bead of mastic between overlap areas.
5. Where drainage board terminates at walls or other projections, wrap filter fabric over exposed edge and terminate on underside of board. Extend filter fabric a minimum of 1-1/2 inches onto underside of board.
6. Temporarily weight drainage board to maintain in place until next phase of work. Size and type of weight provided shall not damage previously complete waterproofing work or drainage board.
7. Cover drainage board promptly with next phase of work. Do not allow drainage board to be exposed for more than seven days. If drainage board is scheduled for exposure beyond seven days, install a supplemental layer of filter fabric to protect against excessive dirt and debris buildup as well as UV exposure. Remove and discard filter fabric prior to the installation of permanent overburden materials.

F. Root Barriers

1. Provide root barriers on the membrane in compliance with the membrane manufacturer's recommendations.

### 3.4 FIELD QUALITY CONTROL

#### A. Site Tests:

##### 1. Water test:

- a. Prior to installation of drainage board, water test membrane by ponding a minimum of 2 inches for a period of 24 hours to ensure a watertight system.
- b. At sloped areas of greater than 2% or ramp areas, maintain a curtain of water flowing continuously over the area for a period of 48 hours.
- c. Provide means of water containment during water testing to prevent flooding of adjoining areas and areas below the plaza.
- d. Verify that the structure can support the dead load weight of the water prior to testing.
- e. If leaks occur, drain area and repair membrane. Retest.
- f. Construct water containment barriers as approved by the membrane manufacturer.
- g. Water tests can be waived jointly by the Owner and the Manufacturer, only after the Contractor has demonstrated the ability to provide successful system installation in previous application areas.

##### 2. Application monitoring:

- a. Keep at the site and maintain in proper condition an adequate number (at least one per application crew) of durable, wet film thickness gauges.
- b. Continuously use gauges during the application process to ensure the specified thickness.
- c. Owner will periodically monitor the application rates of the membrane components and will notify the job foreman of noted discrepancies.
- d. Owner's periodic monitoring of the application rates shall not relieve the Contractor of the responsibility to provide the specified membrane thickness.

#### B. Manufacturer's Field Service:

1. A technically competent employee of the waterproofing membrane manufacturer (the technician), not associated with the Contractor, the installation crew, product distributor or sales representative shall be on site before the first installation of the membrane system. Provide resume of experience and credentials for approval by the Owner.

2. The technician shall remain on site for the length of time necessary to observe the preparation and installation of 50% of the waterproofing membrane system (including drainage board).
3. Do not begin application of the waterproofing membrane system until the technician has approved the preparation, cleanliness and surface texture of the substrate.
4. The technician shall review all Contractor application techniques and procedures and shall advise the Contractor when, where and as required to obtain specification compliance.
5. Owner reserves the right to request the presence of the same technician on site for installation of the remainder of the waterproofing membrane system or related work if difficulties are encountered, as determined by the Owner, at no additional cost to the Owner.
6. Owner reserves the right to request a different technician if the one at the site fails to perform the duties herein specified. The Contractor and manufacturer shall comply with the Owner's request at no additional cost to the Owner.

### 3.5 CLEAN-UP

- A. During the progress of the work, remove from the project all discarded materials and debris.
- B. Clean all surfaces affected by work of this Section and repair all damage caused to adjacent construction or property, at no cost to the Owner.
- C. Leave adjacent premises clean and free of construction dirt and debris which resulted as part of the construction process.
- D. Remove empty containers from the facility at the end of each working day.
- E. Place soiled cloths that constitute fire hazards in suitable metal safety containers or remove them from the site at the end of each working day. Take special care in storage or disposal of flammable materials. Comply with health and fire regulations.

END OF SECTION

## SECTION 079200

### SEALANTS

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Miscellaneous sealants as noted on the Project Drawing Set.

##### 1.2 RELATED SECTIONS

- A. Section 071400 – Fluid Applied Waterproofing.
- B. Section 079000 – Expansion Joints.

##### 1.3 DEFINITIONS

- A. Where the term "manufacturer's recommendations," or variations thereon, are found in this Specification, it shall mean "manufacturer's recommendations which are found in publications available to and commonly used by the general architectural and consulting professions."

##### 1.4 SUBMITTALS

- A. Copies of literature for all manufactured products, including manufacturer's specifications, test data and installation instructions or applicator's manual.
- B. Letter per Paragraph 1.5.B.
- C. Resume of contractor superintendent or employee per Paragraph 1.5.D.
- D. Manufacturer's certification per Paragraphs 1.5.F.
- E. Proof samples of sealants intended to be installed per Paragraph 1.5.G.
- F. If requested, Field samples of sealants installed on site per Paragraph 1.5.H.
- G. Material Safety Data Sheets on all materials which are classified as hazardous materials.
- H. Upon completion of the Work and prior to final payment, provide written recommendations for routine care and maintenance. Provide list of three Contractors nearest the project location who are qualified to perform repairs to the sealants. Identify common causes of damage and include instructions for temporary patching until permanent repair can be made by qualified personnel.
- I. Upon completion of the Work and prior to final payment, provide a fully executed warranty.



## 1.5 QUALITY ASSURANCE

### A. Applicable Codes:

1. The Contractor shall comply with all Federal, State and Municipal laws, codes, ordinances and regulations applicable to the Work in this Contract and also with all requirements of the National Fire Protection Association, the National Electric Code, and the Occupational Safety and Health Administration (OSHA). If the above laws, codes or ordinances conflict with the Specification, then the laws, codes or ordinances shall govern, except in such cases where the Specification exceeds them in quality of materials or labor, then the Specifications shall be followed.

B. The sealant installer must be acceptable to the manufacturer. Provide written confirmation that the intended sealant installer is acceptable to the manufacturer.

C. The Contractor shall review locations where joint sealant work is specified, and shall submit in writing existing conditions and newly specified details which would cause sealant material to fail. Failure to review existing conditions or identify details or procedures which will cause failure of sealant material to perform as specified, the Contractor shall become responsible for all costs relating to correcting the deficient work, including all direct and indirect costs to the Owner.

D. The Contractor's superintendent, or another technically competent employee of the Contractor approved by the Owner and Manufacturer, shall be on site and supervise installation of all sealant on this project. Sealant identified as being installed not under the direct supervision of this person shall be subject to removal and replacement, at the direction of the Owner. This person identified for supervision of the work shall have supervised at least three prior projects of similar magnitude and type.

E. The Owner may, at his discretion, choose to remove up to a six-inch length of sealant in locations at a time after installation and initial curing of sealant to verify installation as specified. The Contractor shall include in his Bid the costs to repair one such location for each 100 ft. of sealant installation. If inspections of these locations by the Owner reveal deficient installation of sealant, the Owner may remove additional sealant to further quantify the length of deficient sealant. The Contractor shall repair all deficient locations of sealant found by the Owner at no additional cost and no extension of time for the work.

F. Sealant materials shall be certified to be compatible by the manufacturer for use with the membrane system.

G. Proof Samples of all sealant materials used on the job site shall be prepared in advance of the work by the Contractor and submitted to the Owner for purposes of testing and examination. Samples shall be manufactured with a unit of material from the first batch intended for use on the project. Samples (4 total) shall be at least 2 inch x 2 inch square and 1/2 inch thick, with troweled top surfaces,

identified with manufacturer's batch numbers, date and location of preparation.

- H. The Owner may, at his discretion, direct the Contractor to prepare and submit Field Samples of sealant materials used on the job site during the work. Samples shall be manufactured on site, from a unit of material from the same batch in use that day. Samples (2 total) shall be at least 2-inch x 2-inch square and 1/2 inch thick, with troweled top surfaces, identified with manufacturer's batch numbers, date and location on the project where the sealants represented in the samples were installed. Up to three sets of Field Samples may be requested on this project in the Base Bid.

#### 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to job site in sealed, undamaged containers. Each container shall be identified with material's name, date of manufacture and lot number.
- B. Only those materials being used during any one work shift may be stored in the Work area. Coordinate location of storage area with the Owner.
- C. Sealant materials shall be kept sealed when not in use.
- D. Storage and handling of materials shall conform to the requirements of the applicable safety regulatory agencies.
- E. Storage areas shall be heated or cooled as required for maintaining the product temperatures within the range recommended by the manufacturer.

#### 1.7 PROJECT CONDITIONS

- A. Install sealant materials in strict accordance with all safety and weather conditions required by product literature or as modified by applicable rules and regulations of Local, State and Federal authorities having jurisdiction.
- B. Fumes and debris shall be controlled to prevent harmful or undesirable effects in surrounding areas.
- C. When toxic or flammable solvents are used, the Contractor shall take all necessary precautions as recommended by the manufacturer. In all cases, the handling and use of toxic or flammable solvents, including adequate ventilation and personal protective equipment, shall conform to the requirements of the applicable safety regulatory agencies.

#### 1.8 SEQUENCING

- A. Install sealants after any required concrete repairs.
- B. Install sealants after adequate cure of concrete repairs. Confirm required cure time with sealant manufacturer.
- C. Install all sealants prior to installation of membrane systems.

## 1.9 WARRANTY

- A. New sealant work shall be warranted for a period of five (5) years against defects due to installation or material deficiencies, including but not limited to excessive softness, excessive entrapped air in cured cross sections, disbonding, cohesive failure, leakage and ultra violet exposure degradation.
- B. In addition to the (5) year warranty the silicone manufacturer is to furnish a warranty of (15) years for all types of new sealant joints to the Owner. New sealant work shall be warranted against defects due to material failure, including but not limited to excessive softness, excessive entrapped air in cured material, disbonding, cohesive failure, leakage and ultra violet exposure degradation.
- C. All required testing and quality assurance operations necessary to furnish the warranty are Contractor and manufacturer's responsibility.

## PART 2 PRODUCTS

### 2.1 CRACK AND BURRIED CONCRETE JOINT SEALANTS

- A. Multi-component, unmodified, polyurethane. Approved products manufacturers include:
  - 1. Sika 2c NS-TG/SL by Sika Corp.
  - 2. Dymeric 240FC by Tremco, Inc.
- B. Minimum compression or extension of 25% of the nominal joint width without adhesive or cohesive failure.
- C. Primer(s) as recommended by sealant manufacturer for each substrate.
- D. Sealants in areas to be coated with membrane per Section 071800 shall be gun grade (non-sag) unless otherwise noted on the Drawings or in this Section.
- E. Cove sealants shall be gun grade (non-sag).
- F. Backer Rod or Bond Breaker Tape: Backer Rod shall be closed-cell, polyethylene in sizes to maintain 25 percent compression. Backer rod shall not be used except where indicated on the Drawings or unless approval for each intended application location is obtained from the Owner. Alternative use of bond breaker tape in size appropriate for the width of joint and approved for use by the sealant manufacturer will be allowed on a case-by-case basis.
- G. For joint edge repairs refer to Specification Section 030100.

## 2.2 PLAZA / STAIR SILICONE SEALANTS

- A. Approved for horizontal or vertical sealant installations. Products and manufacturers include:
  - 1. Dowsil 888 by Dow Corning, Inc.
  - 2. Spectrem 800 NS by Tremco Sealant Waterproofing Division.
- B. Minimum compression or extension of 50% of the nominal joint width without adhesive or adhesive failure.
- C. Primer(s) as recommended by the sealant manufacturer for each substrate.
- D. Sealants shall be gun grade (non-sag) unless otherwise noted on the Drawings or in this Section.
- E. Backer Rod. Backer Rod shall be closed-cell, polyethylene in sizes to maintain 50 percent compression. Backer rod shall not be used except where indicated on the Drawings or unless approved for each intended application location is obtained by the Owner.
- F. For joint edge repairs refer to Specification Section 030100.

## 2.3 STONE CLADDING AND SOLID GRANIT SILICONE SEALANTS

- A. Approved Silicone Sealants
  - 1. Dowsil 795 silicone perimeter sealant by Dow Corning.
  - 2. Spectrum 3 silicone sealant by Tremco.
  - 3. SilPruf SCS2000 sealant by G.E.
- B. Primer(s) as recommended by the sealant manufacturer for each substrate.

## PART 3 EXECUTIONS

### 3.1 GENERAL

- A. Remove existing sealants in joint cavities, coves and other locations and clean surfaces to remove residue. Rout any new joint cavities scheduled for new sealant. Grind and vacuum clean all joint cavities, coves and other locations scheduled for new sealant as required by the sealant manufacturer within 24 hours of sealant installation.
- B. Primer shall be used for all sealant installations regardless of manufacturer's requirements, unless a letter from the manufacturer states use of a primer is detrimental. Allow primer to cure per manufacturer's recommendation prior to sealant installation.
- C. Joint cavities that become contaminated by dirt or moisture after initial preparation,

shall be cleaned again at no additional cost to the Owner.

- D. Modify the depth of existing joints by additional routing or positioning of backer rod to maintain a width to depth ratio of 2 to 1 unless otherwise noted on the drawings. At no location is the sealant width allowed to exceed 1-1/2".
- E. Where necessary, square up joint edges and execute repairs with epoxy repair mortar in accordance with manufacturer's recommendations.
- F. Rout cracks per details in surfaces at locations directed by the Owner.
- G. Rout joints per details.

### 3.2 NEW SEALANT

- A. Refer to Article 3.1 for joint cavity preparation requirements.
- B. Clean substrate surfaced and apply primer as recommended by the sealant manufacturer.
- C. Install backer rod or bond-breaker tape where required. Vary size of backer rod if necessary based on field conditions per Article 2.1.F or Article 2.2.F.
- D. Install sealant as indicated in details on the Drawings.

### 3.3 JOINT EDGE REPAIRS

- A. Identify joint edge spalls which are too large to be filled with new sealant. Review repair locations with Owner in advance of the work.
- B. Square edges of spall with diamond blade as indicated on Drawings.
- C. Clean cavity per Article 3.1.
- D. Mix epoxy and clean, dry sand to form grout material, and install per Specification Section 030100.
- E. Allow for cure prior to sealant installation.

### 3.4 MISCELLANEOUS SEALANTS

- A. Install miscellaneous sealants around drains, pipe penetrations in floors, and elsewhere. Install per Article 3.2 and as indicated on the Drawings.

### 3.5 CLEAN-UP

- A. During the progress of the Work, remove from the project all discarded coating materials, rubbish, cans and rags.
- B. All sealant material and drops shall be completely removed from hardware, adjacent floor areas, metal work, etc., and the premises shall be left clean and in orderly condition.

- C. All hardware, adjacent floor areas, metal work, etc., and the general premises shall be left clean and free of all construction dirt and debris. This includes removal of all debris from pipes, etc., which resulted from work specified herein.
- D. Repaint in matching color all curbs, columns, walls, etc., where existing paint was removed during preparation for sealant installation. Refer to Section 321723.
- E. Empty containers shall be removed from the garage at the end of each working day. All cloths soiled with coating that might constitute a fire hazard shall be placed in suitable metal safety containers or shall be removed from the building at the end of each working day. Special care shall be taken in storage or disposal of flammable materials. Comply with health and fire regulations.

END OF SECTION

## SECTION 081100

### STEEL DOORS AND FRAMES

#### PART 1 GENERAL

##### 1.1 SUMMARY

###### A. Section Includes:

1. Pressed steel hollow metal doors and frames.

###### B. Related Sections:

1. Section 042000 – Unit Masonry.
2. Section 087100 – Door Hardware.
3. Section 099100 – Painting.

##### 1.2 REFERENCES

- A. Specified American National Standards Institute (ANSI) Standards.
- B. Specified American Society for Testing and Materials (ASTM) Standards.
- C. Door and Hardware Institute “Recommended Locations for Builders Hardware for Standard Steel Doors and Frames.”
- D. National Fire Protection Association (NFPA) Standard No. 80.
- E. Steel Door Institute (SDI) references:
  1. SDI-100: Recommended Specifications – Standard Steel Doors and Frames.
  2. SDI-105: Recommended Erection Instructions for Steel Frames.
  3. SDI-117: Manufacturing Tolerances – Standard Steel Doors and Frames.

##### 1.3 SUBMITTALS

- A. Product Data: For each type of door and frame specified, include details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation of standard steel doors and frames. Include details of each frame type, elevations of door design types, conditions at

openings, details of construction, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.

- C. Label Construction Certification: For door assemblies required to be fire rated and exceeding limitations of labeled assemblies, submit manufacturer's certification that each door and frame assembly has been constructed to conform to design, materials, and construction equivalent to requirements for labeled construction.

#### 1.4 QUALITY ASSURANCE

- A. Provide doors and frames complying with ANSI/ADI-100 and as herein specified.
- B. Fire-Rated Door Assemblies: Units that comply with NFPA 80, are identical to door and frame assemblies whose fire resistance characteristics have been determined per ASTM E 152 and which are labeled and listed by UL, Factory Mutual, Warnock Hersey, or other testing and inspecting organization acceptable to authorities having jurisdiction.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage.
- B. Inspect doors and frames upon delivery for damage. Minor damage may be repaired provided refinished items are equal in all respects to new work and acceptable to Architect and Owner; otherwise, remove and replace damaged items as directed.
- C. Store doors and frames at building site under cover. Place units on minimum 4-inches high wood blocking. If cardboard wrapper on door becomes wet, remove carton immediately. Provide ¼" spaces between stacked doors to promote air circulation.

#### 1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify openings by field measurements before fabrication and indicate measurements on shop drawings.
- B. Do not install rusted doors or frames.

#### 1.7 COORDINATION

- A. Coordinate installation of anchorages for standard steel frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, anchor bolts, and items with integral anchors, that are embedded in masonry. Deliver such items to Project site in time for installation.

### PART 2 PRODUCTS



## 2.1 MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide standard steel doors and frames by one of the following:
  - 1. Ceco Corp.
  - 2. Curries Company.
  - 3. Republic Builders Products Corp.
  - 4. Steelcraft Manufacturing Co.

## 2.2 MATERIALS

- A. Hot-Rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A569 and ASTM A568.
- B. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A366 and ASTM A568.
- C. Supports and Anchors: Fabricate of not less than 18-gage sheet steel.
- D. Inserts, Bolts, Fasteners: Manufacturer's standard units.
- E. Shop Applied Paint: Rust-inhibitive primer, either air-drying or baking, suitable as a base for specified finish paints.
- F. Supports and Anchors: After fabricating, galvanize units to be built into exterior walls according to ASTM A153, Class B.
- G. Inserts, Bolts, and Fasteners: Hot-dip galvanizing per ASTM A153.
- H. Grout: Comply with ASTM C476, with a slump of 4 inches for standard steel door frames built into concrete or masonry, as measured according to ASTM C143.
- I. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

## 2.3 DOORS

- A. ANSI/SDI-100, Grade III, extra heavy-duty, Model 2 seamless, minimum 14 gauge, cold-rolled sheets steel faces, hot dipped galvanized per ASTM A525 - G60. Top channel turned web up to eliminate dirt pockets.

## 2.4 FRAMES

- A. Provide metal frames for doors; types and styles as shown on Drawings.
- B. Joints machine mitered, arc-welded on faces, and ground smooth.
- C. Minimum gages: 12 gauge.
- D. Hot-dipped galvanized per ASTM A525 - G60.
- E. Wall Anchors: Adjustable T-shaped, corrugated stirrup and strap, or wire anchors; minimum 3 per jamb of the following minimum sizes:
  - 1. T-shaped: 18 gauge, 3 inches by 10 inches.
  - 2. Strap: 18 gauge, 2 inches by 10 inches.
  - 1. Wire: 0.156 inch.
- F. Floor Anchors: Minimum 18 gauge welded to each jamb.
- G. Spreader Bars: Provide one removable spreader bar at frames under 6 inches deep, two at frames 6 inches or deeper, tack welded to bottom of jambs.
- H. Door Silencers:
  - 1. Manufacturer's Standard.
  - 2. Three (3) per single door. Two (2) silencers on head of double door frames.
  - 3. Drill holes for door silencers: ship loose.
- I. Plaster Guards: Provide minimum 26-gage steel plaster guards or mortar boxes at back of hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.

## 2.5 FABRICATION

- A. Fabricate steel door and frame units to be rigid, neat in appearance and free from defects, warp, or buckle. Wherever practicable, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at project site. Comply with ANSI/SDI-100 requirements.
- B. Internal Construction: Manufacturer's standard honeycomb, polyurethane, polystyrene, unitized steel grid, vertical steel stiffeners, or rigid mineral fiber core with internal sound deadener on inside of face sheets where appropriate in accordance with SDI standards.

- C. Clearances:
  - 1. Jambs and heads:  $\frac{1}{8}$  inch.
  - 2. Meeting edges, pairs of doors:  $\frac{1}{4}$  inch.
  - 3. Bottom where no threshold occurs:  $\frac{3}{4}$  inch.
  - 2. Bottom at threshold:  $\frac{1}{8}$  inch above threshold.
- D. Fabricate exposed faces of doors and panels from only cold-rolled steel.
- E. Tolerances: Comply with SDI 117.
- F. Fabricate frames, concealed stiffeners, reinforcement, edge channels, and moldings from either cold-rolled or hot-rolled steel.
- G. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.
- H. Hardware Preparation:
  - 1. Prepare units to receive finish hardware, including cutouts, reinforcing, drilling, and tapping with templates from hardware supplier in compliance with ANSI A115.
  - 2. Door reinforcing plates: 8 gauge for hinges; 14 gauge for closure; 16 gauge for other hardware.
  - 3. Frame reinforcing plates: 8 gauge for hinges; 16 gauge for other reinforcement.
  - 4. Cover boxes for cutouts: 26 gauge welded to back of frame.
  - 3. Provide set bolts or spacers for through-bolted hardware.
  - 6. Location of hardware: Locate hardware per “Recommended Locations for Builders Hardware for Standard Steel Doors and Frames” by Door and Hardware Institute. Comply with requirements for handicapped.
- I. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at project site.
- J. Shop Painting: Clean, treat, and apply primer to exposed surfaces of steel door and frame units.
  - 1. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.

2. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive and compatible with finish paint.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

##### A. General:

1. Install standard steel doors, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.
2. Install in accordance with reference standard criteria for squareness, alignment, twist, and plumbness.

##### B. Placing Frames: Comply with provisions of SDI-105.

1. Place frames prior to construction of new enclosing walls and ceilings, unless otherwise noted. Set frames accurately in position, plumbed, square, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreader leaving surfaces smooth and undamaged.
2. In masonry construction, locate 3 wall anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb.
3. Install fire-rated frames in accordance with NFPA Standard No. 80.
4. Field apply bituminous coating to backs of frames that are filled with grout containing anti-freeze agents.
5. Coordinate installation with masonry wall installation, to allow solidly filling space between frames and masonry with grout.

##### C. Door Installation: Fit hollow metal doors accurately in frames, within clearances specified in ANSI/SDI-100.

1. Install fire-rated doors with clearances as specified in NFPA Standard No. 80.

#### 3.2 ADJUSTING AND CLEANING

##### A. Prime Coat Touch-up: Immediately after erection, sand smooth any damaged areas of prime coat and apply touch-up of compatible air-drying primer, ready for finish painting per Section 099100.

##### B. Final Adjustments:

1. Check and readjust operating hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.
2. Adjust doors to proper fit and swing; leave in proper noise-free operating condition acceptable to Architect.
3. Adjust hardware for proper noise-free operation and function, acceptable to Architect and Owner.

C. Cleaning:

1. Remove grout and other bonding material from hollow metal work immediately after installation.
2. Clean exposed door and frame surfaces to paintable condition acceptable to Architect.
3. Clean hardware surfaces to new condition.

END OF SECTION

SECTION 087100  
DOOR HARDWARE

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes:
  - 1. Hardware for hollow metal doors.
- B. Related Sections:
  - 1. Section 081100 - Steel Frames and Doors.

1.2 REFERENCES

- A. ANSI A117.1 - Specification For Making Buildings and Facilities Accessible To and Usable By Physically Handicapped People.
- B. ADA Accessibility Guidelines For Buildings and Facilities.
- C. ANSI/BHMA – A156.13 Series 1000 Grade 1, Mortise Locks and Latches.
- D. ANSI/NFPA 101 – Life Safety Code.
- E. UL – Underwriters Laboratories.
- F. ANSI A250.6 – Application of Hardware.

1.3 REGULATORY REQUIREMENTS

- A. Comply with Ohio Building Code and ADA standards.
- B. Comply with specifications and testing procedures in Ohio Building Code for fire-rated openings. Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed by UL, Warnock Hersey, FM, or other testing and inspecting organization acceptable to authorities having jurisdiction.

1.4 SUBMITTALS

- A. Product Data: Manufacturer's data for each item of door hardware including installation instructions, maintenance of operating parts and finishes, and other information necessary to show compliance with requirements.

B. Final Hardware Schedule:

1. Contents: Organize schedule into hardware sets indicating complete designations of every item required for each door or opening. Include the following information:
  - a. Type, style, function, size, and finish of each hardware item.
  - b. Name and manufacturer of each item.
  - c. Fastenings and other pertinent information.
  - d. Location of each hardware set cross-referenced to floor plans and door and frame schedule.
  - e. Explanation of all abbreviations, symbols, and codes contained in schedule.
  - f. Mounting locations for hardware.
  - g. Door and frame sizes and materials.
2. Submittal Sequence: Submit final schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work that is critical in the project construction schedule. Include with the schedule product data, samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.
3. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.

C. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

D. Samples of each door hardware type required, in specified finish. Tag for identification and location. Approved full-size samples may be returned and incorporated into work.

1.5 QUALITY CONTROL

- A. Single Source Responsibility: Obtain all items of hardware of each type from same manufacturer.
- B. Supplier Qualifications: Recognized architectural door hardware supplier employing a full-time experienced Architectural Hardware Consultant.
- C. Service: Supplier shall respond immediately for service calls and a 12-month call-back period from contractor and Owner for service, repair, or replacement of faulty hardware

which does not function as scheduled or as manufactured.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Packaging of door hardware, on a set by set basis, is responsibility of supplier.
- B. Provide secure lock-up for door hardware delivered to the project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the work will not be delayed by hardware losses both before and after installation.

#### 1.7 WARRANTIES

- A. General Warranty: As provided for in other contract document requirements.
- B. Special Warranties:
  - 1. Ten (10) years from date of Final Completion: Manual closers, mortise locksets.
  - 2. Five (5) years from date of Final Completion: Exit devices.
  - 3. One (1) year from date of Final Completion: Flat goods, trim, stops, bolts, thresholds, weather-stripping.

#### 1.8 MAINTENANCE

- A. Provide all adjustment and maintenance tools, and maintenance manuals, recommended by hardware manufacturer.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. Standards and Substitutions:
  - 1. All catalog numbers listed in hardware sets are from current catalog of manufacturers listed below under "Manufacturer Listed", and shall be considered as standards. Contractor may at his option provide equivalent products of the other manufacturers listed below under "Other Approved Manufacturers", except where the comment "No Substitution" is made.

- B. Manufacturer List:

ITEMS	STANDARD SPECIFIED	APPROVED SUBSTITUTION
Butt Hinges	McKinney	Hager, Stanley
Mortise Locksets	Sargent	Russwin/Corbin



Closers	Sargent 281 Series	LCN 4040 Series Heavy Duty
Cylinders	Best Peaks	No Substitution
Thresholds	National Guard	Pemko, Hager
Door Seals	National Guard	Pemko Hager
Weatherstripping	National Guard	Pemko, Hager
Stops	Rockwood	Trimco, Hager
Push-Pulls	Rockwood	Pemko, Hager
Kickplates	Rockwood	Pemko, Hager
O.H. Holders	Sargent	Glynn-Johnson
Exit Devices	Sargent	Von Duprin, Precision

## 2.2 MATERIALS AND FABRICATION

- A. Base Metals: Produce hardware units of basic metal and forming method indicated using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units for finish designations indicated.
- B. Fasteners:
1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws.
  2. Furnish screws for installation with each hardware item. Provide Phillips flathead screws except as otherwise indicated.
  3. Finish exposed screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
  4. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners.
  5. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work.
  6. Provide **security-type fasteners** where listed in hardware sets.

## 2.3 HINGES

- A. Exterior Door Type, heavy duty, 5-knuckle anti-friction.
- B. Base Metal: All stainless steel (hinge, pin body, head, etc).
- C. Hinge Pins: Non-removable pins or safety studs, with flat button and matching plug, finished to match leaves.

D. Minimum Number of Hinges:

1. 3 hinges per door leaf for doors 90 inches or less in height.
2. Provide one additional hinge for each 30 inches or fraction thereof of additional height.
3. Fire-Rated Doors: Not less than 3 UL Listed hinges per door leaf for doors 90 inches or less in height with same rule for additional hinges.

E. Hinge Sizes: 4-1/2" x 4-1/2" for doors up to 36" wide; 5" x 4-1/2" for doors over 36" wide.

2.4 LOCKS AND LOCKSETS

A. Heavy duty mortise locks with lever trim and 2-piece anti-friction latchbolts, UL listed, complying with ANSI A 156.13, Series 1000, Grade 1.

B. Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt, with flat lip strikes for locks with 2-piece anti-friction latchbolts as recommended by manufacturer.

C. Bolt Throw:

1. Provide ¾ inch minimum throw of latch for mortise locks.
2. Provide 1 inch minimum throw for all dead bolts.
3. Comply with UL requirements for throw of bolts and latch bolts on rated fire openings.

D. Levers: Solid cast.

2.5 LOCK CYLINDERS AND KEYING

A. Final keying requirements shall be determined by the Owner or the Owner's agent in a meeting with the hardware supplier for the project **according to the existing keying system implemented in the facility. No substitutions.**

B. Provide construction master key system for use during construction period. Use of permanent keys to void operation of construction master key.

C. Locks to be Grand Master Keyed and Master Keyed in sets.

D. Provide additional permanent combined cores under each Master Key set for Owner's reserve.

- E. Provide Visual key control for keys only. Stamp keys with “Do Not Duplicate”.
- F. Provide keys of nickel silver only.
- G. Key Quantity:
  - 1. Furnish 2 change keys for each lock, and one master key.
  - 2. Furnish 1 additional key blank for each lock.
  - 3. Deliver permanent keys to Owner or Owner’s Representative only. Obtain signed receipt from owner when keys are accepted.

## 2.6 EXIT/PANIC DEVICES

- A. Provide touch bar type exit device for each door leaf when listed in the hardware set, with stainless steel rail assemblies, and matching lever/lockset trim.
- B. UL Listed, complying with ANSI/BHMA A 156.3, Grade 1.
- C. Strikes:
  - 1. Provide recess type top strikes for bolts locking into head frames, unless otherwise indicated.
  - 2. Provide dust-proof strikes for foot bolts, except where special threshold construction provides non-recessed strike for bolt.
  - 3. Provide roller type strikes where recommended by manufacturer of the latch and lock units.
- D. Lock Throw: Comply with UL requirements for throw of bolts and latch bolts on rated fire openings.
- E. Exit Device Dogging: Except on fire-rated doors where closers are provided on doors equipped with exit devices, equip the units with allen-keyed dogging device to keep the latch bolt retracted, when engaged.
- F. Provide shim kits as required at no additional charge, if window lite trim does not permit rail assembly to lie flush with door surface.

## 2.7 CLOSERS

- A. ANSI A156.4, Grade 1 with 10-year warranty. Unless noted otherwise, comply with manufacturer’s recommendations for size of door closer unit depending on size of door, exposure to weather, and anticipated frequency of use.
- B. Provide adjustable units complying with NFPA 101 and ADA requirements for door

opening force and delayed action closing.

- C. Provide parallel arms for all overhead closers, unless noted otherwise.
- D. High-impact non-corrosive covers which completely conceal valves to discourage tampering.
- E. Finish: As scheduled.

## 2.8 FLUSH BOLTS

- A. Application: Provide pair (top and bottom) of manual or automatic flush bolts for doors as scheduled, meeting Federal Specification No. 1049.
- B. Flush Bolt Heads: Minimum of ½-inch-diameter rods of brass, bronze, or stainless steel with minimum 12-inch-long rod for doors up to 7'-0" in height. Provide longer rods as necessary for doors exceeding 7'-0" in height.
- C. Provide dust-proof strike for floor and/or threshold and strike for head frame.

## 2.9 DOOR PROTECTION PLATES

- A. Application: Provide mop plates, kick plates, and armor plates where indicated in hardware set.
- B. Fasteners: For metal plates, provide manufacturer's standard exposed fasteners for door trim units consisting of either machine screws or self-tapping screws with metal to match plate material.
- C. Fabricate edge trim of stainless steel to fit door thickness in standard lengths or to match height of protection plates.
- D. Fabricate protection plates not more than 1-1/2 inches less than door width on hinge side and not more than ½ inch less than door width on pull side. Stainless steel, 0.050 inch (U.S. 18 gage).

## 2.10 DOOR STOPS AND BUMPERS

- A. BHMA A156.16, Grade 1.
- B. Wall Stops: Cast type with rubber bumpers, with suitable fastening device for each wall condition.

## 2.11 WEATHERSTRIPPING AND SEALS

- A. General: Provide continuous weather stripping on exterior doors and smoke, light, or sound seals on interior doors where indicated or scheduled. Provide noncorrosive fasteners for exterior applications.

- B. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strip is easily replaceable and readily available from stocks maintained by manufacturer.
- C. Weather Stripping at Jambs and Heads: Provide bumper-type resilient insert and metal retainer strips, surface applied unless shown as mortised or semi-mortised, and of following metal, finish, and resilient bumper material:
  - 1. Metal: Extruded aluminum with natural anodized finish.
  - 2. Sealing material: Nylon Brush.
- D. Weather Stripping at Door Bottoms: Provide threshold consisting of contact-type resilient insert and metal housing of design and size shown and of following metal, finish, and resilient seal strip:
  - 1. Metal: Extruded aluminum with natural anodized finish.
  - 2. Sealing material: Nylon Brush.

## 2.12 THRESHOLDS

- A. Application: Except as otherwise indicated, provide metal threshold unit of type, size, and profile as shown at every exterior door opening and at other locations where indicated or scheduled. Comply with BHMA A156.21.
- B. Provide units not less than 4 inches wide, formed to accommodate change in floor elevation where indicated, fabricated to accommodate door hardware and to fit door frames, and as follows:
- C. Provide units with profile ½-inch or less in height to comply with ADA requirements.
- D. For means of egress doors, comply with NFPA 101.

## 2.13 HARDWARE FINISHES

- A. Unless noted otherwise, provide all exposed door hardware in the following standard finish: US32D (BHMA 630) - Satin Stainless Steel.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.
- C. Provide protective lacquer coating on all exposed hardware finishes of brass, bronze, and aluminum, except as otherwise indicated. The suffix "-NL" is used with standard finish designations to indicate "no lacquer."

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Mount hardware units at heights indicated in the following applicable publications, except as specifically indicated or required to comply with governing regulations and except as noted otherwise.
  - 1. Door and Hardware Institute “Recommended Locations for Builders Hardware for Standard Steel Doors and Frames.”
- B. Install each hardware item in compliance with the manufacturer’s instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in Division 08 and 09 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.
- C. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- D. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- E. Provide wiring for electrical security items if scheduled herein. Coordinate installation with electrical items not furnished by this Contractor.
- F. Install hardware in fire-rated doors in compliance with NFPA 80 and all Local code requirements.
- G. Install hardware in compliance with NFPA 101 and ADA.
- H. Convert construction cores to Owner’s permanent cores.

### 3.2 ADJUSTING, CLEANING AND DEMONSTRATING

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.
- B. Clean operating items as necessary to restore proper function and finish of hardware and doors.
- C. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- D. Clean adjacent surfaces soiled by hardware installation.

- E. Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes.

### 3.3 HARDWARE SCHEDULE

#### A. General:

1. Provide hardware for each door to comply with requirements of this Section, hardware set numbers indicated in door schedule, and in the following schedule of hardware sets.
2. Hardware sets are generic and only indicate basic types of items and lock functions. Refer to this Specification for manufacturer and product designation, required quantities, sizes, capacities, and finish or color, as applicable.
3. Hardware supplier shall furnish all related items, such as arms, brackets, plates, fasteners, etc., required for complete functional installation of scheduled hardware items.

#### **HARDWARE SET #01**

3 ea	Hinge	TA2314 4-1/2" x 4-1/2" US32D	McKinney
1 ea	Mortise Lock	36 8204 LNJ US32D	Sargent
1 ea	Cylinder	1E-74 C4 RP3 626 Peaks	Best
1 ea	Surface Closer	36 281-P10 EN	Sargent
1 ea	Door Stop	442 US32D	Rockwood

END OF SECTION

SECTION 099100  
PAINTING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation, priming, and painting of the following, as noted on the Drawings:
1. Concrete slab soffits, beam and column drops, and other concrete surfaces where specifically noted.
  2. Metal doors and frames.
  3. Exposed-to-view MEP/FP items (piping, conduit, etc.).
  4. Miscellaneous metals.

1.2 WORK NOT INCLUDED

- A. **Do not field paint the following work:**
1. Concrete columns and walls below beam and drop panel elevations, unless specifically noted.
  2. Concrete masonry units or joints, unless specifically noted.
  3. Prefinished and natural finished items, including but not limited to prefinished equipment, finished mechanical and electrical equipment such as light fixtures and grilles.
  4. Non-ferrous metal surfaces including aluminum, stainless steel, chromium plate, and copper, except where noted to be painted.
  5. Operating parts and labels.

1.3 RELATED SECTIONS

- A. Section 033000 - Cast-in-Place Concrete.
- B. Section 042000 – Unit Masonry.
- C. Section 055000 - Metal Fabrications.
- D. Section 079200 – Sealants.
- E. Section 081100 – Steel Doors and Frames.
- F. Division 21 and 22 Sections for Fire Protection and Plumbing items to be painted.
- G. Division 23 Sections for HVAC items to be painted.
- H. Divisions 26 and 28 for Electrical items to be painted.



#### 1.4 REFERENCES

- A. ASTM D 16 – Terminology Related to Paint, Varnish, Lacquer, and Related Products.
- B. Structural Steel Painting Council (SSPC): SSPC-SP 1 – Solvent Cleaning.
- C. Structural Steel Painting Council (SSPC): SSPC-SP 2 – Hand Tool Cleaning.
- D. Structural Steel Painting Council (SSPC): SSPC-SP 3 – Power Tool Cleaning.
- E. Structural Steel Painting Council (SSPC): SSPC-SP 5/NACE 1 – White Metal Blast Cleaning.
- F. Structural Steel Painting Council (SSPC): SSPC-SP 10/NACE 2 – Near-White Metal Blast Cleaning.
- G. Structural Steel Painting Council (SSPC): SSPC-SP 13/NACE 6 – Surface Preparation of Concrete.

#### 1.5 DEFINITIONS

- A. "Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.
- B. "Dry Film Thickness" as used herein means the thickness of a coat of paint in a fully cured state measured in mils (1/1000 inch).
- C. "Well-adhered" as used herein means materials that cannot be removed by lifting with a dull putty knife.

#### 1.6 SUBMITTALS

- A. Submit manufacturer's product data and technical information including:
  - 1. Paint label analyses and application instructions.
  - 2. Each material and cross-referenced coating, finish system, and application, identified by manufacturer's catalog number and general classification.
  - 3. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
- B. Submit complete line of manufacturer's color samples for each product.
- C. Letter of approval per Paragraph 1.7.A.
- D. Prior project experience per Paragraph 1.7.B.
- E. Name and resume of persons per Paragraph 1.7.C.
- F. Manufacturer's sample warranty.

#### 1.7 QUALITY ASSURANCE

- A. The contractor for this Section of work shall be approved in writing by the manufacturer and shall have no less than (3) years' experience in performance of similar work in size and complexity.
- B. All work under this Section shall be performed by Contractors which have successfully performed at least three verifiable years of projects similar to those involved in this Contract and three (3) or more prior projects in a climate similar to that for this project. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- C. All work under this Section shall be under the immediate control of the Contractor's superintendent(s) experienced in this type of work. The person(s) shall have supervised three prior projects of similar magnitude and type, and shall be present during all operations. This person(s) shall be approved by the Owner.
- D. For paint systems with two or more finish coats, slightly tint the first and intermediate coats a different color. Demonstrate with sample boards or on mock-ups.
- E. Mock-Up:
  - 1. Concrete Paint.
    - a. Cleaning and Preparation of Concrete:
      - 1) Clean and prepare one 600 SF ceiling/soffit location as directed by Architect.
      - 2) Demonstrate cleaning equipment and procedures intended for surface preparation.
      - 3) Coating manufacturer to approve cleaned substrate before coating application.
    - b. Coating of Concrete:
      - 1) Demonstrate cleaning and preparation process.
      - 2) Demonstrate application process, using proper equipment and procedures, including methods to control and limit overspray.
      - 3) Provide a listing of materials for each application and coating; include Manufacturer's stock number and date of manufacture.
    - c. Schedule the above activities with the Construction Manager, and notify the Architect 2 days prior to each activity, so they may observe each activity.
- F. Pre-installation meeting to be held a minimum of one week prior to start of work on mock-up. Meeting to be attended by the Construction Manager, Painting Trade Contractor, Architect, and representative of the paint manufacturer.
- G. Provide access to work area for Owner Representative or Architect to inspect quality of work, progress, and field conditions. Access to be completed during normal working hours. If access requires mechanical equipment (man-lift, swing stage, etc.), provide

necessary operators.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to job site in original, new and unopened packages, and containers bearing manufacturer's name and label, and following information:
1. Name or title of material.
  2. Fed. Spec. number, if applicable.
  3. Manufacturer's stock number and date of manufacture.
  4. Manufacturer's name.
  5. Contents by volume, for major pigment and vehicle constituents.
  6. Thinning instructions.
  7. Application instructions.
  8. Color name and number.
  9. Store materials and equipment in clean, dry, protected, and well ventilated storage area approved by the Construction Manager. Keep storage area clean and accessible at all times. Protect from extreme heat and freezing.

#### 1.9 PROTECTION

- A. Place paint or solvent soaked rags, waste, or other materials which might constitute a fire hazard in metal containers and remove from premises at the close of each day's work. Take every precaution to avoid damage by fire.
- B. Protect the work of all other trades against damage, marking or injury by suitable covering during the progress of the painting and finishing work. Repair any damage done.
- C. Protect and filter debris and chemicals from entering storm drains. Direct water runoff from all cleaning processes to the filtration system before allowing it to enter the storm drain system.
- D. During all cleaning operations, coordinate drain protection with the local municipality.

#### 1.10 ENVIRONMENTAL REQUIREMENTS

- A. Install coating materials in strict accordance with all safety and weather conditions required by product literature or as modified by applicable rules and regulations of Local, State, and Federal authorities having jurisdiction.
- B. Fumes and dust shall be controlled to prevent harmful or undesirable effects in surrounding areas.
- C. When toxic or flammable solvents are used, the Contractor shall take all necessary precautions as recommended by the manufacturer. In all cases, the handling and use

of toxic or flammable solvents, including adequate ventilation and personal protective equipment, shall conform to the requirements of the applicable safety regulatory agencies.

- D. Apply water base paints only when temperature of surfaces to be painted and surrounding air temperatures are between 50 Deg. F. (10 Deg. C.) and 90 Deg. F. (32 Deg. C.), unless otherwise permitted by paint manufacturer's printed instructions.
- E. Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45 Deg. F. (7 Deg. C.) and 95 Deg. F. (35 Deg. C.), unless otherwise permitted by paint manufacturer's printed instructions.
- F. Work shall not be conducted when there is a chance of surface temperature falling below 40 degrees F in the 24 hours following application.
- G. Schedule paint application to avoid or protect work areas from excessive dust and airborne contaminants during application and curing.
- H. Do not apply coatings in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces, or when there is a chance of rain within 24 hours after application. (After application, surfaces should be protected from rain for not less than 6 hours).
  - 1. Allow wet surfaces to dry thoroughly and attain temperature and conditions specified before proceeding with or continuing coating operation.
  - 2. Work may continue during inclement weather only if areas and surfaces to be coated are enclosed and temperature within the area can be maintained within limits specified by manufacturer during application and drying periods.
- I. Apply paint to surfaces that are cured and dry per manufacturer's tolerances.

#### 1.11 SEQUENCING

- A. Prior to beginning paint preparation, complete all concrete, masonry, and sealant repairs including curing periods.

#### 1.12 WARRANTY

- 1. The manufacturer shall furnish a (5) year warranty to the Owner for all types of new paint installed. New paint work shall be warranted against material defects, including but not limited to disbonding, inadequate preparation, cohesive failure, cracking, and ultra violet exposure degradation.
  - a. All required testing and quality assurance operations necessary to furnish warranty are Contractor and manufacturer's responsibility.

### PART 2 PRODUCTS

#### 2.1 PAINT MATERIALS, GENERAL

- A. Material Compatibility: Provide primers, undercoats, and finish-coat materials that are compatible with one another and substrates indicated under conditions of service and

application, as demonstrated by manufacturer based on testing and field experience.

B. Material Quality: Provide manufacturer's highest grade of the products specified. Materials not displaying manufacturer's product identification are not acceptable.

C. Colors:

1. Concrete surfaces: Bright White.
2. Metal surfaces: As selected by Architect from custom color charts.
3. MEP/FP items: As selected by Architect to match adjacent surfaces.
4. Others surfaces: As selected by Architect from custom color charts.

## 2.2 MANUFACTURERS – CONCRETE SURFACES (CEILING, SOFFITS, ETC.)

A. Subject to compliance with requirements, products of one of the following manufacturers:

1. Sherwin Williams; Industrial and Marine Coatings (S-W).
2. Tnemec Company, Inc. (Tnemec).
3. Devoe Coatings. (Devoe).

## 2.3 MANUFACTURERS – METAL SURFACES

A. Subject to compliance with requirements, products of one of the following manufacturers:

1. Carboline Company (Carboline).
2. Sherwin Williams; Industrial and Marine Coatings (S-W).
3. Tnemec Company, Inc. (Tnemec).

## PART 3 EXECUTION

### 3.1 EXAMINATION

A. With Applicator present, examine substrates and conditions under which paint will be applied, for compliance with application requirements.

1. Apply paint only after unsatisfactory conditions have been corrected and surfaces to receive paint are thoroughly dry.
2. Start of application is construed as Applicator's acceptance of surfaces within that particular area.

B. Notify Owner in writing of any such conditions or defects. Do not begin work until unsatisfactory conditions are corrected. Failure to notify Owner prior to beginning work constitutes acceptance by Contractor of the surfaces and conditions under which the

work is to be performed, and acceptance by Contractor for the performance of the work.

- C. Coordination of Work: Review other Sections in which primers or other coatings are provided to ensure compatibility of total systems for various substrates. On request, furnish information on characteristics of specified finish materials to ensure compatible primers.
1. If a potential incompatibility of primers applied by others exists, obtain the following from the primer Applicator before proceeding:
    - a. Confirmation of primer's suitability for expected service conditions.
    - b. Confirmation of primer's ability to be top coated with materials specified.
  2. Notify Architect about anticipated problems before using the paints specified over substrates primed by others.

### 3.2 PREPARATION

A. Protection:

1. Provide adequate protection of all surrounding surfaces not intended to receive coating from damage due to preparation, cleaning or coating procedures. Repair damage at no cost to the Owner.
2. Plan work so that construction dirt, dust, and debris will not fall onto wet, newly coated surfaces.
3. When toxic or flammable solvents are used, the coating contractor shall take all necessary precautions as recommended by the manufacturer. In all cases, the handling and use of toxic or flammable solvents, including adequate ventilation and personal protective equipment, shall conform to the requirements of the applicable safety regulatory agencies.
4. Provide the necessary protection to contain all dust, dirt, debris and coating chips within work area. Do not allow to migrate into building interior spaces or storm drain system.
5. Provide "Wet Paint" signs as required to protect newly coated finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of coating operations.

B. Surface Preparation:

1. Perform preparation and cleaning procedures in accordance with coating manufacturer's instructions and as herein specified, for each particular substrate condition.
2. Remove all surface contamination such as chalk, loose coating, mill scale dirt, foreign matter, rust, rust stains, mold, mildew, mortar, efflorescence, weld splatter and slag, and sealers from surfaces to be coated.

3. Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-coated, or provide surface-applied protection prior to surface preparation and coating operations. Remove, if necessary, for complete coating of items and adjacent surfaces. Following completion of coating of each space or area, reinstall removed items.
4. Provide barrier coats over incompatible primers or remove primers and reprime substrate.
5. For concrete or masonry, prepare hair line cracks (1/64" or less) per manufacturer's instructions. Reference the Details to repair cracks larger than 1/64".
6. Cementitious Substrates: Prepare concrete, brick, concrete masonry block, and cement plaster surfaces to be coated. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods to prepare surfaces.
  - a. Use abrasive blast-cleaning methods if recommended by paint manufacturer.
  - b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not coat surfaces if moisture content exceeds that permitted in manufacturer's written instructions.
7. Ferrous-Metal Substrates: Clean ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC recommendations.
  - a. Blast-clean steel surfaces as recommended by coating manufacturer and according to SSPC-SP 10/NACE No. 2.
  - b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
  - c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire brush, solvent clean, and touch up with same primer as the shop coat.
8. Galvanized Ferrous Metal Substrates: Clean galvanized surfaces according to manufacturer's written instructions for the type of service, metal substrate, and application required and the following:
  - a. SSPC-SP1 Solvent Cleaning to remove soluble contaminants such as oils and grease. SSPC-SP2 Hand Tool Clean or SSPC-SP11 Power Tool Cleaning to remove insoluble contaminants such as white rust if present. Thoroughly roughen the entire surface per SSPC-SP7 Brush Off Blast Cleaning or by utilizing power tools fitted with cup wheels, discs, grinders and sanders.
  - b. As an alternate to abrasive blasting, apply a solution of Oakite 747 LTS

Pretreatment (or engineer-approved equal, followed by a thorough rinse with clean, potable water.

- c. Solvent clean and wire brush galvanized bolts and apply specified primer directly to the galvanized surface.
  - d. Prior to application of overall field coats, clean all surfaces free of oil, grease and other foreign matter per SSPC-SP1 Solvent Cleaning.
- C. Material Preparation: Carefully mix and prepare painting materials according to manufacturer's written instructions.
1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
  2. Stir materials before applying to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into the material. Remove film and, if necessary, strain paint material before using.
  3. Use only the type of thinners approved by manufacturer and only within recommended limits.

### 3.3 APPLICATION

- A. General: Apply paint according to manufacturer's written instructions.
1. Use applicators and techniques best suited for the material being applied.
  2. Do not apply paints over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to forming a durable coating film.
  3. Provide finish coats compatible with primers used.
  4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convactor covers, grilles, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
  5. Coat back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
- B. Scheduling Coating: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for coating as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required is the same regardless of application method.
    - a. Omit primer on metal surfaces that have been shop primed and touchup painted.
    - b. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer.



- c. Where manufacturer's written instructions require sanding, sand between applications to produce a smooth, even surface.
  - d. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until coating has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat does not cause undercoat to lift or lose adhesion.
2. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance. Give special attention to edges, corners, crevices, welds, exposed fasteners, and similar surfaces to ensure that they receive a dry film thickness equivalent to that of flat surfaces.
- C. Application Procedures: Apply paint by brush, roller, spray, or other applicators according to manufacturer's written instructions.
- D. Minimum Coating Thickness: Apply each material no thinner than manufacturer's recommended spreading rate. Provide total dry film thickness of the entire system as recommended by manufacturer.
- E. Before applying finish coats, apply a prime coat of material, as recommended by manufacturer, to material required to be coated or finished that has not been prime coated by others.
1. Recoat primed and sealed substrates if there is evidence of suction spots or unsealed areas in first coat, to ensure a finish coat with no burn-through or other defects caused by insufficient sealing.
- F. Completed Work: Match approved Samples for color, texture, and coverage. Remove, refinish, or recoat work that does not comply with specified requirements.

### 3.4 FIELD QUALITY CONTROL

- A. Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:
1. Owner may engage the services of a qualified testing agency to sample coating material being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
  2. Testing agency may perform appropriate tests for the following characteristics as required by Owner:
    - a. Quantitative materials analysis.
    - b. Absorption.
    - c. Accelerated weathering.
    - d. Accelerated yellowness.
    - e. Color retention.

- f. Alkali and mildew resistance.
  - g. Abrasion resistance.
  - h. Apparent reflectivity.
  - i. Washability.
  - j. Dry opacity.
  - k. Recoating.
  - l. Skinning.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with specified requirements. Contractor shall remove noncomplying coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. If necessary, Contractor may be required to remove rejected materials from previously coated surfaces if, on recoating with specified materials, the two coatings are not compatible.

### 3.5 CLEANING

- A. Cleanup: At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- 1. After completing paint application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

### 3.6 PAINTING SCHEDULE

- A. Schedule below establishes criteria for the Painting Schedule and does not exclude Part 2 product options.
- B. Concrete:
- 1. Surface Preparation:
    - a. SSPC-SP13 – Low pressure, warm water cleaning.
    - b. Cleaner: Provide cleaners for removal of soot, dirt, and pollutants, which are compatible with all primers, intermediate coats, and finish coat. Thoroughly rinse all clean agents before applying primer or finish coats.
  - 2. Approved manufacturer's systems:
    - a. Sherwin Williams:
      - 1) Primer: Loxon Concrete & Masonry Primer – One (1) Primer coat. Application rate recommended by the manufacturer to achieve a total dry film thickness of 4.0-6.0 mils.
      - 2) Finish Coats: Conflex XL – Two (2) Finish coats. Application rate

recommended by the manufacturer to achieve a total dry film thickness of 2.0-3.0 mils per coat.

b. Tnemec:

- 1) Primer: Elastogrip FC 151 – One (1) Primer coat. Application rate recommended by the manufacturer to achieve a total dry film thickness of 4.0-6.0 mils.
- 2) Finish Coats: Enviro-Crete 156 – Two (2) Finish coats. Application rate recommended by the manufacturer to achieve a total dry film thickness of 2.0-3.0 mils per coat.

c. Devoe Coatings:

- 1) Primer: Dulux Professional Primer 2000 - One (1) Primer coat. Application rate recommended by the manufacturer to achieve a total dry film thickness of 4.0-6.0 mils.
- 2) Finish Coats: Devflex 4206 – Two (2) Finish coats. Application rate recommended by the manufacturer to achieve a total dry film thickness of 2.0-3.0 mils per coat.

C. Non-Galvanized Ferrous Metal:

1. Surface Preparation:

a. SSPC-SP1 Solvent Cleaning.

2. Approved manufacturer's systems:

a. Sherwin Williams:

- 1) Primer: One (1) Coat: Corothane I Galvapak zinc; 3.0 to 4.0 mils DFT.
- 2) Finish Coats: Two (2) Coats: Corothane I Aliphatic Finish Coat, 2.0 to 3.0 mils DFT.

b. Tnemec:

- 1) Primer: One (1) Coats: Series N27 S.T. Epoxy; 4.0 to 6.0 mils DFT.
- 2) Finish Coat: Two (2) Coats: Endura-Shield Series 73; 2.0 to 3.0 mils DFT.

c. Devoe Coatings:

- 1) Primer: One (2) Coats: Devran 224HS; 4.0 to 6.0 mils DFT.
- 2) Finish Coat: Two (2) Coats: Devthane 379UVA; 2.0 to 3.0 mils DFT.

D. Previously Coated or Rusted Exterior Metal:

1. Surface Preparation:

- a. SSPC-SP3 Power Tool Clean to remove all loose mill scale, loose rust, and other foreign matter.
  - b. SSPC-SP1 Solvent Clean to remove all visible oil, grease, soil, and other contaminants.
  - c. Chemical Etch galvanized metals with the following (or approved equal) per manufacturer's instructions.
    - 1) Great Lakes Laboratories Clean 'n Etch.
    - 2) Henkel's Galvaprep 5.
2. Approved manufacturer's systems:
- a. Sherwin Williams:
    - 1) Primer: One (1) Coat Macropoxy 646 - 4.0 to 6.0 mils DFT.
    - 2) Finish Coat: Two (2) Coats: Hi Solids Polyurethane – 2.0 to 4.0 mils DFT.
  - b. Tnemec:
    - 1) Primer: One (1) Coat: Chembuild Series 135; 4.0 to 6.0 mils DFT.
    - 2) Finish Coat: Two (2) Coats: Endura-Tone Series 1028-Color; 2.0 to 4.0 mils DFT.
  - c. Devco Coatings:
    - 1) Primer: One (1) Coat Devshield #4130 Rust Penetrating Metal Primer.
    - 2) Finish Coat: Two (2) Coats: ICI #4206 Devco Industrial Enamel.

END OF SECTION

## SECTION 104400

### FIRE PROTECTION SPECIALTIES

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section includes fire extinguishers and fire extinguisher cabinets in parking garage/area. Refer to Drawings for quantity and location.
- B. Section includes bracket-mounted fire extinguishers in Equipment/Storage Rooms (2 Total).

##### 1.2 REFERENCES

- A. National Fire Protection Association:
  - 1. NFPA 10 - Standard for Portable Fire Extinguishers.
- B. Underwriters Laboratories Inc.:
  - 1. UL - Fire Protection Equipment Directory.

##### 1.3 PERFORMANCE REQUIREMENTS

- A. Conform to NFPA 10.
- B. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for purpose specified and indicated.

##### 1.4 SUBMITTALS

- A. Product Data: Submit extinguisher and cabinet operational features, color and finish, and anchorage details.
- B. Shop Drawings: Indicate cabinet physical dimensions, mounting measurements, location, etc.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

##### 1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: Submit test, refill or recharge schedules, and re-certification requirements.

#### PART 2 PRODUCTS

## 2.1 FIRE EXTINGUISHERS

- A. Manufacturers:
  - 1. JL Industries.
  - 2. Larsen's Manufacturing Co.
  - 3. Potter Roemer.
- B. Type: ABC Dry Chemical, 10 pound, UL Rating of 4A-60B/C, steel cylinder equipped with pressure gauge, discharge nozzle, and squeeze-grip lever.
- B. Extinguisher Finish: Red, high-gloss, epoxy or enameled coating.

## 2.2 FIRE EXTINGUISHER CABINETS

- A. Manufacturers:
  - 1. JL Industries.
  - 2. Larsen's Manufacturing Co.
  - 3. Potter Roemer.
- B. Configuration: Surface mounted, square trim. Size to accommodate fire extinguishers.
- C. Basis of Design: J. L. Industries Cosmopolitan Series, Vertical Duo door with SAF-T-LOK access mechanism.
- D. Door Glazing: Glass, clear, tempered safety glass.
- E. Exterior Finish: Type 304 stainless steel, #4 finish on doors, trim, tub, top, sides, and bottom panels.
- F. Cabinet Mounting Hardware: Stainless steel, appropriate to cabinet.
- G. Form cabinet enclosure with right angle inside corners and seams.
- H. Pre-drill for anchors.
- I. Hinge doors for 180-degree opening with continuous piano hinge. Furnish roller type catch.
- J. Weld, fill, and grind components smooth.
- K. Glaze doors with resilient channel gasket glazing.

## 2.3 ACCESSORIES

- A. Cabinet Signage:

1. Vertical Diecut Lettering ( $\frac{3}{4}$ " x 18") reading "FIRE EXTINGUISHER" , mounted on face of cabinet door.
2. Basis of Design: J. L. Industries #LDCVRFE.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Examine surfaces to receive items specified for defects that will adversely affect execution and quality of work.
- B. Coordinate with Owner to examine fire extinguishers for proper charging and tagging.

#### 3.2 INSTALLATION

- A. Install cabinets plumb and level, at mounting heights in conformance with manufacturer's instructions and shop drawings.
- B. Secure rigidly in place.
- C. Place extinguishers in cabinets.
- D. Provide bracket-mounted extinguishers in Equipment Rooms (2 Total).
- E. Position cabinet signage as required by authorities having jurisdiction.
- F. Review operations with Owner.

#### 3.3 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films.
- B. Adjust cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes or replace cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and mounting bracket manufacturers.
- E. Replace cabinets that have been damaged or have deteriorated beyond successful repair by finish touch-up or similar minor repair procedures.

END OF SECTION

## SECTION 21 05 01 BASIC FIRE SUPPRESSION REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 Special Note

- A. All provisions of the Bidding Requirements, General Conditions and Division 01 apply to work specified in this Division.
- B. Scope of Work – Fire Suppression: The scope of the Fire Suppression work includes furnishing, installing, testing and warranty of all Fire Suppression work and complete Fire Suppression systems shown on the Fire Suppression drawings and specified herein.

#### 1.2 Permits and Regulations

- A. Include payment of all permit and inspection fees applicable to the work in this Division. Furnish for the Owner certificates of approval from the governing inspection agencies, as a condition for final payment.
- B. Work must conform to applicable local, state and federal laws, ordinances and regulations. Where drawings or specifications exceed code requirements, the drawings and specifications shall govern. Install no work contrary to minimum legal standards.

#### 1.3 Inspection of Site

- A. Each bidder shall inspect the project site. Conditions shall be compared with information shown on the drawings. Report immediately to the Construction Manager any significant discrepancies which may be discovered. After the Contract is signed, no allowance will be made for failure to have made a thorough inspection.

#### 1.4 Drawings and Specifications

- A. The drawings indicate the general arrangement of the work and are to be followed insofar as possible. The word "provide", as used, shall mean "furnish and install". If significant deviations from the layout are necessitated by field conditions, detailed layouts of the proposed departures shall be submitted to the Construction Manager for approval before proceeding with the work.
- B. Make all necessary field measurements to insure correct fitting. Coordinate work with all other trades in such a manner as to cause a minimum of conflict or delay.
- C. The drawings and specifications shall be carefully studied during the course of bidding and construction. Any errors, omissions or discrepancies encountered shall be referred immediately to the Construction Manager for interpretation or correction, so that misunderstandings at a later date may be avoided. The Contract drawings are not intended to show every vertical or horizontal offset which may be necessary to complete the systems. Having pipe and fittings fabricated and delivered in advance of making actual measurements shall not be sufficient cause to avoid making offsets and minor changes as may be necessary to install piping and equipment.



- D. The Architect shall reserve the right to make minor adjustment in locations of system runs and components where considered desirable in the interest of concealing work or presenting a better appearance where exposed. Any such changes shall be anticipated and requested sufficiently in advance as to not cause extra work, or unduly delay the work. Coordinate work in advance with all other trades and report immediately any difficulties which can be anticipated.
- E. Equipment or piping shall not be installed in the dedicated electrical space above or in the working space required around electrical switchgear, motor control centers or panelboards as identified by the National Electric Code (NEC).
- F. Where any system runs and components are so placed as to cause or contribute to a conflict, it shall be readjusted at the expense of the contractor causing such conflict. The Architect's decision shall be final in regard to the arrangement of equipment, piping, etc., where conflict arises.
- G. Provide offsets in system runs, additional fittings and necessary drains required to complete the installation, or for the proper operation of the system. The Contractor shall exercise due and particular caution to determine that all parts of the work are made quickly and easily accessible.
- H. Should overlap of work among the trades become evident, this shall be called to the attention of the Construction Manager. In such event, none of the trades or their suppliers shall assume that they are relieved of the work which is specified under their branch until instructions in writing are received from the Construction Manager.

#### 1.5 Coordination Drawings

- A. The Fire Suppression Contractor shall initially prepare and be responsible for 0.25" scale coordination drawings. These drawings shall be produced using a computer aided drafting software of a mutually agreed upon format and distributed to the Plumbing, HVAC and Electrical Contractors for their input and revisions. Assure that all Contractors work together to obtain finish coordinated drawings with no work being installed until all Contractors have approved and signed-off with their approval and drawings have been submitted and reviewed by the Architect and Engineer.

#### 1.6 Inspection

- A. All work shall be subject to inspection of Federal, State and local agencies as may be appropriate, and of the Construction Manager and Architect.
- B. Final inspection certificates shall be obtained by the Contractor and given to the Construction Manager and owner.

1.7 Record Drawings

- A. Contractor shall maintain a separate set of prints of the Contract Documents and shall show all changes or variations, in a manner to be clearly discernible, which are made during construction. Upon completion of the work, these drawings shall be turned over to the Construction Manager.

1.8 Operating and Maintenance Manuals

- A. Three copies of operating and maintenance manuals shall be assembled for Fire Suppression work by the Contractor.
- B. All shop drawings and installation, maintenance and operating instruction pamphlets or brochures, wiring diagrams, parts list and other information, along with warranties, shall be obtained from each manufacturer of the principal items of equipment. Pipe pressure test reports shall also be included. In addition, the Contractor shall prepare a chart listing all items of equipment which are furnished under this Contract and indicating the nature of maintenance required, the recommended frequency of checking these points and the type of lubricating media or replacement material required.
- C. These shall be assembled into three-ring loose leaf binders or other appropriate binding. An index and tabbed sheets to separate the sections shall be included. These shall be submitted to the Construction Manager for review. Upon approval, manuals shall be turned over to the Owner.

1.9 Final Inspection and Punch List

- A. As the time of work completion approaches, the Contractor shall survey and inspect the work and develop their own punch list to confirm that it is complete and finished. Then notify the Construction Manager and request that a final inspection be made. It shall not be considered the Engineer's or Architect's obligation to perform a final inspection until the Contractor has inspected the work and so states at the time of the request for the final inspection.
- B. Requests to the Construction Manager for final inspection may be accompanied by a limited list of known deficiencies in completion, with appropriate explanation and schedule for completing these; this is in the interest of expediting acceptance for beneficial occupancy.
- C. The Construction Manager will inspect the work and prepare a punch list of items requiring correction, completion or verification. Corrective action shall be taken by the Contractor to the satisfaction of Construction Manager within 30 days of receipt of the Construction Manager's punch list.

#### 1.10 Warranty

- A. This Contractor shall warrant all workmanship, equipment and material entering into this Contract for a period of one year from date of final acceptance or date of beneficial use, as agreed to between Contractor and Construction Manager. Any materials or equipment proving to be defective during this warranty period shall be made good by this Contractor without expense to the Owner.
- B. This provision is intended specifically to cover deficiencies in Contract completion or performance which are discovered after systems are placed in operation.
- C. This provision shall not be construed to include maintenance items such as re-tightening or repacking glands, greasing, oiling and cleaning strainers after these have been done for final close-out.
- D. Provisions of this warranty shall be considered supplementary to warranty provisions under General Conditions.

### PART 2 - PRODUCTS

#### 2.1 Materials and Equipment

- A. Materials and equipment furnished under this Contract shall be in strict accordance with the specifications and drawings and shall be new and of best grade and quality. When two or more articles of the same material or equipment are required, they shall be of the same manufacturer.

#### 2.2 Reference Standards

- A. Where standards (NFPA, NEC, ASTM, UL, etc.) are referenced in the specifications or on the drawings, the latest edition is to be used except, however, where the authority having jurisdiction has not yet adopted the latest edition, the edition so recognized shall be used.

#### 2.3 Equipment Selection

- A. Before bidding equipment, and again in the preparation of shop drawings, the Contractor and their supplier shall verify that adequate space is available for entry and installation of the item of equipment, including associated piping and accessories. Also verify that adequate space is available for servicing of the equipment.
- B. If extensive changes in pipe or equipment layout, or electrical wiring and equipment are brought about by the use of equipment which is not compatible with the layout shown on the drawings, necessary changes shall be deemed to be included in the contract.

## 2.4 Shop Drawings

- A. Electronic copies of shop drawings and descriptive information shall be assembled by the Contractor of equipment and materials furnished in their Contract, and submitted to the Construction Manager for review as stated in the General Conditions. These shall be submitted as soon as practicable and before equipment is installed and before special equipment is manufactured. Submittal information shall clearly identify the manufacturer, specific model number, approval labels, performance data, electrical characteristics, features, specified options and additional information sufficient to evidence compliance with the Contract Documents. Shop drawings for equipment, devices and materials shall be labeled and identified same as on the Contract Documents. If compliance with the above criteria is not provided shop drawings will be subject to rejection and returned without review.
- B. The review of shop drawings by the Construction Manager, Architect or Engineer shall not relieve the Contractor from responsibility for errors in the shop drawings. Deviations from specifications and drawing requirements shall be called to the Architect's and Engineer's attention in a separate clearly stated notification at the time of submittal for the Architect's and Engineer's review.
- C. Shop drawings and product data of the following Fire Suppression equipment and materials shall be submitted:
  - 1) Pipe, fittings and joining methods.
  - 2) Firestopping systems for pipe penetrations.
  - 3) Unions and flanges.
  - 4) Sleeves.
  - 5) Expansion Loops.
  - 6) Labels, markings and tags.
  - 7) Standpipes.
  - 8) Pipe hangers.
  - 9) Valves.
  - 10) Gauges.
  - 11) Sprinklers and accessories.
  - 12) Sprinkler system installation drawings per NFPA 13, applicable calculations and water supply flow curve.

## PART 3 – EXECUTION

### 3.1 Pipe Testing

- A. Pipe testing for fire suppression piping shall be as described below and in Section 21 11 13 Facility Water Distribution Piping.
- B. Insure that air is vented from piping when piping is hydrostatically tested.
- C. Tests shall be witnessed by field representatives of the Construction Manager or Architect or shall be monitored by a recorder. Furnish a written record of each piping system test indicating date, system, pressure, duration and results of tests. Copies of test reports shall be included in the O&M manuals.

- D. Leaks discovered during testing shall not be patched. Threaded connections shall be either tightened or replaced. Small leaks in welded pipe may be chipped and rewelded.

### 3.2 Water Testing

- A. Prior to any flushing or cleaning of piping, the water supply shall be tested for the microorganisms and chemicals present with Microbiologically Influenced Corrosion (MIC).
  - 1. Use of test kits shall not be permitted.
  - 2. Laboratories used shall be:
    - a Huegenot Labs – Port Jervis, NY.
    - b Martier Enterprises – Brighton, CO.
    - c BTI Products, LP – Baryfield, CO.
    - d Other lab which has at least 5 years experience in sample testing and analysis for MIC.
- B. The results of the test(s) shall be submitted to the Construction Manager within 14 days of completion of the test(s).

### 3.3 Pipe Cleaning

- A. Before placing each piping system in operation, the piping system shall be thoroughly flushed out with clean water.
- B. Refer to appropriate Sections for cleaning of other piping for normal operation.

### 3.4 Operation and Adjustment of Equipment

- A. As each piping system is put into operation, all items of equipment included therein shall be adjusted to proper working order. This shall include tightening packing glands, and adjusting all operating equipment.
- B. Caution: Verify that all bearings are lubricated, all motors are operating in the right direction, and correct overload heater elements are provided on all motors. Do not depend wholly on the electrician's judgment in these matters. Follow specific instructions in regard to lubrication. Do not oil or grease presealed ball bearings unless upon manufacturer's specific instructions.
- C. Test relief valves, air vents and regulating valves to insure proper operation.

### 3.5 Operating Demonstration and Instructions

- A. The Contractor shall set the various systems into operation and demonstrate to the Owner and Construction Manager that the systems function properly and that the requirements of the Contract are fulfilled.
- B. The Contractor shall provide the Owner's representatives with detailed explanations of operation and maintenance of equipment and systems. For each piece of Fire Suppression equipment and for systems, where designated in other Sections of Division 21, the respective equipment manufacturer shall provide a qualified representative to demonstrate the operation, maintenance and service

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

requirements of the equipment and/or system. A thorough review of the operating and maintenance manuals shall be included in these instructional meetings. At the completion of the demonstration the Contractor shall present a demonstration certificate to the Owner for signature. A copy of the certificate shall be sent to the Construction Manager.

- C. O&M manuals shall be submitted, reviewed and approved prior to scheduling of demonstrations.

END OF SECTION

## SECTION 21 05 02 AGREEMENT AND WAIVER FOR USE OF ELECTRONIC FILES

### PART 1 - GENERAL

- 1.1 The Engineer, at his sole discretion and without obligation, makes graphic portions of the contract documents available for use by the contractor in electronic format. These electronic files are proprietary, and remain the Engineer's Instruments of Service and shall be for use solely with respect to this project, as provided in the Standard Form of Agreement between Owner/Architect and Engineer.
- 1.2 Electronic files shall be released only after bids have been received for the project and contracts have been signed with the contractors.
- 1.3 The contractor shall acknowledge receipt of electronic files in the requested format for this project. The electronic files are provided as a convenience to the User, for use in preparing shop drawings and/or coordination drawings related to the construction of only the project identified in the Agreement. The electronic files and the information contained within are the property of the Engineer and/or the Architect and/or the Owner, and may not be reproduced or used in any format except in conjunction with the project identified in the Agreement.
- 1.4 The User acknowledges that the information provided in the electronic files is not a substitution or replacement for the Contract Documents and does not become a Contract Document. The User acknowledges that neither the Engineer, the Architect, the Consultants, the Client or the Owner make any warrant or representation that the information contained in the electronic files reflect the Contract Documents in their entirety. The User assumes full responsibility in the use of the electronic files, including the responsibility to see that all manual modifications, addenda, bulletins, clarifications and Change Orders to the drawings executed as a part of the Contract Documents have been incorporated.
- 1.5 The User acknowledges that the receipt of electronic files in no way relieves the User from the responsibility for the preparation of shop drawings or other schedules as set forth in the Contract between the Contractor and the Owner.
- 1.6 Electronic files are available in a .DWG or .RVT format for a cost as indicated in the Agreement and Waiver Form. Providing the documents in a .DWG version that differs from the product version that the .DWG files were initially created in will incur additional charges per sheet, as indicated in the Agreement and Waiver Form. Charges are for the Engineer's time to prepare the documents in the format stated. They are available through the Engineer's office on a C.O.D. basis only. A sample of the format will be provided by the Engineer upon request by the contractor, for the purpose of testing the compatibility of the format to the contractor's systems.
- 1.7 All drawings will be in an AutoCAD file format, when requested to be .DWG format.
- 1.8 All electronic files shall be stripped of the Project's name and address, the Architect's and Engineer's and any consultant's name and address, and any professional licenses indicated on the contract documents, (and all dimensions, verbiage, and statistical information). Use of these electronic files is solely at the contractor's risk, and shall in no way alter the contractor's Contract for Construction.

- 1.9 The User agrees to indemnify, hold harmless and defend the Engineer, the Architect, the Consultants, the Owner, the Client and any of their agents from any litigation resulting from the use of (by any means of reproduction or electronic media) these files. The Engineer makes no representation regarding fitness for any particular purpose, or suitability for use with any software or hardware, and shall not be responsible or liable for errors, defects, inexactitudes, or anomalies in the data, information, or documents (including drawings and specifications) caused by the Engineer's or its consultant's computer software or hardware defects or errors; the Engineer's or its consultant's electronic or disk transmittal of data, information or documents; or the Engineer's or its consultant's reformatting or automated conversion of data, information or documents electronically or disk transmitted from the Engineer's consultants to the Engineer.
- 1.10 The contractor waives all claims against the Engineer, its employees, officers and consultants for any and all damages, losses, or expenses the contractor incurs from such defects or errors in the electronic files. Furthermore, the contractor shall indemnify, defend, and hold harmless the Engineer, and its consultants together with their respective employees and officers, harmless from and against any claims, suits, demands, causes of action, losses, damages or expenses (including all attorney's fees and litigation expenses) attributed to errors or defects in data, information or documents, including drawings and specifications, resulting from the contractor's distribution of electronic files to other contractors, persons, or entities.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

- 3.1 Attached "Agreement" shall be submitted with accompanying payment to the Engineer prior to delivery of electronic files.

END OF SECTION





**Project:** Banks Lot 28, BP#2  
Cincinnati, Ohio

**Owner:** Hamilton County

**Heapy Engineering Project Number:** 2019-07018

**Heapy Engineering Project Manager:** Dave Madden

The Provider, named below, will furnish the Recipient, named below, certain documents prepared by the Provider or its sub consultants in an electronic format. These documents are hereinafter collectively referred to as "Electronic Files". The Electronic Files are instruments of the Provider services performed solely for the Owner's benefit and to be used solely for this Project. The Provider does not represent that the information contained in the Electronic Files are suitable for use on any other project or for any other purpose. If the Electronic Files are used for any other project or purpose without the Provider's specific written permission, the risk of such use shall be assumed solely by the Recipient or other user.

**Prior to the use of the Electronic Files the Provider and the Recipient agree to the following terms and conditions:**

1. The Provider and Recipient fully understand that the data contained in these electronic files are part of the Provider's Instruments of Service. The Provider shall be deemed the author of the drawings and data, and shall retain all common law, statutory law and other rights, including copyrights.
2. The Recipient confirms their request to the Provider for Electronic Files for the Project listed above, which the Recipient understands are to be provided only in accordance with, and conditioned upon, the terms and conditions of the Agreement and Waiver for Use of Electronic Files).
3. The Provider agrees that the Recipient may use the Electronic Files for the sole purpose of preparing shop drawings and/or coordination drawings for the above Project only. Any Electronic Files provided are strictly for the use of the Recipient in regard to the Project named above, and shall not be utilized for any other purpose or provided by the Recipient to any entity other than its subcontractors for the Project named above.
4. The Recipient acknowledges that the furnishing of Electronic Files in no way relieves the Recipient from the responsibility of shop drawings or other schedules as set forth in the Contract between the Contractor and the Owner.
5. The Recipient acknowledges:
  - a. That the Electronic Files do not contain all of the information of the Bid Documents or Contract Documents for the construction of the Project above.

- b. That information in the Bid Documents or Contract Documents may be revised or modified in the future.
  - c. The Provider does not have, and will not have, any duty or obligation to advise or give notice to the Recipient of any such revisions or modifications.
  - d. That the Recipient agrees that its use of the Electronic Files is at the Recipient's sole risk of liability, and that the Recipient shall make no claim or demand of any kind against the Provider arising out of Recipient's receipt or use of the Electronic Files.
6. The Provider makes no representation or warranty of any kind, express or implied, with respect to the Electronic Files and specifically makes no warranty that the Electronic Files shall be merchantable or fit for any particular purpose, or accurate or complete. Furthermore, any description of said Electronic Files shall not be deemed to create an implied or express warranty that such Electronic Files shall conform to said description.
7. Due to the unsecured nature of the Electronic Files and the inability of the Provider or the Recipient to establish controls over their use, the Provider assumes no responsibility for any consequences arising out of the use of the data. It is the sole responsibility of the Recipient to check the validity of all information contained within the Electronic Files. The Recipient shall at all times refer to the Construction Documents of the project during all phases of the project. The Recipient shall assume all risks and liabilities resulting from the use of this data, and the Recipient agree(s) to waive any and all claims and liability against the Provider and its sub consultants resulting in any way from the use of the Electronic Files.
8. Electronic Files are provided strictly as a courtesy by the Provider solely for the convenience of the Recipient, and are not part of the Bid Documents or Contract Documents for the Project. The Electronic Files do not replace or supplement the paper copies of any drawings, specifications, or other documents included in the Contract Documents for use on the project.
  - a. The Recipient assumes full responsibility in the use of Electronic Files, including the responsibility to see that all manual modifications, addenda, bulletins, clarifications and Change Orders to the drawings executed as a part of the Contract Documents have been incorporated.
9. As stated herein, the possibility exists that the Electronic Files provided may differ from the Bid Documents or Contract Documents for construction of the Project. The Provider shall not be responsible, nor be held responsible, for differences between Electronic Files, the Bid Documents, and Contract Documents. The Bid Documents or Contract Documents for the Project may be modified by the Provider at any time, either before or after construction begins. The Provider has no responsibility, either before or after any such modification, to determine or to advise the Recipient whether any such modification causes Electronic Files provided to the Recipient to be out of date, inconsistent with the Bid Documents or Contract Documents, or otherwise unsuitable or unfit for use in any way.
10. The Recipient assumes all risk and liability for any losses, damages, claims, or expenses (including defense and attorney fees) resulting from its receipt, use, or

possession of Electronic Files furnished by the Provider. The Provider makes no representation, warranty or guarantee that the Electronic Files:

- a. Are suitable for any other usage or purpose.
  - b. Have any particular durability.
  - c. Will not damage or impair the Recipient's computer or software.
  - d. Contain no errors or mechanical flaws or other discrepancies that may render them unsuitable for the purpose intended by the Recipient.
11. Recipient agrees to indemnify, defend and hold harmless the Provider, agents, employees, and the Owner from, and against, any and all claims, suits, losses, damages or costs, of any kind or nature, including attorney's fees, arising from or by reason of the Recipient's use of Electronic Files provided by the Provider, and such defense and indemnification obligation duties shall survive any use under this Agreement and Waiver for Use of Electronic Files.
12. The Recipient agrees that the Provider shall have no responsibility whatsoever for problems of any nature arising from transmitting and storing electronic files at a Recipient requested FTP or project management site or the conversion of the Electronic Files by the Recipient or others for use in non-native applications. The Provider will not provide Electronic Files in compressed formats. Recipient agrees to accept the files in the format provided by the Provider, and that Recipient's conversion or electronic file storage at the Recipient's requested site, shall be at Recipient's sole risk.
13. Recipient acknowledges:
- a. That the Electronic Files provided by the Provider are a graphical representation of the building in order to generate two-dimensional industry standard drawings.
  - b. That the data contained in the Electronic Files may not be 100% accurate and should not be used for dimensional control, building layout, shop drawings, or any other similar purpose
  - c. That any schedule of materials produced directly from the Electronic Files has not been checked for accuracy.
  - d. That the information in the Electronic Files should be used only for comparative purposes and shall not be relied upon for accurate quantity estimates or used in establishing pricing.
14. Electronic Files provided by the Provider will only contain elements and content that the Provider deems necessary and appropriate to share. No specific Level of Development (LOD) is implied or expected. The Recipient agrees that no proprietary content, MvParts or Revit Families or any other AutoCAD MEP or Revit MEP content shall be removed from the model and/or used for any other purpose but to support this specific project.
15. The Provider, at its sole discretion, may modify the Electronic files before they are provided to the Recipient. Such modifications may include, but are not necessarily limited to, removal of certain information. The Provider, at its sole discretion, may refuse to provide some or all Electronic Files requested by Recipient.

16. The availability of Electronic Files that were not prepared by the Provider is subject to the consent of the Owner or consultant that prepared those Electronic Files. The Provider will not negotiate with the Owner or consultant or repeatedly solicit the Owner or consultant to obtain such consent. Neither this Agreement and Waiver for Use of Electronic Files nor any such separate Consultant's consent may be assigned or transferred by Recipient to any other person or entity.

Provider (Name of Company): \_\_\_\_\_

Recipient (Name of Company): \_\_\_\_\_

Recipient Address: \_\_\_\_\_

Name of authorized Recipient Representative: \_\_\_\_\_

Title of authorized Recipient Representative: \_\_\_\_\_

E-mail address of authorized Recipient Representative: \_\_\_\_\_

Signature of authorized Recipient Representative: \_\_\_\_\_

Date: \_\_\_\_\_

NOTE: Select requested Electronic File Format, File Transfer Medium and complete applicable Cost Summary.

**A. Electronic File Format (select one):**

1.  .DWG Format - List of Drawings Requested: \_\_\_\_\_

2.  Revit Project Model Requested (Model only, no Views included)

**B. File Transfer Medium (select one):**

CD-ROM  DVD-ROM  Heavy FTP  User's FTP site  Flash Drive

**C. Delivery of Electronic Files Cost Summary:**

Available Electronic .DWG file format:

2018 DWG

If a different file version is required than the indicated available version state the requested version:

\_\_\_\_\_ .DWG

**Note that an additional charge per sheet will be incurred.**

Cost of Preparation of Division 21 Electronic .DWG Files:

First Drawing: \$50.00 \$50.00

Additional Drawings \$15.00 each \_\_\_\_\_ x \$15.00 =\$ \_\_\_\_\_

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

Conversion to .DWG version different from available .DWG:  
\$5.00 additional/sheet \_\_\_\_\_ x \$ 5.00 = \$ \_\_\_\_\_

Total Cost: (Please make check payable to Heapy Engineering  
and include a copy of this form.) \$ \_\_\_\_\_

All files will be bound together.

Available electronic Revit file format:

2018 .RVT

Cost of Preparation of Division 21 Electronic Revit Model Files:

Revit Project Model without Views \$500.00

Total Cost: (Please make check payable to Heapy Engineering  
and include a copy of this form.) \$ \_\_\_\_\_

SECTION 21 05 04 BASIC FIRE SUPPRESSION MATERIALS AND METHODS

PART 1 – GENERAL

1.1 Construction Water

- A. Refer to Division 01 - General Requirements, for information regarding construction water.

1.2 Sleeve Placement Coordination Drawings

- A. Prepare coordination drawings showing size, type, location and material of Fire Suppression sleeves. Refer to Sections 01 11 00 and 21 05 07 for additional information.
- B. Submit coordination drawings in accordance with Division 01 Requirements, at least 14 calendar days before the first scheduled concrete pour.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 - EXECUTION

3.1 Workmanship

- A. Materials and equipment shall be installed and supported in a first-class and workmanlike manner by mechanics skilled in their particular trades. Workmanship shall be first-class in all respects, and the Architect shall have the right to stop the work if highest quality workmanship is not maintained.
- B. Fire Suppression work shall be performed by Contractors that are fully certified by the State or authority having jurisdiction.

3.2 Protection

- A. Each Contractor shall be entirely responsible for all material and equipment furnished in connection with their work. Special care shall be taken to properly protect all parts thereof from theft, damage or deterioration during the entire construction period in such a manner as may be necessary, or as directed by the Construction Manager.

3.3 Cutting and Patching

- A. Refer to Division 01 - General Requirements for information regarding cutting and patching.
- B. Plan the work well ahead of the general construction. Where pipes are to pass thru walls, partitions, floors, roof or ceilings, place sleeves in these elements or arrange with the Construction Manager to provide openings where sleeves are not practical. Where sleeves or openings have not been installed, cut holes and patch as required for the installation of this work, or pay other trades for doing

this work when so directed by the Architect. Any damage caused to the building in this work shall be repaired or rectified.

- C. All sleeves and openings not used or partially used shall be closed to prevent passage of smoke and fire.

#### 3.4 Painting

- A. Coordinate with Construction Manager for extent of painting required.
- B. Refer to Division 09 – Finishes for methods to be utilized.

END OF SECTION

## SECTION 21 05 05 FIRESTOPPING

### PART 1 - GENERAL

- 1.1 Firestopping assemblies shall be provided at penetrations of piping thru fire rated floors, fire rated floor-ceiling and roof ceiling assemblies, fire rated walls and partitions and fire rated shaft walls and partitions. In addition, firestopping assemblies shall be provided at penetrations thru 0-hour rated floors. Refer to the drawings for fire rated building elements and pipe layouts.
- 1.2 Firestopping assemblies shall be tested and rated in accordance with ASTM E814 and E119 and listed in accordance with UL 1479, as published in the UL Fire Resistance Directory. Firestopping shall provide a fire rating equal to that of the construction being penetrated.
- 1.3 Firestopping materials, assemblies and installation shall conform to requirements of the OBC and the authority having jurisdiction.
- 1.4 For those firestopping applications that exist for which no UL tested system is available through any manufacturer, a manufacturer's engineering judgment derived from similar UL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgment drawings must follow requirements set forth by the International Firestop Council.
- 1.5 Shop drawings and product data shall be prepared and submitted for review and approval. Submittals shall include manufacturer's specifications and technical data of each material, documentation of U.L. firestopping assemblies and installation instructions. Submittals shall include all information required in the OBC.

### PART 2 - PRODUCTS

- 2.1 Firestopping materials shall be manufactured and/or supplied by Hilti, 3M, Tremco, Specified Technologies or other approved manufacturer.
- 2.2 Materials shall be in the form of caulk, putty, sealant, intumescent material, wrap strip, fire blocking, ceramic wool and other materials required for the UL listed assemblies. These shall be installed in conjunction with sleeves and materials for fill and damming.
- 2.3 Combination pre-set floor sleeve and firestopping assemblies shall be equal to Hilti CP 680.

### PART 3 - EXECUTION

- 3.1 Installation of all materials and assemblies shall be in accordance with UL assembly drawings and the manufacturer's instructions.
- 3.2 Installation shall be done by an experienced installer who is certified, licensed or otherwise qualified by the firestopping manufacturer as having the necessary training and experience.



The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- 3.3 Refer to Section 21 05 07 Piping Materials and Methods for Fire Suppression for pipe sleeve requirements and treatment of penetrations not requiring firestopping.

END OF SECTION

SECTION 21 05 07 PIPING MATERIALS AND METHOD FOR FIRE SUPPRESSION

PART 1 - GENERAL

- 1.1 Piping materials and methods for piping common to Division 21 – Fire Suppression shall be as specified herein and as shown on the drawings.
- 1.2 Included in this Section are:
  - A. Pipe, fittings and joining methods.
  - B. Unions and flanges.
  - C. Pipe sleeves, openings, curbing and escutcheons.
  - D. Installation methods of piping.
- 1.3 Refer to other Sections in Division 21 for selection of piping materials for the various services. Piping materials and installation methods peculiar to certain individual systems are specified in Sections related to those systems.
- 1.4 Refer to Section 21 05 05 Firestopping and Division 07 for firestopping requirements.
- 1.5 Welders shall be qualified and fully certified in accordance with ASME Boiler and Pressure Vessel Code, Section IX, Welding and Brazing Qualifications.
- 1.6 Welding procedures, testing and welder performance shall comply with The American Welding Society Welding Handbook, AWS B2.1, Specification for Welding Procedure and Performance Qualification and National Welding Institute.
- 1.7 Pipe sleeves, floor and wall openings, water protective curbing and escutcheon plates shall be provided as described below. Pipe sleeves shall be placed in all floor slabs, poured concrete roof decks, walls and partitions, except as noted below, to allow new piping to pass thru and to allow for expansion, contraction and normal movement of the pipe. Refer to Section 21 05 04 Basic Fire Suppression Materials and Methods, Article 1.1, for sleeve placement coordination drawings.
- 1.8 Soldering procedures per ANSI B16.18.
- 1.9 Sleeves are not required:
  - A. In floor slabs on grade.
  - B. In core drilled openings in solid concrete not requiring water protection. Sleeves are required, at concrete block walls, to facilitate containment of required firestopping material.
  - C. In large floor openings for multiple pipe risers which are within a fire rated shaft, unless the opening is to be closed off with concrete or other material after pipes are set.

- 1.10 Where pipes penetrate walls and floors other than those required to be fire rated, the annular space between the sleeve, core drilling or opening and the pipe or pipe insulation shall be closed to retard the passage of smoke.

## PART 2 - PRODUCTS

- 2.1 For detail of pipe and fitting products see Section 21 13 12 Fire Suppression Piping.
- 2.2 Unions and flanges shall be:
- A. Unions on steel pipe 2" and smaller, malleable iron with ground seat, bronze to steel, 300 lbs., screwed ends.
  - B. Flanges on steel pipe with welded or screwed joints, 2.50" and larger. Gaskets shall be 0.0625" thickness, ASME B16.21, full face compressed sheet suitable for temperature and pressure ranges of the application.
  - C. Mechanical joints associated with grooved end pipe are acceptable in lieu of unions and flanges.
- 2.3 A dielectric connector shall be incorporated at each connection between ferrous and non-ferrous piping. Connectors shall be:
- A. Dielectric coupling with non-conductive polymer liner, Victaulic Style 47, Gruvlok "Di-Lok" and Lochinvar Corp. "V-Line" or engineer approved equal, Dielectric fitting on service pressures less than 300 psi.
- 2.4 Pipe sleeves shall be:
- A. Podium Level structure **where exposed to weather** (refer to Drawings for exact locations): Schedule 40 ASTM A53, Type E, Grade A hot-dipped galvanized steel.
  - B. All other Podium Level structure (refer to Drawings for exact locations): Schedule 40 ASTM A53, Type E, Grade A ungalvanized steel.
  - C. All other sleeves: Schedule 40 PVC, Type 1, ASTM D-2466, **color gray**.

## PART 3 - EXECUTION

- 3.1 Pipe and tubing shall be cut and fabricated to field measurements and run parallel to normal building lines. Pipe ends shall be cut square and ends reamed to remove burrs. The pipe interior shall be cleaned of foreign matter before erection of the pipe.
- 3.2 Piping shall be installed consistent with good piping practice, run concealed wherever possible and located as to be protected from damage by freezing. Coordinate with other trades to attain a workmanlike installation.
- 3.3 Piping shall be supported as specified in Section 21 05 29 Hangers and Supports for Fire Suppression Piping. Piping with mechanical joints for grooved end steel pipe shall

be supported in accordance with the manufacturer's recommendations. Pipe alignment in both the horizontal and vertical must be tightly maintained. Misalignment must be corrected to the satisfaction of the Architect before the system is accepted.

- 3.4 Piping shall not be run above electrical switchgear or panelboards, nor above the access space in the immediate vicinity of the equipment, in accordance with the N.E.C..
- 3.5 Unions and flanges shall be installed at pipe connections to equipment and as required for erection purposes.
- 3.6 Length of wall sleeves shall be such that the sleeve ends are substantially flush with both sides of the wall or partition. Floor sleeves shall be flush with the bottom and top of the floor slab except, in mechanical rooms and other areas which might have water on the floor, sleeves shall project a minimum of 1" above finished floor.
- 3.7 Refer to Section 21 05 05 Firestopping. Pipe sleeves which are a part of firestopping assemblies shall conform to the requirements of the assembly with particular emphasis regarding size, annular space, length, passage or non-passage of insulation and the installation of the sleeves.
- 3.8 In lieu of firestopping and where permitted by the OBC, uninsulated metallic pipes requiring no pipe sleeves in passing thru concrete floors or concrete or masonry walls or partitions, the annular space shall be closed full depth of the penetration with materials and methods compatible with the floor, wall or partition material (concrete, grout or mortar).
- 3.9 Where firestopping is not required, the annular space between the sleeve, core drilling or opening and the pipe shall be closed with caulking to retard the passage of smoke.

END OF SECTION

## SECTION 21 05 17 EXPANSION LOOPS FOR FIRE SUPPRESSION PIPING SYSTEMS

### PART 1 – GENERAL

- 1.1 Fire Suppression pipe expansion loops with flexible metal hose sections shall be provided to accommodate building expansion and contraction. Pipe anchors and pipe alignment guides shall be provided in conjunction with expansion loops. Expansion loops shall be UL listed for fire sprinkler systems.

### PART 2 - PRODUCTS

- 2.1 Pipe expansion loops shall consist of two sections of flexible metallic pipe, connected by a 180° return bend or two 90° elbows with an intervening rigid or flexible pipe section, and 90° elbows with grooved or flanged ends, for connections to the piping. Flexible metallic pipe shall be constructed of seamless corrugated inner tubing of Type 321 stainless steel or tin-bronze with woven wire braid outer jacket of the same alloy. Working pressure shall be minimum 175 psi at 70 degrees. Expansion loops shall be Metraflex “Fireloop” or equal by Flex-Hose, Engineered Flexible Products or Mason, or engineer approved equal.
- 2.2 Expansion loops connectors in piping crossing building expansion joints shall have flexible sections in all segments of the loop.
- 2.3 Alignment guides shall consist of a guide spider to be clamped to the pipe and a guide body with support attachment means. Guides on cold services shall have an integral thermal barrier. Bracing steel and attachments, cables, concrete inserts and other attachments to the structure shall be sized for the required stress loads.

### PART 3 – EXECUTION

- 3.1 Expansion loops shall be installed in accordance with manufacturer's instructions.
- 3.2 Pipe anchors shall be provided in conjunction with expansion loops. Anchor assemblies and attachment to the building structure shall be designed to overcome resistive and frictional forces of the loops and joints.
- 3.3 Pipe guides shall be placed on each side of the expansion loop, attached to the building structure. Number and spacing shall be in accordance with manufacturer’s instructions.
- 3.4 Expansion loops shall be supported from the structure at the 180° return bend or at the intervening section where a return bend is not incorporated. Provide a 0.25” ball valve for drain or air venting where the loop is not installed in the horizontal plane.

END OF SECTION

## SECTION 21 05 19 GAUGES FOR FIRE SUPPRESSION PIPING

### PART 1 - GENERAL

- 1.1 Pressure gauges shall be provided as shown on the drawings and as specified herein.
- 1.2 Gauges furnished as a part of factory assembled equipment are specified with such equipment.

### PART 2 - PRODUCTS

- 2.1 Manufacturers products listed below are basis of design. Other acceptable manufacturers are Winters, Milijoco or Palmer Instruments, or Engineer approved equal.
- 2.2 Pressure Gauges
  - A. Pressure gauges shall be Bourdon tube type with 4.50" dial and cast aluminum case, equal to Trerice 600CB Series. Accuracy shall be 1% at mid-range.
  - B. Pressure gauges at pumps shall be liquid filled Bourdon tube type with 4" dial and stainless steel case and internals, equal to Trerice 700 Series.
  - C. A brass cock or bronze ball valve and a pressure snubber shall be furnished with each pressure gauge.
  - D. Ranges of pressure gauges shall be selected to be consistent with anticipated pressures. Range shall be approximately twice the normal system working pressure at the gauge location.

### PART 3 - EXECUTION

- 3.1 Pressure gauges shall be installed where shown on the drawings, where required by applicable codes and also at:
  - A. Fire Suppression - top of each standpipe; in each riser.
- 3.2 Gauges shall be positioned to be read with unobstructed view from the floor. Pressure-temperature test plugs shall be installed where shown, located in a position to be most readable.

END OF SECTION

SECTION 21 05 29 HANGERS AND SUPPORTS FOR FIRE SUPPRESSION PIPING

PART 1 – GENERAL

1.1 All piping shall be supported from the building structure.

PART 2 - PRODUCTS

2.1 Manufacturers listed below are basis of design. Other applicable manufacturers are B-line, Erico, Fee, Mason and PHD or Engineer approved equal.

2.2 Hangers and supports for horizontal piping shall be equal to:

- A. General service - clevis type - Anvil Fig. 260.
- B. Pear shaped band hangers with adjustable swivel ring, lock nut and rod attachment - Anvil Fig. 69.

2.3 Hanger rods shall be solid galvanized steel, threaded-end or all-thread rod, of diameter listed below. A hanger attachment device (beam clamps, concrete inserts, etc.) and locking nuts at the hanger attachment shall be provided on each hanger. Locking nuts shall be provided at each clevis, trapeze and swivel ring type hanger.

Pipe Sizes	Min. Rod Dia.
1" to 3"	0.375"
4" to 6"	0.50"
8"	0.625"

2.4 Hanger rod attachment devices for attachment to the structure shall be:

- A. After-set galvanized steel expansion type concrete inserts.

2.5 Galvanized steel spring and neoprene isolators in hanger rods, as required in Part 3, shall be equal to Mason Series 30N except in pipe sizes 6" and larger shall be Series PC30N.

2.6 Base mounted pipe supports shall be factory or shop prime coat painted equal to Anvil catalog numbers as follows:

- A. Pipe slide having carbon steel base (with guide arrangement) and inverted tee with Teflon slide plate on each - Fig. 257, type 3.
- B. Base mounted pipe roller stand - Fig. 271.

2.7 Pipe riser supports shall be as follows:

- A. Riser clamps on piping - Anvil Fig. 261.

2.8 Trapeze hangers for numerous pipes run in parallel may be utilized. Horizontal support members shall be unistrut type section with spring and nut connectors, suspended with hanger rods and attachments similar to individual pipe hanger suspension.

### PART 3 - EXECUTION

- 3.1 Spacing of hangers shall be as specified herein and, in addition, spacing and hanging methods in conformance with NFPA Standards when more stringent.
  - A. Steel pipe (vertical) - at the base and 15 ft. maximum spacing unless otherwise shown.
  - B. Steel pipe (horizontal) - 8 ft. intervals for piping 2" size and smaller, 10 ft. spacing for piping 2.50" thru 6", 12 ft. spacing for larger pipe.
- 3.2 In piping systems with rolled or cut groove end pipe and mechanical joint couplings, pipe hangers shall be provided on horizontal piping at normal specified intervals and, in addition, so that no pipe shall be left unsupported between any two couplings nor left unsupported whenever a change in direction takes place. Vertical piping shall be supported at normal specified intervals or every other pipe length, whichever is more frequent. The base of the riser or base fitting shall be supported.
- 3.3 Attachment of pipe hangers to the structure shall be with:
  - A. After-set concrete inserts, in 4" minimum depth concrete, set in drilled holes. Powder actuated driven fasteners are not permitted.
  - B. Unistrut type channel support system may be utilized where a number of pipes are run parallel. Channel shall be pre-set or attached to the structure with inserts or clamps.
- 3.4 Pipe hangers shall be adjusted to proper elevation, hanger rods set in a vertical position and locking nuts secured before pipe insulation is installed.
- 3.5 Extended legs of pipe riser clamps shall be shortened as needed to maintain concealment of the clamp within the pipe chase. Insure that adequate support is still maintained.

END OF SECTION



## SECTION 22 05 33 HEAT TRACING FOR FIRE SUPPRESSION PIPING

### PART 1 - GENERAL

- 1.1 Equipment, wiring, and associated devices for self-regulating electric heat trace shall be provided as shown on the drawings and as specified.
- 1.2 Refer to Section 21 05 07 Piping Materials and Methods and other Sections for work related to this Section.

### PART 2 – PRODUCTS

- 2.1 Provide a **UL 515A Listed, CSA Certified** electric self-regulating heating cable, connection kits and electronic controller for providing freeze protection of the fire suppression piping as indicated on the drawings. The cable shall utilize a radiation-crosslinked conductive polymer as the heating element, and the cable shall be specifically designed, manufactured and **UL Listed, CSA Certified for freeze protection temperature maintenance for fire suppression systems**.
- 2.2 Product will have a minimum power output of 8 W/ft at 208V, 1Ph.
- 2.3 Minimum accessories to be included as needed:
  - A. Power connections (tee, splice)
  - B. Standard connections (tee, splice)
  - C. Lighted end seal
  - D. Labels
  - E. Glass cloth adhesive tape.
  - F. UL Listed microprocessor based single point or multipoint controller.
  - G. Stainless steel jacketed three-wire resistance temperature device.
  - H. Heat tracing power distribution panel (316SS, NEMA 4x) for single or group control.
  - I. Dry contacts as required for alarm signal to fire alarm (existing)
- 2.4 Basis-of-Design Product: Chromolox (Omar McDowell Co. (440) 808-2280, [omc@omarmcdowell.com](mailto:omc@omarmcdowell.com)). Subject to compliance with requirements, provide equal product by RayChem, DeltaTherm, Thermon, or Omegalux.

### PART 3 - EXECUTION

- 3.1 Install electric heating cable according to the drawings and the manufacturer's instructions. The installer shall be responsible for providing a functional system, installed in accordance with applicable national and local requirements.

- 3.2 Install electric heating cables after piping has been tested and before insulation is installed.
- 3.3 Install insulation over piping with electric heating cables (after initial testing) according to 22 07 19 Plumbing Piping Insulation.
- 3.4 Install warning tape on piping insulation where piping is equipped with electric heating cables.
- 3.5 Set field-adjustable switches and circuit-breaker trip ranges.
- 3.6 Protect installed heating cables, including non-heating leads, from damage.
- 3.7 Each circuit shall be protected with a 30 mA ground-fault protection device. Ground equipment according to Division 26.
- 3.8 Connect wiring according to Division 26.
- 3.9 Testing: Perform tests after cable installation but before application of coverings such as insulation. Follow the heat trace manufacturer's testing guidelines and instructions.
- 3.10 Procedure: Measure the heater circuit continuity and the insulation resistance between the braid and the bus wires with a 2500 Vdc megohmmeter (megger).
- 3.11 Timing: The tests should be performed after the pipe insulation has been installed and prior to the installation of wall or ceiling panels and shall be witnessed by the Construction Manager and the manufacturer or the manufacturer's representative.
- 3.12 Acceptable results: The heater circuit shall be continuous and megger readings shall be at least 1000 megohm regardless of the heater length. Circuits yielding unacceptable readings must be repaired or replaced.

END OF SECTION

## SECTION 21 05 53 IDENTIFICATION OF FIRE SUPPRESSION PIPING AND EQUIPMENT

### PART 1 - GENERAL

- 1.1 Identification of Fire Suppression equipment shall consist of equipment labeling, pipe marking and valve tagging as specified hereinafter.
- 1.2 Each item of major equipment shall be labeled. This shall include fire pumps, air compressor, dry pipe valves and other similar equipment.
- 1.3 Pipe markings shall be applied to all piping.
- 1.4 Each shutoff valve, other than at equipment, shall be identified with a stamped tag. Valves and tagging shall be scheduled typewritten on 8.50" x 11" paper, tabulating valve number, piping system, system abbreviation, location of valve (room or area) and service (e.g. - South wing Zone 1).
- 1.5 Labels, tags and markers shall comply with ANSI A13.1 for lettering size, colors and length of color field.
- 1.6 Equipment and device identification specified in other Sections shall be provided as a part of those requirements.
- 1.7 Coordinate pipe markings and valve tags with HVAC and Plumbing Contractors to assure similar markings.

### PART 2 - PRODUCTS

- 2.1 Equipment labeling shall be the following:
  - A. Permanently attached engraved brass or plastic laminated signs with 1" high lettering. Signs on exterior equipment shall be brass.
- 2.2 Sprinkler system riser room door labeling shall be 3" high red letters, or as approved by the local fire department.
- 2.3 Pipe markings shall be:
  - A. Plastic semi-rigid snap-on type, manufacturer's standard pre-printed color coded pipe markers extending fully around the pipe or pressure-sensitive vinyl markers similar to the above.
  - B. On piping 6" and greater diameter, full band as specified above or strip-type markers fastened to the pipe with laminated or bonded application or by color-coded plastic tape not less than 1.50" wide, full circle at both ends of the marker.
  - C. Arrows for direction of flow provided integral with the pipe marker or separate at each marker.
- 2.4 Valve tags shall be polished brass or plastic laminate with solid brass S hook. Tags shall be engraved with "F" (for Fire Suppression) and the designated number.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- 2.5 Labels, markings and tags shall be manufactured by W.H. Brady, Seton, Allen, Kolbi or Industrial Safety Supply, or engineer approved equal.

### PART 3 - EXECUTION

- 3.1 Identification labeling, marking and tagging shall be applied after painting has been completed.
- 3.2 Coordinate names, abbreviations and other designations used in fire suppression identification work, with corresponding designations shown, specified or scheduled on drawings.
- 3.3 The Plumbing, Fire Suppression and HVAC Contractors shall coordinate labeling, marking and tagging to attain coordinated and consistent systems of identification.
- 3.4 Equipment labeling shall consist of unit designation as shown on the drawings.
- 3.5 Pipe markers shall be placed:
  - A. At 50 ft. centers in other exposed locations.
  - B. On mains at each branch take-off.
  - C. At least once in each room.
- 3.6 Valve tags shall be placed on each valve except those intended for isolation of individual items of equipment. Valve tag schedules shall be prepared as specified above. Copies of one set of schedules shall be laminated in clear plastic and placed where directed by the Owner. Other sets shall be included in the Operating and Maintenance Manuals.

END OF SECTION

## SECTION 21 13 12 FIRE SUPPRESSION PIPING

### PART 1 - GENERAL

- 1.1 Piping, valves and devices for the Fire Suppression system shall be provided as shown on the drawings, as specified and as required for a complete system.
- 1.2 Piping and associated devices and materials shall conform to provisions of Section 21 05 07 Piping Materials and Methods for Fire Suppression, Section 21 05 29 Hangers and Supports for Fire Suppression Piping and as specified in this and other Fire Suppression Sections.
- 1.3 Pipe, fittings and joints shall conform to specifications and standards references of NFPA 13 Standard for the Installation of Sprinkler Systems and NFPA 14 Standard for the Installation of Standpipe and Hose Systems.
- 1.4 Fire suppression system materials and components shall be UL listed or FM Global approved for fire suppression service. Piping, fittings, valves and system components shall be rated at not less than 300 psi or greater so that system pressures do not exceed working pressure ratings.
- 1.5 Welding in place will be permitted only if written approval is obtained from the authority having jurisdiction. Welders and welding procedures in both the shop and in the field shall conform to AWS B2.1, Specification for Qualification of Welding Procedures and Welders for Piping and Tubing. Welding of galvanized piping is prohibited.

### PART 2 - PRODUCTS

- 2.1 Pipe, fittings and joining methods shall be:
  - A. TYPE F1 - Wet Pipe System  
Pipe - Schedule 40 black steel, ASTM A53, Type E or F, or ASTM A135. Fittings and joints - malleable or cast iron screwed type or flanged.
  - B. TYPE F2 - Wet Pipe System  
Pipe - Schedule 40 black steel, ASTM A53, Type E or F, or ASTM A135, with mechanically rolled or cut groove ends.  
Fittings and joints – grooved-end joint with malleable or ductile iron body, ASTM A-536 or A-47 and nitrile or EPDM gaskets. Victaulic "Firelock" Style 005 or 009 rigid, Victaulic IGS or equal by AnvilStar "Gruvlok" or Tyco/Grinnell. All fittings and couplings shall be of the same manufacturer.
  - C. TYPE F3 - Dry Pipe System  
Same as F1 except galvanized pipe (ASTM A795) and galvanized fittings.
  - D. TYPE F4 - Dry Pipe System  
Same as F2 except galvanized pipe (ASTM A795) and galvanized fittings, and grooved-end coupling gasket shall be flush seal type.

All Pipe and fittings shall be coated, treated, prepared to prevent/inhibit Microbial Induced Corrosion.

2.1 Valves on the piping of the fire suppression systems shall be UL listed or FM approved for fire suppression application. Valves shall be manufactured by Nibco, whose catalog numbers are listed below, or equal by Kennedy, Hammond or Watts.

A. Butterfly Valves.

Type A4. 2" and larger.

Nibco LD3510-4 (or engineer approved equal), 200 lb. w.w.p.(dead-end service), ductile or cast iron tapped lug body, nickel plated ductile iron disc, molded in EPDM seat, 416 S.S. stem, worm-gear operator with handwheel and indicator. Valves with integral supervisory switches are acceptable if supervisory mechanism is UL listed.

B. Ball Valves.

Type B5. 2" and smaller.

Nibco KT-505-4 (or engineer approved equal), 300 w.w.p. two-piece bronze body, screwed ends, chrome plated brass ball, bronze stem, full port, TFE seat and seal. Gear box operator with handwheel and indicator. Valves with integral supervisory switches are acceptable if supervisory mechanism is UL listed.

C. Check Valves.

Type C8. 2" and smaller.

Nibco KT-403-W (or engineer approved equal), 200 lb. w.w.p., swing check, bronze body, threaded bonnet, Buna-N faced disc.

Type C9. 2.50" and larger.

Nibco F-908-W (or engineer approved equal), 175 lb. w.w.p., swing check, cast iron body and bonnet, bronze mounted, renewable seat and disc, flanged ends, rubber faced disc, drilled and tapped ball drip boss with plug.

Type C10. 2.50" and larger.

Nibco KW-900-W (or engineer approved equal), 250 psi c.w.p., wafer check, ductile iron body, wafer style, bronze disc, molded Buna-N resilient seat, stainless steel spring and pins.

D. Gate Valves.

Type D8. 2" and smaller.

Nibco T-104-0 (or engineer approved equal), 175 w.w.p., bronze body, bronze trim, O.S.&Y. pattern, threaded ends, solid wedge disc, hand wheel.

Type D9. 2.50" and larger.

Nibco F-607-OTS (or engineer approved equal), cast iron body, bronze mounted, O.S.&Y. pattern, flanged ends, solid wedge, hand wheel.

2.2 Valves of equal construction and features with ends compatible with grooved end pipe mechanical joint couplings are acceptable on such systems, and shall be manufactured by the coupling system manufacturer.

2.3 Valves where designated as supervised type shall be suitable for mounting of an electrical supervisory switch to monitor the valve position, open or closed.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- 2.4 Unions, flanges, pipe sleeves and firestopping shall be as described in Section 21 05 07 Piping Materials and Methods for Fire Suppression and Section 21 05 05 Firestopping.
- 2.5 Pipe hangers and supports shall be UL listed or FM approved and shall be as described in Section 21 05 29 Hangers and Supports for Fire Suppression Piping.

### PART 3 - EXECUTION

- 3.1 Pipe mains shall be installed with a slope not less than 0.0625" vertical per 1'-0" horizontal toward the direction of flow. Branch piping shall be installed with a slope not less than 0.0625" vertical per 1'-0" horizontal toward the main piping.
- 3.2 Installation of piping, valves, hangers, sleeves and other components shall conform to NFPA 13 for sprinkler systems, NFPA 14 for standpipe and hose systems, Section 21 05 07 Piping Materials and Methods for Fire Suppression and Section 21 05 29 Hangers and Supports for Fire Suppression Piping.
- 3.3 Mechanical joint type couplings shall be installed in strict conformance with manufacturer's recommendations, including torquing of coupling bolts to recommended levels. Submit coupling torque requirements to Construction Manager.

END OF SECTION

## SECTION 21 13 13 FIRE SUPPRESSION SPRINKLER AND STANDPIPE SYSTEM

### PART 1 - GENERAL

- 1.1 Provide a complete dry standpipe and sprinkler system as outlined on the drawings and as specified. Division 21 Contractor is also responsible for a complete deluge suppression and local detection system. The system shall include a complete electrically-actuated deluge sprinkler system, a local deluge releasing panel, and linear heat detection cabling. The releasing panel shall provide remote contacts for alarm and trouble signals.
- 1.2 Division 21 contractor is responsible for a complete suppression and local detection system.
- 1.3 Division 21 contractor is responsible for testing and full operation of complete detection and suppression system.
- 1.4 The sprinkler and standpipe system shall conform to requirements of NFPA 13 and 14, respectively, OBC Chapter 9 and other requirements of the authority having jurisdiction.
- 1.5 All materials and devices, as appropriate, shall be UL listed, FM Global approved and acceptable to the authority having jurisdiction.
- 1.6 Bidders on Fire Suppression work shall be regularly engaged in the installation of the respective fire control systems and shall be fully certified by the State or authority having jurisdiction, as applicable. Bidders shall provide a list of approved operational installations upon request.
- 1.7 The Fire Suppression Contractor shall obtain and pay for a permit and other applicable fees.
- 1.8 The Fire Suppression Contractor shall perform a fire pump flow test to serve as the basis for hydraulic calculations in sizing of piping and other elements of the system. Calculations shall include not less than a 5 psi safety factor. Main pipe sizes shown on the drawings shall not be reduced. Flow tests performed within 6 months of the date of permit will be acceptable. A copy of the flow test report shall be included with the submitted hydraulic calculations.
- 1.9 Hydraulic calculations shall be based on minimum area of operation as indicated on the drawings.
- 1.10 Installation drawings for the sprinkler and standpipe system shall be developed showing all information needed to obtain approval from the authority having jurisdiction. A summary sheet shall be included showing all pertinent information per NFPA 13 and 14. Drawings shall be submitted to the Construction Manager for review and to the authority having jurisdiction for approval.
- 1.11 Pipe, fittings, valves, accessories, devices and installation shall be as specified in Section 21 13 12 Fire Suppression Piping. Refer to Section 21 13 15 Fire Suppression Equipment.

### PART 2 - PRODUCTS



- 2.1 Sprinklers and related items shall be manufactured by Central, Gem, Star, Reliable, Globe, Viking or Victaulic, or engineer approved equal.
- 2.2 Sprinklers, unless otherwise noted, shall be quick-response frangible bulb or fusible solder style having a temperature range suitable for the application and pressure rating in excess of the maximum system pressure. Refer to the drawings for sprinkler types, finishes and features. Escutcheon plates for pendent and sidewall sprinklers shall be two-piece to allow removal of the escutcheon and sprinkler without disturbing the ceiling or wall. Escutcheon plates shall be a part of the listed sprinkler assembly.
- 2.3 Extended coverage sprinklers are acceptable.
- 2.4 Flexible sprinkler drops are not acceptable.
- 2.5 Special coatings shall be factory applied by the sprinkler manufacturer only. Field application of coatings or finishes that would nullify the UL listing or FM Global approval of the sprinkler is prohibited.
- 2.6 Spare sprinklers and sprinkler wrenches shall be furnished in accordance with the requirements of NFPA 25. Stock of spare sprinklers shall include each type, temperature classification and pressure rating in rough proportion of those installed. Provide a wall-mounted stainless steel cabinet for spare sprinklers and wrenches.
- 2.7 All components shall be compatible with the respective system, including but not limited to trim pieces, valves, solenoids, monitoring/control modules, waterflow switches and pressure switches.
- 2.8 All supervisory and alarm switches shall be UL Listed and/or FM Approved for fire alarm signaling use. Devices shall contain at minimum one single pole double throw (SPDT) "Form C" signal contacts having 120 VAC, 7.5 amps minimum rating unless otherwise specified. Devices shall be NEMA 4 rated unless otherwise specified.
- 2.9 Dry-pipe valve assembly shall be complete with necessary components, accessories and piping, and shall include the following:
  - A. Dry sprinklers shall be utilized where the sprinklers are in the pendent position. Dry pendants are not required where return bends are used as permitted by NFPA 13.
  - B. Dry Pipe Valve
    1. Dry pipe valves shall utilize either a latching rubber-faced clapper or an internal pressurized diaphragm assembly. Valve shall employ an air pressure differential principle to ensure water release upon loss of air pressure in system piping. The valve shall be constructed of a ductile iron body with trim. Dry pipe valves shall be UL Listed and FM Global Approved. Dry pipe valves shall have a minimum working water pressure of 1250 psi. Valve trim shall be compatible.
  - C. Air Pressurization Device
    1. Air pressure shall be maintained and monitored on all dry pipe sprinkler systems.
  - D. Pressure Switches

1. Each valve assembly shall include two types of pressure switches connected to the alarm line. Switches shall be compatible with and monitored by the local fire alarm control panel. Supervisory attachments shall be compatible with the type valve on which it is to be installed. Switches shall include a metal housing with a neoprene diaphragm, SPDT snap action switches and a ½ inch NPT male pipe thread. There shall be two SPDT Form C contacts factory adjusted to operate at 4 to 8 psi. The switch shall be capable of being mounted in any position in the alarm line trim piping. Pressure switches shall have the ability to be wired for Class A or Class B service. Size devices according to related pipe size. Provide an enlarged section of pipe where necessary.
  - a. An alarm pressure switch shall indicate water flow. Alarm pressure switch shall have the ability to be wired for Class A or Class B service. Switch shall include a field adjustable alarm set point of not less than 0 to 60 seconds.
  - b. A supervisory pressure switch shall monitor air pressure within the system. Pressure supervisory switches shall be capable of monitoring both low and high air pressure within the system. Pressure settings shall be field-adjustable.

E. Check Valve

1. The system check valve shall be UL Listed and FM Approved for use on fire protection systems. The check valve shall be constructed of a ductile iron body with a brass seat and an EPDM rubber faced clapper assembly hinged to a removable access cover. Working water pressure shall be minimum 250 psi.
2. Check valves internal to the system valves are acceptable.

PART 3 - EXECUTION

- 3.1 The location of piping and devices shall be coordinated with other trades to assure proper fit of all building systems and adequate access to test stations, control valves and water flow alarms. Sprinkler piping shall be so located as to be protected from damage by freezing.
- 3.2 Sprigs to upright sprinklers shall contain no fittings between the branch line tee and the reducing coupling at the sprinkler. Riser nipples exceeding 30 inches in length shall be individually supported.
- 3.3 Dry pipe system switches and supervisory attachments for valves shall be furnished and installed. Make all final adjustments.
- 3.4 The entire piping system shall be hydrostatically tested at 200 psig minimum and not less than 50 psi above the maximum system pressure. Test pressure shall be applied for a period of not less than 2 hours and shall be measured at the low point of the piping being tested. Piping shall show no leakage by visual inspection and by pressure gauge reading. Testing procedure and pertinent data shall be recorded and made available to the Owner and to the authority having jurisdiction. Remove air from system piping before proceeding with the test.
- 3.5 Provide system drain valves, flow test valves, related accessories and discharge and drain piping. Piping shall be extended to a discharge location as shown on the drawings.
- 3.6 Conduct all flow and flow alarm tests as required by NFPA 13 and 14.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

END OF SECTION

## SECTION 22 05 01 BASIC PLUMBING REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 Special Note

- A. All provisions of the Bidding Requirements, General Conditions and Division 01 apply to work specified in this Division.

#### 1.2 Scope of Work - Plumbing

- A. The scope of the Plumbing work includes furnishing, installing, testing and warranty of all Plumbing work and complete plumbing systems shown on the Plumbing drawings and specified herein.

#### 1.3 Permits and Regulations

- A. Include payment of all permit and inspection fees applicable to the work in this Division. Furnish for the Owner certificates of approval from the governing inspection agencies, as a condition for final payment.
- B. Work must conform to applicable local, state and federal laws, ordinances and regulations. Where drawings or specifications exceed code requirements, the drawings and specifications shall govern. Install no work contrary to minimum legal standards.

#### 1.4 Inspection of Site

- A. Each bidder shall inspect the project site. Conditions shall be compared with information shown on the drawings. Report immediately to the Construction Manager any significant discrepancies which may be discovered. After the Contract is signed, no allowance will be made for failure to have made a thorough inspection.

#### 1.5 Drawings and Specifications

- A. The drawings indicate the general arrangement of the work and are to be followed insofar as possible. The word "provide", as used, shall mean "furnish and install". If significant deviations from the layout are necessitated by field conditions, detailed layouts of the proposed departures shall be submitted to the Construction Manager for approval before proceeding with the work.
- B. Make all necessary field measurements to insure correct fitting. Coordinate work with all other trades in such a manner as to cause a minimum of conflict or delay.
- C. The drawings and specifications shall be carefully studied during the course of bidding and construction. Any errors, omissions or discrepancies encountered shall be referred immediately to the Construction Manager for interpretation or correction, so that misunderstandings at a later date may be avoided. The Contract Drawings are not intended to show every vertical or horizontal offset which may be necessary to complete the systems. Having pipe and fittings

fabricated and delivered in advance of making actual measurements shall not be sufficient cause to avoid making offsets and minor changes as may be necessary to install piping and equipment.

- D. The Architect shall reserve the right to make minor adjustment in locations of system runs and components where considered desirable in the interest of concealing work or presenting a better appearance where exposed. Any such changes shall be anticipated and requested sufficiently in advance as to not cause extra work, or unduly delay the work. Coordinate work in advance with all other trades and report immediately any difficulties which can be anticipated.
- E. Equipment or piping shall not be installed in the dedicated electrical space above or in the working space required around electrical switchgear, motor control centers or panelboards as identified by National Electric Code (NEC) 110.16 Spaces About Electrical Equipment 600 Volts Nominal or Less. For equipment rated over 600 Volts Nominal – 110.32 Work Space Above Equipment – 110-33 Entrance and Access to Work Space – 110.34 Work Space and Guarding.
- F. Where any system runs and components are so placed as to cause or contribute to a conflict, it shall be readjusted at the expense of the contractor causing such conflict. The Architect's decision shall be final in regard to the arrangement of equipment, piping, etc., where conflict arises.
- G. Provide offsets in system runs, additional fittings, necessary drains and minor valves, traps and devices required to complete the installation, or for the proper operation of the system. The Contractor shall exercise due and particular caution to determine that all parts of the work are made quickly and easily accessible.
- H. Should overlap of work among the trades become evident, this shall be called to the attention of the Construction Manager. In such event, none of the trades or their suppliers shall assume that they are relieved of the work which is specified under their branch until instructions in writing are received from the Construction Manager.

#### 1.6 Coordination Drawings

- A. The Contractor shall initially prepare and be responsible for 0.25" scale coordination drawings. These drawings shall be produced using a computer aided drafting software of a mutually agreed upon format and distributed to the Plumbing, HVAC and Electrical Contractors for their input and revisions. Assure that all Contractors work together to obtain finish coordinated drawings with no work being installed until all Contractors have approved and signed-off with their approval and drawings have been submitted and reviewed by the Architect and Engineer.

#### 1.7 Inspection

- A. All work shall be subject to inspection of Federal, State and local agencies as may be appropriate, and of the Construction Manager and Architect.

- B. Final inspection certificates shall be obtained by the Contractor and given to the Construction Manager and Owner.

#### 1.8 Record Drawings

- A. The Contractor shall maintain a separate set of prints of the Contract Documents and shall show all changes or variations, in a manner to be clearly discernible, which are made during construction. Upon completion of the work, these drawings shall be turned over to the Construction Manager.

#### 1.9 Operating and Maintenance Manuals

- A. Three copies each of operating and maintenance manuals shall be assembled for Plumbing work by the Contractor.
- B. All shop drawings and installation, maintenance and operating instruction pamphlets or brochures, wiring diagrams, parts list and other information, along with warranties, shall be obtained from each manufacturer of the principal items of equipment. Pipe pressure test reports, domestic water disinfection certificate of completion and bacteriological analysis results shall also be included. In addition, the Contractor shall prepare a chart listing all items of equipment which are furnished under this Contract and indicating the nature of maintenance required, the recommended frequency of checking these points and the type of lubricating media or replacement material required.
- C. These shall be assembled into three-ring loose leaf binders or other appropriate binding. An index and tabbed sheets to separate the sections shall be included. These shall be submitted to the Construction Manager for review. Upon approval, manuals shall be turned over to the Owner.

#### 1.10 Final Inspection and Punch List

- A. As the time of work completion approaches, the Contractor shall survey and inspect the work and develop their own punch list to confirm that it is complete and finished. Then notify the Construction Manager and request that a final inspection be made. It shall not be considered the Engineer's or Architect's obligation to perform a final inspection until the Contractor has inspected the work and so states at the time of the request for the final inspection.
- B. Requests to the Construction Manager for final inspection may be accompanied by a limited list of known deficiencies in completion, with appropriate explanation and schedule for completing these; this is in the interest of expediting acceptance for beneficial occupancy.
- C. The Construction Manager will inspect the work and prepare a punch list of items requiring correction, completion or verification. Corrective action shall be taken by the Contractor to the satisfaction of Construction Manager within 30 days of receipt of the Construction Manager's punch list.

### 1.11 Warranty

- A. This Contractor shall warrant all workmanship, equipment and material entering into this Contract for a period of one year from date of final acceptance or date of beneficial use, as agreed to between Contractor and Construction Manager. Any materials or equipment proving to be defective during this warranty period shall be made good by this Contractor without expense to the Owner.
- B. This provision is intended specifically to cover deficiencies in Contract completion or performance which are discovered after systems are placed in operation.
- C. This provision shall not be construed to include maintenance items such as re-tightening or repacking glands, greasing, oiling, belt tightening and cleaning strainers after these have been done for final close-out.
- D. Provisions of this warranty shall be considered supplementary to warranty provisions under General Conditions.

## PART 2 - PRODUCTS

### 2.1 Materials and Equipment

- A. Materials and equipment furnished under this Contract shall be in strict accordance with the specifications and drawings and shall be new and of best grade and quality. When two or more articles of the same material or equipment are required, they shall be of the same manufacturer.

### 2.2 Reference Standards

- A. Where standards (NFPA, NEC, ASTM, UL, etc.) are referenced in the specifications or on the drawings, the latest edition is to be used except, however, where the authority having jurisdiction has not yet adopted the latest edition, the edition so recognized shall be used.

### 2.3 Equipment Selection

- A. The selection of materials and equipment to be furnished under this contract shall be governed by the following:
  - 1) Where trade names, brands, or manufacturers of equipment or materials are listed in the specification, the exact equipment listed shall be furnished. Where more than one name is used, the Contractor shall have the option of selecting between any one of the several specified. All products shall be first quality line of manufacturer's listed.
  - 2) Where the words "or approved equal" appear after a manufacturer's name, specific approval must be obtained from the Construction Manager during the bidding period in sufficient time to be included in an addendum. The same shall apply for equipment and materials not named in the specifications, where approval is sought.

- 3) Where the words "equal to" appear, followed by a manufacturer's name and sometimes a model or series designation, such designation is intended to establish quality level and standard features. Approval of equal equipment by other manufacturers must be obtained per paragraph 2.3.A.2 above.
- B. Before bidding equipment, and again in the preparation of shop drawings, the Contractor and their supplier shall verify that adequate space is available for entry and installation of the item of equipment, including associated piping and accessories. Also verify that adequate space is available for servicing of the equipment.
- C. If extensive changes in pipe or equipment layout, or electrical wiring and equipment are brought about by the use of equipment which is not compatible with the layout shown on the drawings, necessary changes shall be deemed to be included in the Contract.

#### 2.4 Shop Drawings

- A. Electronic copies of shop drawings and descriptive information shall be assembled by the Contractor of equipment and materials furnished in their Contract, and submitted to the Construction Manager for review as stated in the General Conditions. These shall be submitted as soon as practicable and before equipment is installed and before special equipment is manufactured. Submittal information shall clearly identify the manufacturer, specific model number, approval labels, performance data, electrical characteristics, features, specified options and additional information sufficient to evidence compliance with the Contract Documents. Shop drawings for equipment, fixtures, devices and materials shall be labeled and identified same as on the Contract Documents. If compliance with the above criteria is not provided shop drawings will be subject to rejection and returned without review.
- B. The review of shop drawings by the Construction Manager, Architect or Engineer shall not relieve the Contractor from responsibility for errors in the shop drawings. Deviations from specifications and drawing requirements shall be called to the Architect's and Engineer's attention in a separate clearly stated notification at the time of submittal for the Architect's and Engineer's review.
- C. Shop drawings and product data of the following Plumbing equipment and materials shall be submitted:
  - 1) Pipe, fittings and joining methods for the various systems.
  - 2) Pipe hangers and saddles.
  - 3) Expansion Loops.
  - 4) Sleeves.
  - 5) Firestopping.
  - 6) Labels, Markings and Tags.
  - 7) Valves.
  - 8) Supply system specialties, including hose bibbs.
  - 9) Drainage system specialties.
  - 10) Plumbing Pumps



## PART 3 – EXECUTION

### 3.1 Pipe Testing

- A. All piping provided in this work shall be pressure tested, as specified below.
- B. Pipe testing for Plumbing piping shall be:
  - 1) Domestic cold water piping - hydrostatic at 125 psig or 1.50 times the maximum operation pressure of the system, whichever is higher, for 6 hours at the low point of the system.
  - 2) Soil, waste and vent piping and storm piping - rough test and final test, in conformance to Plumbing Code requirements.
- C. Testing shall be performed prior to application of insulation. Insure that air is vented from piping when piping is hydrostatically tested.
- D. Tests shall be witnessed by field representatives of the Construction Manager or Architect or shall be monitored by a recorder. Furnish a written record of each piping system test indicating date, system, pressure, duration and results of tests. Copies of test reports shall be included in the O&M manuals.
- E. Leaks discovered during testing shall not be patched. Threaded connections shall be either tightened or replaced. Small leaks in welded pipe may be chipped and rewelded.

### 3.2 Pipe Cleaning

- A. Before placing each water piping system in operation, the piping system shall be thoroughly flushed out with clean water. Remove, clean and replace all strainer screens once flushing is complete. On domestic water systems, remove, clean and replace all fixture mounted strainer screens and faucet aerators after fixtures are set and connected piping is flushed thru the fixtures.
- B. Refer to appropriate Sections for cleaning of other piping for normal operation.

### 3.3 Disinfection of Piping

- A. All new and any existing domestic water piping out of service more than 30 days shall be disinfected by a company or personnel regularly engaged in the performance of this service.
- B. Keep new piping isolated from the service piping until after disinfection is completed and proven acceptable by bacteriological test results. Provide a service cock at the point of connection for injection of the disinfecting agent. If it is necessary to use a potable water supply in the performance of the disinfection procedures, provide temporary reduced pressure zone back flow prevention until disinfection and analysis results are complete.

- C. Thoroughly flush the system, as previously described, prior to disinfection. Disinfection shall be performed in accordance with AWWA C651 Standards. Disinfection shall be by means of a chlorine solution injected into the water system near the source. Each outlet shall be tested to prove presence of minimum chlorine concentration. Document that adequate levels of chlorine are present in each pipe section. Following the appropriate retention period, flush out the system with clean water until the residual free chlorine content is equal to the level of the incoming water, but not greater than 1.5 parts per million or until approved by the Health Department.
- D. Perform a bacteriological analysis of the potable water system. One test sample shall be collected from the end of the main and one from each branch. Provide certification stating the name of the lab performing the testing, the job name, the date of the sample and results of the testing.
- E. Disinfection procedures shall be witnessed or approved by the Construction Manager, Architect or other qualified representative, who shall present the Contractor with a letter or certificate of completion.

#### 3.4 Operation and Adjustment of Equipment

- A. As each piping system is put into operation, all items of equipment included therein shall be adjusted to proper working order. This shall include balancing water systems, tightening packing glands, and adjusting all operating equipment.
- B. Test relief valves, air vents and regulating valves to insure proper operation.

#### 3.5 Operating Demonstration and Instructions

- A. The Contractor shall set the various systems into operation and demonstrate to the Construction Manager that the systems function properly and that the requirements of the Contract are fulfilled.
- B. The Contractor shall provide the Owner's representatives with detailed explanations of operation and maintenance of equipment and systems. A thorough review of the operating and maintenance manuals shall be included in these instructional meetings.
- C. O&M manuals shall be submitted, reviewed and approved prior to scheduling of demonstrations.

END OF SECTION

SECTION 22 05 02 AGREEMENT AND WAIVER FOR USE OF ELECTRONIC FILES

PART 1 - GENERAL

- 1.1 The Engineer, at his sole discretion and without obligation, makes graphic portions of the contract documents available for use by the contractor in electronic format. These electronic files are proprietary, and remain the Engineer's Instruments of Service and shall be for use solely with respect to this project, as provided in the Standard Form of Agreement between Owner/Architect and Engineer.
- 1.2 Electronic files shall be released only after bids have been received for the project and contracts have been signed with the contractors.
- 1.3 The contractor shall acknowledge receipt of electronic files in the requested format for this project. The electronic files are provided as a convenience to the User, for use in preparing shop drawings and/or coordination drawings related to the construction of only the project identified in the Agreement. The electronic files and the information contained within are the property of the Engineer and/or the Architect and/or the Owner, and may not be reproduced or used in any format except in conjunction with the project identified in the Agreement.
- 1.4 The User acknowledges that the information provided in the electronic files is not a substitution or replacement for the Contract Documents and does not become a Contract Document. The User acknowledges that neither the Engineer, the Architect, the Consultants, the Client or the Owner make any warrant or representation that the information contained in the electronic files reflect the Contract Documents in their entirety. The User assumes full responsibility in the use of the electronic files, including the responsibility to see that all manual modifications, addenda, bulletins, clarifications and Change Orders to the drawings executed as a part of the Contract Documents have been incorporated.
- 1.5 The User acknowledges that the receipt of electronic files in no way relieves the User from the responsibility for the preparation of shop drawings or other schedules as set forth in the Contract between the Contractor and the Owner.
- 1.6 Electronic files are available in a .DWG or .RVT format for a cost as indicated in the Agreement and Waiver Form. **Providing the documents in a .DWG version that differs from the product version that the .DWG files were initially created in will incur additional charges per sheet, as indicated in the Agreement and Waiver Form.** Charges are for the Engineer's time to prepare the documents in the format stated. They are available through the Engineer's office on a C.O.D. basis only. A sample of the format will be provided by the Engineer upon request by the contractor, for the purpose of testing the compatibility of the format to the contractor's systems.
- 1.7 All drawings will be in an AutoCAD file format, when requested to be .DWG format.
- 1.8 All project models will be furnished without views.
- 1.9 All electronic files shall be stripped of the Project's name and address, the Architect's / and / Engineer's / and / any consultant's name and address, and any professional licenses indicated on the contract documents, (and all dimensions, verbiage, and

statistical information). Use of these electronic files is solely at the contractor's risk, and shall in no way alter the contractor's Contract for Construction.

- 1.10 The User agrees to indemnify, hold harmless and defend the Engineer, the Architect, the Consultants, the Owner, the Client and any of their agents from any litigation resulting from the use of (by any means of reproduction or electronic media) these files. The Engineer makes no representation regarding fitness for any particular purpose, or suitability for use with any software or hardware, and shall not be responsible or liable for errors, defects, inexactitudes, or anomalies in the data, information, or documents (including drawings and specifications) caused by the Engineer's or its consultant's computer software or hardware defects or errors; the Engineer's or its consultant's electronic or disk transmittal of data, information or documents; or the Engineer's or its consultant's reformatting or automated conversion of data, information or documents electronically or disk transmitted from the Engineer's consultants to the Engineer.
- 1.11 The contractor waives all claims against the Engineer, its employees, officers and consultants for any and all damages, losses, or expenses the contractor incurs from such defects or errors in the electronic files. Furthermore, the contractor shall indemnify, defend, and hold harmless the Engineer, and its consultants together with their respective employees and officers, harmless from and against any claims, suits, demands, causes of action, losses, damages or expenses (including all attorney's fees and litigation expenses) attributed to errors or defects in data, information or documents, including drawings and specifications, resulting from the contractor's distribution of electronic files to other contractors, persons, or entities.

## PART 2 - PRODUCTS – NOT USED

## PART 3 - EXECUTION

- 3.1 Attached "Agreement" shall be submitted with accompanying payment to the Engineer prior to delivery of electronic files.

END OF SECTION



**ELECTRONIC FILES  
HEAPY RELEASE FORM TO CONTRACTORS**

**Project:** Banks Lot 28, BP#2  
Cincinnati, Ohio

**Owner:** Hamilton County

**Heapy Engineering Project Number:** 2021-07091

**Heapy Engineering Project Manager:** Dave Madden

The Provider, named below, will furnish the Recipient, named below, certain documents prepared by the Provider or its sub consultants in an electronic format. These documents are hereinafter collectively referred to as "Electronic Files". The Electronic Files are instruments of the Provider services performed solely for the Owner's benefit and to be used solely for this Project. The Provider does not represent that the information contained in the Electronic Files are suitable for use on any other project or for any other purpose. If the Electronic Files are used for any other project or purpose without the Provider's specific written permission, the risk of such use shall be assumed solely by the Recipient or other user.

**Prior to the use of the Electronic Files the Provider and the Recipient agree to the following terms and conditions:**

1. The Provider and Recipient fully understand that the data contained in these electronic files are part of the Provider's Instruments of Service. The Provider shall be deemed the author of the drawings and data, and shall retain all common law, statutory law and other rights, including copyrights.
2. The Recipient confirms their request to the Provider for Electronic Files for the Project listed above, which the Recipient understands are to be provided only in accordance with, and conditioned upon, the terms and conditions of the Agreement and Waiver for Use of Electronic Files).
3. The Provider agrees that the Recipient may use the Electronic Files for the sole purpose of preparing shop drawings and/or coordination drawings for the above Project only. Any Electronic Files provided are strictly for the use of the Recipient in regard to the Project named above, and shall not be utilized for any other purpose or provided by the Recipient to any entity other than its subcontractors for the Project named above.
4. The Recipient acknowledges that the furnishing of Electronic Files in no way relieves the Recipient from the responsibility of shop drawings or other schedules as set forth in the Contract between the Contractor and the Owner.
5. The Recipient acknowledges:
  - a. That the Electronic Files do not contain all of the information of the Bid Documents or Contract Documents for the construction of the Project above.

- b. That information in the Bid Documents or Contract Documents may be revised or modified in the future.
  - c. The Provider does not have, and will not have, any duty or obligation to advise or give notice to the Recipient of any such revisions or modifications.
  - d. That the Recipient agrees that its use of the Electronic Files is at the Recipient's sole risk of liability, and that the Recipient shall make no claim or demand of any kind against the Provider arising out of Recipient's receipt or use of the Electronic Files.
6. The Provider makes no representation or warranty of any kind, express or implied, with respect to the Electronic Files and specifically makes no warranty that the Electronic Files shall be merchantable or fit for any particular purpose, or accurate or complete. Furthermore, any description of said Electronic Files shall not be deemed to create an implied or express warranty that such Electronic Files shall conform to said description.
7. Due to the unsecured nature of the Electronic Files and the inability of the Provider or the Recipient to establish controls over their use, the Provider assumes no responsibility for any consequences arising out of the use of the data. It is the sole responsibility of the Recipient to check the validity of all information contained within the Electronic Files. The Recipient shall at all times refer to the Construction Documents of the project during all phases of the project. The Recipient shall assume all risks and liabilities resulting from the use of this data, and the Recipient agree(s) to waive any and all claims and liability against the Provider and its sub consultants resulting in any way from the use of the Electronic Files.
8. Electronic Files are provided strictly as a courtesy by the Provider solely for the convenience of the Recipient, and are not part of the Bid Documents or Contract Documents for the Project. The Electronic Files do not replace or supplement the paper copies of any drawings, specifications, or other documents included in the Contract Documents for use on the project.
  - a. The Recipient assumes full responsibility in the use of Electronic Files, including the responsibility to see that all manual modifications, addenda, bulletins, clarifications and Change Orders to the drawings executed as a part of the Contract Documents have been incorporated.
9. As stated herein, the possibility exists that the Electronic Files provided may differ from the Bid Documents or Contract Documents for construction of the Project. The Provider shall not be responsible, nor be held responsible, for differences between Electronic Files, the Bid Documents, and Contract Documents. The Bid Documents or Contract Documents for the Project may be modified by the Provider at any time, either before or after construction begins. The Provider has no responsibility, either before or after any such modification, to determine or to advise the Recipient whether any such modification causes Electronic Files provided to the Recipient to be out of date, inconsistent with the Bid Documents or Contract Documents, or otherwise unsuitable or unfit for use in any way.
10. The Recipient assumes all risk and liability for any losses, damages, claims, or expenses (including defense and attorney fees) resulting from its receipt, use, or possession of Electronic Files furnished by the Provider. The Provider makes no representation, warranty or guarantee that the Electronic Files:
  - a. Are suitable for any other usage or purpose.

- b. Have any particular durability.
  - c. Will not damage or impair the Recipient's computer or software.
  - d. Contain no errors or mechanical flaws or other discrepancies that may render them unsuitable for the purpose intended by the Recipient.
11. Recipient agrees to indemnify, defend and hold harmless the Provider, agents, employees, and the Owner from, and against, any and all claims, suits, losses, damages or costs, of any kind or nature, including attorney's fees, arising from or by reason of the Recipient's use of Electronic Files provided by the Provider, and such defense and indemnification obligation duties shall survive any use under this Agreement and Waiver for Use of Electronic Files.
12. The Recipient agrees that the Provider shall have no responsibility whatsoever for problems of any nature arising from transmitting and storing electronic files at a Recipient requested FTP or project management site or the conversion of the Electronic Files by the Recipient or others for use in non-native applications. The Provider will not provide Electronic Files in compressed formats. Recipient agrees to accept the files in the format provided by the Provider, and that Recipient's conversion or electronic file storage at the Recipient's requested site, shall be at Recipient's sole risk.
13. Recipient acknowledges:
- a. That the Electronic Files provided by the Provider are a graphical representation of the building in order to generate two-dimensional industry standard drawings.
  - b. That the data contained in the Electronic Files may not be 100% accurate and should not be used for dimensional control, building layout, shop drawings, or any other similar purpose
  - c. That any schedule of materials produced directly from the Electronic Files has not been checked for accuracy.
  - d. That the information in the Electronic Files should be used only for comparative purposes and shall not be relied upon for accurate quantity estimates or used in establishing pricing.
14. Electronic Files provided by the Provider will only contain elements and content that the Provider deems necessary and appropriate to share. No specific Level of Development (LOD) is implied or expected. The Recipient agrees that no proprietary content, MvParts or Revit Families or any other AutoCAD MEP or Revit MEP content shall be removed from the model and/or used for any other purpose but to support this specific project.
15. The Provider, at its sole discretion, may modify the Electronic files before they are provided to the Recipient. Such modifications may include, but are not necessarily limited to, removal of certain information. The Provider, at its sole discretion, may refuse to provide some or all Electronic Files requested by Recipient.
16. The availability of Electronic Files that were not prepared by the Provider is subject to the consent of the Owner or consultant that prepared those Electronic Files. The Provider will not negotiate with the Owner or consultant or repeatedly solicit the Owner or consultant to obtain

such consent. Neither this Agreement and Waiver for Use of Electronic Files nor any such separate Consultant's consent may be assigned or transferred by Recipient to any other person or entity.

Provider (Name of Company): \_\_\_\_\_

Recipient (Name of Company): \_\_\_\_\_

Recipient Address: \_\_\_\_\_

Name of authorized Recipient Representative: \_\_\_\_\_

Title of authorized Recipient Representative: \_\_\_\_\_

E-mail address of authorized Recipient Representative: \_\_\_\_\_

Signature of authorized Recipient Representative: \_\_\_\_\_

Date: \_\_\_\_\_

NOTE: Select requested Electronic File Format, File Transfer Medium and complete applicable Cost Summary.

**A. Electronic File Format (select one):**

1.  .DWG Format - List of Drawings Requested: \_\_\_\_\_

2.  Revit Project Model Requested (Model only, no Views included)

**B. File Transfer Medium (select one):**

CD-ROM     DVD-ROM     Heapy FTP     User's FTP site     Flash Drive

**C. Delivery of Electronic Files Cost Summary:**

Available Electronic .DWG file format:

2018 DWG

If a different file version is required than the indicated available version state the requested version:

\_\_\_\_\_ .DWG



## SECTION 22 05 04 BASIC PLUMBING MATERIALS AND METHODS

### PART 1 - GENERAL

#### 1.1 Construction Water

- A. Refer to Division 01, for information regarding construction water.
- B. Cost of water use for construction is not included in Division 22.
- C. Remove construction water meter and piping when no longer required.

#### 1.2 Continuity of Services

- A. Work shall be so planned and executed as to provide reasonably continuous service of existing systems throughout the construction period. Where necessary to disrupt services for short periods of time for connection, alteration or switch-over, the Construction Manager and Owner shall be notified in advance and outages scheduled at the Owner's reasonable convenience.
- B. Submit, on request, a written step-by-step sequence of operations proposed to accomplish the work. The outline must include tentative dates, times of day for disruption, downtime and restoration of services. Submit the outline sufficiently in advance of the proposed work to allow the Architect or Engineer to review the information with the Construction Manager and Owner. Upon approval, final planning and the work shall be done in close coordination with the Construction Manager and Owner.
- C. Shutdown of systems and work undertaken during shutdown shall be bid as being done outside of normal working hours.

#### 1.3 Sleeve Placement Coordination Drawings

- A. Prepare coordination drawings showing size, type, location and material of plumbing sleeves. Refer to Division 01 and section 22 05 07 for additional information.
- B. Submit coordination drawings in accordance with Division 01 requirements, at least 14 calendar days before the first scheduled concrete pour.

### PART 2 – PRODUCTS – NOT APPLICABLE

### PART 3 - EXECUTION

#### 3.1 Workmanship

- A. Materials and equipment shall be installed and supported in a first-class and workmanlike manner by mechanics skilled in their particular trades.

Workmanship shall be first-class in all respects, and the Architect shall have the right to stop the work if highest quality workmanship is not maintained.

- B. Plumbing work shall be performed by licensed Plumbing Contractors in accordance with requirements of the jurisdiction.

### 3.2 Protection

- A. Each Contractor shall be entirely responsible for all material and equipment furnished in connection with their work. Special care shall be taken to properly protect all parts thereof from theft, damage or deterioration during the entire construction period in such a manner as may be necessary, or as directed by the Construction Manager.

### 3.3 Cutting and Patching

- A. Refer to Division 01 - General Requirements for information regarding cutting and patching.
- B. Plan the work well ahead of the general construction. Where pipes are to pass through walls, partitions, floors or ceilings, place sleeves in these elements or arrange with the Construction Manager to provide openings where sleeves are not practical. Where sleeves or openings have not been installed, cut holes and patch as required for the installation of this work, or pay other trades for doing this work when so directed by the Architect. Any damage caused to the building in this work shall be repaired or rectified. Contractor shall coordinate the location of sleeves provided under previous bid package.
- C. All sleeves and openings not used or partially used shall be closed to prevent passage of smoke and fire.

### 3.4 Painting

- A. Coordinate with Construction Manager for extent of painting required.
- B. Refer to Division 09 – Finishes for methods to be utilized.

END OF SECTION

## SECTION 22 05 05 FIRESTOPPING

### PART 1 - GENERAL

- 1.1 Firestopping assemblies shall be provided at penetrations of piping thru fire rated floors, fire rated floor-ceiling and roof ceiling assemblies, fire rated walls and partitions and fire rated shaft walls and partitions. In addition, firestopping assemblies shall be provided at penetrations thru 0-hour rated floors. Refer to the drawings for fire rated building elements and pipe layouts.
- 1.2 Firestopping assemblies shall be tested and rated in accordance with ASTM E814 and E119 and listed in accordance with UL 1479, as published in the UL Fire Resistance Directory. Firestopping shall provide a fire rating equal to that of the construction being penetrated.
- 1.3 Firestopping materials, assemblies and installation shall conform to requirements of the OBC and the authority having jurisdiction.
- 1.4 For those firestopping applications that exist for which no UL tested system is available through any manufacturer, a manufacturer's engineering judgment derived from similar UL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgment drawings must follow requirements set forth by the International Firestop Council.
- 1.5 Shop drawings shall be prepared and submitted for review and approval. Submittals shall include manufacturer's specifications and technical data of each material, documentation of UL firestopping assemblies and installation instructions. Submittals shall include all information required in the OBC / Chapter 1, Section 106 and Chapter 7, Section 712.

### PART 2 - PRODUCTS

- 2.1 Firestopping materials shall be manufactured and/or supplied by Hilti, 3M, Tremco, Specified Technologies, or engineer approved equal.
- 2.2 Materials shall be in the form of caulk, putty, sealant, intumescent material, wrap strip, fire blocking, ceramic wool and other materials required for the UL listed assemblies. These shall be installed in conjunction with sleeves and materials for fill and damming.
- 2.3 Combination pre-set floor sleeve and firestopping assemblies shall be equal to Hilti CP 680, Metacaulk 66590 Series or engineer approved equal.

### PART 3 - EXECUTION

- 3.1 Installation of all materials and assemblies shall be in accordance with UL assembly drawings and the manufacturer's instructions.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- 3.2 Installation shall be done by an experienced installer who is certified, licensed or otherwise qualified by the firestopping manufacturer as having the necessary training and experience.
- 3.3 Refer to Section 22 05 07 Piping Materials and Methods for Plumbing for pipe sleeve requirements and treatment of penetrations not requiring firestopping.

END OF SECTION

## SECTION 22 05 07 PIPING MATERIALS AND METHODS

### PART 1 - GENERAL

- 1.1 Piping materials and methods for piping common to Division 22 Plumbing shall be as specified herein and as shown on the drawings.
- 1.2 Included in this Section are:
  - A. Pipe, fittings and joining methods.
  - B. Unions and flanges.
  - C. Dielectric connectors.
  - D. Pipe sleeves, openings, curbing and escutcheons.
  - E. Installation methods of piping.
- 1.3 Refer to other Sections in Division 22 for selection of piping materials for the various services. Piping materials and installation methods peculiar to certain individual systems are specified in Sections related to those systems. Refer also to firestopping requirements in Division 07.
- 1.4 Refer to Section 22 05 05 Firestopping and Division 07 for firestopping requirements.
- 1.5 Brazing procedures shall be per ANSI B31.5 and the ASTM boiler and Pressure Vessel Code SFA-5.8 Section II.
- 1.6 Soldering procedures per ANSI B16.18.
- 1.7 Pipe sleeves, floor and wall openings, water protective curbing and escutcheon plates shall be provided as described below. Pipe sleeves shall be placed in all floor slabs, poured concrete roof decks, walls and partitions, except as noted below, to allow new piping to pass thru and to allow for expansion, contraction and normal movement of the pipe. Refer to Section 22 05 04 Basic Plumbing Materials and Methods, Article 1.3, for sleeve placement coordination drawings.
- 1.8 Sleeves are not required:
  - A. In floor slabs on grade.
  - B. In core drilled openings in solid concrete not requiring water protection. Sleeves are required at concrete block walls, to facilitate containment of required firestopping material.
  - C. In large floor openings for multiple pipe risers which are within a fire rated shaft, unless the opening is to be closed off with concrete or other material after pipes are set.

- 1.9 Where pipes penetrate walls and floors other than those required to be fire rated, the annular space between the sleeve, core drilling or opening and the pipe or pipe insulation shall be closed to retard the passage of smoke.

## PART 2 - PRODUCTS

- 2.1 Copper tubing, conforming to ASTM B88, Standard Specification for Seamless Copper Water Tube and Fittings and Joints, shall be:
- A. Type C1  
Pipe - Type "L" seamless hard drawn copper tubing.  
Fittings - wrought copper or cast bronze, solder ends.  
Joints - soldered with lead-free tin alloy, 95-5 tin-antimony or silver-bearing tin in accordance with methods of ASTM B828 and equal to Harris "Stay-Brite", "Stay-Brite 8" or "Bridgit", or engineer approved equal. Solder shall meet ASTM B32.
  - B. Type C2  
Pipe - Type "L" seamless hard drawn copper tubing.  
Fittings - wrought copper or cast bronze, solder ends.  
Joints - brazed with 15% silver brazing alloy equal to Harris "Stay-Silv 15", Harris "Dynaflow", or engineer approved equal. Brazing filler shall meet AWS A5.8.
- 2.2 Unions and flanges shall be:
- A. Unions on copper tubing, all bronze construction 150 lb., solder ends.
- 2.3 A dielectric connector shall be incorporated at each connection between ferrous and non-ferrous piping. Connectors shall be:
- A. Dielectric coupling with non-conductive polymer liner, Victaulic Style 47, Gruvlok "Di-Lok", Lochinvar Corp. "V-Line", or engineer approved equal, dielectric fitting on services 200 degrees and less, and pressures less than 300 psi.
  - B. Dielectric flange with non-metallic bolt hole grommets and gasket.
- 2.4 Pipe sleeves shall be:
- A. All other sleeves: Schedule 40 PVC, Type 1, ASTM D-2466, **color gray**.

## PART 3 - EXECUTION

- 3.1 Pipe and tubing shall be cut and fabricated to field measurements and run parallel to normal building lines. Pipe ends shall be cut square and ends reamed to remove burrs. The pipe interior shall be cleaned of foreign matter before erection of the pipe.
- 3.2 Piping shall be pitched for drainage. The low points shall be fitted with a 0.75" drain valve (with hose thread adapter if not piped to a floor drain) except that on piping 1.25" and smaller where a drain valve is not shown, a drain plug is acceptable.

- 3.3 Piping shall be installed consistent with good piping practice, run concealed wherever possible and located as to be protected from damage by freezing. Coordinate with other trades to attain a workmanlike installation.
- 3.4 Internals of sweat end valves shall be removed when damage or warping could occur due to applied heat of soldering. Where silver brazing is specified, solder connection of valves shall be used to reduce the danger of damage.
- 3.5 Close open ends of piping during installation to keep interior of the pipe clean.
- 3.6 Piping shall not be run above electrical switchgear or panelboards, nor above the access space in the immediate vicinity of the equipment, in accordance with the N.E.C.
- 3.7 Unions and flanges shall be installed as required for erection purposes. A union shall be installed at each threaded shut-off valve on the side of the valve for which shut-off service is intended.
- 3.8 Refer to 22 05 05 Firestopping. Pipe sleeves which are a part of firestopping assemblies shall conform to the requirements of the assembly with particular emphasis regarding size, annular space, length, passage or non-passage of insulation and the installation of the sleeves.
- 3.9 Pipe sleeves shall be placed and coordinated in the initial stages of construction before concrete, masonry and other general construction activity. Means shall be taken to assure that the sleeve will not move during or after construction. Beams, columns and other structural members unless noted otherwise shall not be sleeved except upon approval of the Architect.
- 3.10 Length of wall sleeves shall be such that the sleeve ends are substantially flush with both sides of the wall or partition. Floor sleeves shall be flush with the bottom and top of the floor slab except, in mechanical rooms and other areas which might have water on the floor, sleeves shall project a minimum of 1" above finished floor. Refer to sleeve schedule on drawings for required sleeve sizes.
- 3.11 In lieu of firestopping and where permitted by the OBC, uninsulated metallic pipes requiring no pipe sleeves in passing thru concrete floors or concrete or masonry walls or partitions, the annular space shall be closed full depth of the penetration with materials and methods compatible with the floor, wall or partition material (concrete, grout or mortar).
- 3.12 Where firestopping is not required, the annular space between the sleeve, core drilling or opening and the pipe or pipe insulation shall be closed with caulking to retard the passage of smoke.

END OF SECTION

## SECTION 22 05 17 EXPANSION LOOPS FOR PLUMBING PIPING SYSTEMS

### PART 1 – GENERAL

- 1.1 System Description: Domestic water pipe expansion loops with flexible metal hose sections shall be provided to accommodate building expansion and contraction. Pipe anchors and pipe alignment guides shall be provided in conjunction with expansion loops. Pipe alignment guides shall be provided in conjunction with flexible “V” connectors.

### PART 2 - PRODUCTS

- 2.1 Pipe expansion loops shall consist of two sections of flexible metallic pipe, connected by a 180° return bend or two 90° elbows with an intervening rigid or flexible pipe section, and 90° elbows with flanged or copper sweat ends, for connections to the piping main. Flexible metallic pipe shall be constructed of seamless corrugated inner tubing of Type 321 stainless steel or tin-bronze with woven wire braid outer jacket of the same alloy. Working pressure for stainless steel shall be 150 psi at 350 degrees and for tin-bronze 100 psi. Expansion loops shall be Metraflex “Metraloop” Flex-Hose, “Tri-Flex Loop”, Engineered Flexible Products, Mason, or Engineer approved equal.
- 2.2 Flexible “V” connectors shall consist of two sections of flexible metallic pipe, connected by a 90° return bend with integral drain port, and 45° elbows with flanged or copper sweat ends, for connection to the piping main. Flexible metallic pipe shall be constructed of seamless corrugated inner tubing of Type 321 stainless steel or tin-bronze with woven wire braid outer jacket of the same alloy. Working pressure for stainless steel shall be 150 psi at 350 degrees and for tin-bronze 100 psi. “V” connectors shall be manufactured by Metraflex, Mason, Twin City Hose, Engineered Flexible Products, or engineer approved equal.
- 2.3 Expansion loops and “V” connectors in piping crossing building expansion joints shall have flexible sections in all segments of the loop.
- 2.4 Alignment guides shall consist of a guide spider to be clamped to the pipe and a guide body with support attachment means. Guides on cold services shall have an integral thermal barrier. Bracing steel and attachments, cables, concrete inserts and other attachments to the structure shall be sized for the required stress loads.

### PART 3 – EXECUTION

- 3.1 Expansion loops and “V” connectors shall be installed in accordance with manufacturer’s instructions.
- 3.2 Pipe anchors shall be provided in conjunction with expansion loops. Anchor assemblies and attachment to the building structure shall be designed to overcome resistive and frictional forces of the loops and joints.
- 3.3 Pipe guides shall be placed on each side of the expansion loop or “v” connector, attached to the building structure. Number and spacing shall be in accordance with manufacturer’s instructions.



The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- 3.4 Expansion loops shall be supported from the structure at the 180° return bend or at the intervening section where a return bend is not incorporated. Provide a 0.25” ball valve for drain or air venting where the loop is not installed in the horizontal plane.

END OF SECTION

## SECTION 22 05 23 GENERAL DUTY VALVES FOR PLUMBING PIPING

### PART 1 - GENERAL

- 1.1 Refer to Section 22 11 16 Interior Domestic Water Piping and Section 22 11 19 Interior Domestic Water Piping Specialties for selection of valves for the various services. Valves peculiar to individual systems are referenced or specified in Sections related to those systems.
- 1.2 Valves and materials shall comply with applicable standards and specification of ANSI, ASTM, ASME and MSS. Working pressure and temperature ratings of each valve shall exceed those imposed by the service in which it is applied.
  - A. ASTM B584 and ASTM B61 Copper Alloy Sand Casting for General Applications.
  - B. MSS SP-80 Bronze Gate, Globe and Check Valves.
  - C. ASME B16.34, MSS SP-110 Ball Valves Threaded, Socket-Welded, Solder Joint, Grooved and Flared Ends.
  - D. Bronze valves made with copper alloy (brass) containing more than 15% zinc are not permitted.
- 1.3 All piping, fittings, valves, solders, fluxes, seals, fixtures, appurtenances and other equipment in which wetted parts are in contact with water, installed in public drinking water systems and plumbing systems providing potable and/or drinking water for human consumption shall conform to the "Lead Free" requirements of NSF 61 Annex G and NSF/ANSI 372.

### PART 2 - PRODUCTS

- 2.1 Valves installed in potable and drinking water systems shall be:
  - A. Ball Valves - Nibco, Grinnell, Apollo, Stockham, Milwaukee, Hammond, Watts, Kitz, Crane, Marwin, or engineer approved equal.
    - 1) Type B1. 2" and smaller.  
Nibco T-585-70, 150 w.s.p., two-piece bronze body, ASTM B584, screwed ends, chrome plated full bronze ball and bronze stem, TFE seat and seal, handle.
- 2.2 Valves installed in non-potable and non-drinking water systems shall be:
  - A. Ball Valves - Nibco, Grinnell, Apollo, Stockham, Milwaukee, Hammond, Watts, Kitz, Crane, Marwin, or engineer approved equal.
    - 1) Type B3. 2.50 inches and 3 inches.  
NIBCO T 580 70-66, 150 s.w.p., 600 w.o.g., two piece bronze body, ASTM B584 screwed ends, 316 stainless steel ball and stem, standard

port, packing nut with adjustable stem packing, reinforced TFE seat and seal, handle.

2) Type B4

Watts G-4000-FDA or American 3700, 200 c.w.p., two-piece fused epoxy coated cast iron body (inside and out), flanged ends, stainless steel or PFA fused cast iron ball and stainless steel stem, full port, PTFE seat and seal, handle.

- 2.3 Sweat end valves of equal construction and features are acceptable in lieu of those specified with screwed ends.
- 2.4 Ball valves in piping which is to be insulated shall have extended shaft necks to accommodate the insulation.

### PART 3 - EXECUTION

- 3.1 Drain valves shall be the same as for shutoff service. Provide a 0.75" hose thread adapter on the outlet of each drain valve that is not piped to a drainage point.
- 3.2 Internals shall be removed and the remaining elements of sweat end valves shall be protected against heat damage during soldering or brazing.
- 3.3 Valves shall be installed with the stem at or above the centerline of the pipe. Valves shall be located to be accessible for operation, servicing and/or removal.
- 3.4 Packing glands shall be tightened before placing the valves in service.

END OF SECTION

SECTION 22 05 29 HANGERS AND SUPPORTS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 All interior piping shall be supported from the building structure.

PART 2 - PRODUCTS

2.1 Manufacturers listed below are basis of design. Other applicable manufacturers are B-line, Erico, Fee, Mason and PHD, or engineer approved equal.

2.2 Hangers and supports for horizontal piping shall be equal to:

- A. General service - clevis type - Anvil Fig. 260.
- B. Uninsulated copper tubing - copper plated clevis type - Anvil Fig. CT-65 (or plastic coated clevis).

2.3 Hanger rods shall be solid galvanized steel, threaded-end or all-thread rod, of diameter listed below. A hanger attachment device (beam clamps, concrete inserts, etc.) and locking nuts at the hanger attachment shall be provided on each hanger. Locking nuts shall be provided at each clevis and trapeze type hanger.

Pipe Sizes	Min. Rod Dia.
1" and smaller	0.25"
1.25" to 3"	0.375"
4" to 6"	0.50"
8"	0.625"

2.4 Where the length of the hanger rod between the top of the hanger and the attachment device is 3" or less, clevis type hangers with rollers, Anvil Fig. 181, shall be used to allow for expansion travel.

2.5 Hanger rod attachment devices for attachment to the structure shall be:

- A. After-set galvanized steel expansion type concrete inserts.

2.6 Galvanized steel spring and neoprene isolators in hanger rods, as required in Part 3, shall be equal to Mason Series 30N except in pipe sizes 6" and larger shall be Series PC30N.

2.7 Base mounted pipe supports shall be galvanized or stainless steel equal to Anvil catalog numbers as follows:

- A. Pipe slide having carbon steel base (with guide arrangement) and inverted tee with Teflon slide plate on each - Fig. 257, type 3.
- B. Base mounted pipe roller stand - Fig. 271.

2.8 Pipe riser supports shall be galvanized steel as follows:

- A. Riser clamps on domestic cold water service piping 1.50" and smaller - similar to Pipe Shields, Inc. E1000.
- 2.9 Hangers on insulated horizontal piping shall be oversized to surround the pipe insulation. To protect the insulation from damage or inordinate compression due to concentrated weight, the following shall be provided at each hanger:
- A. Pipe 2" and smaller - Anvil Fig. 168 18 ga. sheet metal rib-lock shield with belled ends, 12" long.
- 2.10 Insulation saddles shall be compatible with pipe insulation materials and thicknesses. Vapor barrier shall be continuous.
- 2.11 The piping contractor and the insulator shall coordinate the items above during the bidding period and determine, consistent with industry practice, the selection, furnishing and installation of the needed components.

### PART 3 - EXECUTION

- 3.1 Spacing of hangers shall be as follows:
- A. Copper tubing (vertical) - at the base and 10 ft. maximum spacing unless otherwise shown.
  - B. Copper tubing (horizontal) - 6 ft. spacing for tubing 1.25" size and smaller, 8 ft. spacing for 1.50" and 2" sizes, 10 ft. spacing for tubing 2.50" size and larger.
  - C. Cast iron pipe (vertical) - at the base and at each floor (15 ft. maximum spacing).
  - D. Cast iron pipe (horizontal) - at each fitting and at each joint on straight lengths, 10 ft. maximum spacing.
- 3.2 Attachment of pipe hangers to the structure shall be with:
- A. After-set concrete inserts, in 4" minimum depth concrete, set in drilled holes. Powder actuated driven fasteners are not permitted.
- 3.3 Pipe hangers shall be adjusted to proper elevation, hanger rods set in a vertical position and locking nuts secured before pipe insulation is installed.
- 3.4 Extended legs of pipe riser clamps shall be shortened as needed to maintain concealment of the clamp within the pipe chase. Insure that adequate support is still maintained.

END OF SECTION

## SECTION 22 05 53 IDENTIFICATION OF PLUMBING PIPING

### PART 1 - GENERAL

- 1.1 Identification of Plumbing equipment shall consist of equipment labeling, pipe marking and valve tagging as specified hereinafter.
- 1.2 Pipe markings shall be applied to all piping.
- 1.3 Each shutoff valve shall be identified with a stamped tag. Valves and tagging shall be scheduled typewritten on 8.50" x 11" paper, tabulating valve number, piping system, system abbreviation, location of valve (room or area) and service (e.g. - south wing cold water).
- 1.4 Labels, tags and markers shall comply with ANSI A13.1 for lettering size, colors and length of color field.
- 1.5 Coordinate pipe markings and valve tags with HVAC and Fire Suppression Contractors to assure similar markings.

### PART 2 - PRODUCTS

- 2.1 Equipment labeling shall be either, or a mix, of the following:
  - A. Permanently attached engraved brass or plastic laminated signs with 1" high lettering. Signs on exterior equipment shall be brass.
  - B. Stencil painted identification, 2" high letters, with standard fiberboard stencils and standard black (or other appropriate color) exterior stencil enamel.
- 2.2 Pipe markings shall be:
  - A. Plastic semi-rigid snap-on type, manufacturer's standard pre-printed color coded pipe markers extending fully around the pipe and insulation or pressure-sensitive vinyl markers similar to the above.
  - B. Arrows for direction of flow provided integral with the pipe marker or separate at each marker.
- 2.3 Valve tags shall be polished brass or plastic laminate with solid brass S hook. Tags shall be engraved with "P" (for Plumbing) and the designated number.
- 2.4 Labels, markings and tags shall be manufactured by W.H. Brady, Seton, Allen, Kolbi, Industrial Safety Supply, or engineer approved equal.

### PART 3 - EXECUTION

- 3.1 Identification labeling, marking and tagging shall be applied after insulation and painting has been completed.

- 3.2 Coordinate names, abbreviations and other designations used in Plumbing identification work, with corresponding designations shown, specified or scheduled on drawings.
- 3.3 The Plumbing and HVAC Contractors shall coordinate labeling, marking and tagging to attain coordinated and consistent systems of identification.
- 3.4 Pipe markers shall be placed:
  - A. At 25 ft. centers in mechanical rooms and concealed spaces.
  - B. At 50 ft. centers in other exposed locations.
  - C. On mains at each branch take-off.
  - D. At least once in each room.
- 3.5 Refer to appropriate Sections of this specification for installation of underground line marker tape.
- 3.6 Valve tags shall be placed on each valve. Valve tag schedules shall be prepared as specified above. Copies of one set of schedules shall be laminated in clear plastic and placed where directed by the Owner. Other sets shall be included in the Operating and Maintenance Manuals.

END OF SECTION

## SECTION 22 11 16 INTERIOR DOMESTIC WATER PIPING

### PART 1 - GENERAL

- 1.1 Piping, valves and associated devices and materials for interior domestic cold water systems shall be provided as shown on the drawings and as specified.
- 1.2 Refer to Section 22 05 07 - Piping Materials and Methods for Plumbing, Section 22 05 23 – General Duty Valves for Plumbing Piping, Section 22 05 29 Hangers and Supports for Plumbing Piping and other related Sections for required provisions.

### PART 2 - PRODUCTS

- 2.1 Water piping and associated devices, materials and accessories shall be as described in Section 22 05 07 Piping Materials and Methods for Plumbing. Piping shall be:
  - A. 2" and smaller - Type C1.
- 2.2 Valves for the various services shall be as listed below and as described in Section 22 05 23 General Duty Valves for Plumbing Piping.
  - A. Shutoff
    - 1) Ball B1

### PART 3 - EXECUTION

- 3.1 Installation shall conform to provisions in Section 22 05 07 Piping Materials and Methods for Plumbing, 22 05 17 Expansion Loops for Plumbing Systems and Section 22 05 29 Hangers and Supports for Plumbing Piping.

END OF SECTION



## SECTION 22 11 19 INTERIOR DOMESTIC WATER PIPING SPECIALTIES

### PART 1 - GENERAL

- 1.1 Water system specialties shall be provided as shown on the drawings and as specified here and/or on the drawings.
- 1.2 Refer to Section 22 05 07 Piping Materials and Methods for Plumbing, Section 22 05 23 General Duty Valves for Plumbing Piping, Section 22 05 19 Meters and Gauges for Plumbing Piping (for thermometers and pressure gauges) and Section 22 11 16 Interior Domestic Water Piping.

### PART 2 - PRODUCTS

- 2.1 Hose bibbs shall be all brass construction with removable tee handle, 0.75" hose thread outlet and integral vacuum breaker. Hose bibbs shall be Chicago Faucet No. 998 with rough chrome finish, T & S Brass, Zurn, or engineer approved equal.

### PART 3 - EXECUTION

- 3.1 Hose bibbs shall be mounted approximately 36" above the slab.

END OF SECTION

## SECTION 22 13 16 INTERIOR DRAINAGE AND VENT SYSTEMS

### PART 1 - GENERAL

- 1.1 Interior drainage and vent systems including soil, waste and vent system and storm drainage system shall be provided as shown on the drawings and as specified.
- 1.2 Refer to Section 22 05 09 Excavation Backfill and Surface Restoration, Section 22 05 07 Piping Materials and Methods for Plumbing, Section 22 05 29 Hangers and Supports for Plumbing Piping and other related Sections for provisions affecting this Section.
- 1.3 All referenced standards shall be of the latest edition adopted by the jurisdiction unless specifically noted otherwise.
- 1.4 All cast iron drainage and vent pipe, fittings and joining materials shall be listed to the respective standard(s) stated below, and shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute.

### PART 2 - PRODUCTS

#### 2.1 Storm Drainage Piping

##### A. Pipe, fittings and joints above grade shall be:

- 1) Coated cast iron pipe, centrifugally cast, with hub and spigot ends, ASTM A74. Fittings shall be drainage type. Joints shall be push-tight with elastomeric gaskets, ASTM C564 and ASTM C1563.
- 2) Pipe shall be coated cast iron, centrifugally cast with hubless ends, ASTM A-888 and CISPI 301. Joints shall consist of a neoprene gasket ASTM C564, and type 304 corrugated stainless steel shield and clamp assembly, ASTM C1540 complaint, as manufactured by Clamp-All 125, Husky "SD 4000", Mission "Heavy Weight", or engineer approved equal.

### PART 3 - EXECUTION

- 3.1 Cut pipe to required length and ream ends to remove burrs. Align horizontal piping to attain even pitch, minimum of 0.25" per ft. on sizes 2.50" and smaller, 0.125" per ft. on sizes 3" and larger unless specifically noted on drawings.
- 3.2 Piping shall not be run above electrical switchgear or panelboards, nor above access space in the immediate vicinity of the equipment, in accordance with N.E.C. Article 110.26.
- 3.3 Gasket lubricant shall be used in the assembly of push-tight joints.
- 3.4 Horizontal above grade cast iron piping, in sizes 5" and larger, shall be braced to prevent horizontal movement and joint separation at each branch opening and change of

direction. Bracing methods shall be as recommended by pipe manufacturer's installation instructions and the Cast Iron Soil Pipe Institute (CISPI) Handbook.

- 3.5 Provide cleanouts in drainage piping as indicated on the drawings and:
- A. In horizontal piping at intervals no greater than 100 ft.
  - B. At the base of each downspout.
  - C. In storm piping leaving the building for cleanout and testing purposes.

END OF SECTION

## SECTION 22 13 19 DRAINAGE SYSTEMS SPECIALTIES

### PART 1 - GENERAL

1.1 Drainage systems specialties shall be as shown on the drawings and as specified.

### PART 2 - PRODUCTS

2.1 Drains shall be as shown and scheduled on the drawings. Drains shall be equal to listed catalog numbers, type, size, materials and features. Drains shall be manufactured by J.R. Smith, Wade, Josam, Watts, Mifab, Zurn, or Engineer approved equal.

#### 2.2 Cleanouts

- A. Cleanouts shall be of the same manufacturer as floor drains and equal to the listed catalog numbers in type, materials and features.
- B. Exterior cleanouts in areas not subject to vehicular traffic shall be J.R. Smith Series 4220 (or engineer approved equal). Cleanouts shall consist of a cast iron two-piece adjustable housing, ABS, cast iron or bronze NPT gasketed plug and round non-slip cast iron top with securing screw. In areas with decorative paving, tops shall be nickel bronze or bronze.
- C. Exterior cleanouts in areas subject to vehicular traffic shall be J.R. Smith Series 4250 (or engineer approved equal). Cleanouts shall consist of ABS or cast iron gasketed plug, heavy duty double flanged housing and round non-slip cast iron cover with securing screws.
- D. Refer to Part 3 for installation and concrete anchorage of exterior cleanout covers at grade.

### PART 3 - EXECUTION

3.1 Drains shall be set with rim 0.75" below finish floor level unless otherwise noted or directed. Verify exact location and desired rim elevations with the Construction Manager before installation.

3.2 Cleanouts shall be same size as pipe thru 4" size. Maximum size of cleanouts shall be 4" diameter unless larger units are required for testing or special access purposes. Provide cleanouts where indicated on the drawings and at other locations where deemed advisable. Location of cleanouts as stipulated by applicable code shall be considered as the minimum requirement.

END OF SECTION

## SECTION 23 05 01 BASIC HVAC REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 Special Note

- A. All provisions of the Bidding Requirements, General Conditions, and Supplementary Conditions, including Divisions 00 and 01, apply to work specified in this Division.
- B. The scope of the Division 23 work includes furnishing, installing, testing and warranty of all work and complete HVAC systems as shown on the HVAC drawings, and as specified in Division 23 and elsewhere in the project documents.

#### 1.2 Permits and Regulations

- A. Include payment of all permit and inspection fees applicable to the Division 23 work. Furnish for the Owner certificates of approval from the governing inspection agencies, as a condition for final payment.
- B. Work must conform to applicable local, state and federal laws, ordinances and regulations. Where drawings or specifications exceed code requirements, the drawings and specifications shall govern. Install no work contrary to minimum legal standards.

#### 1.3 Inspection of Site

- A. Inspect the project site and the premises of the existing parking garage, including the existing Lot 2 garage exhaust fan rooms and the Central Riverfront Garage admin office. Conditions shall be compared with information shown on the drawings. Report immediately to the Construction Manager any significant discrepancies which may be discovered. After the contract is signed, no allowance will be made for failure to have made a thorough inspection.

#### 1.4 Drawings and Specifications

- A. The drawings indicate the general arrangement of the work and are to be followed insofar as possible. The word "provide", as used, shall mean "furnish and install". If significant deviations from the layout are necessitated by field conditions, detailed layouts of the proposed departures shall be submitted to the Construction Manager for approval before proceeding with the work.
- B. Make all necessary field measurements to ensure correct fitting. Coordinate work with all other trades in such a manner as to cause a minimum of conflict or delay.
- C. The drawings and specifications shall be carefully studied during the course of bidding and construction. Any errors, omissions or discrepancies encountered shall be referred immediately to the Construction Manager for interpretation or correction, so that misunderstandings at a later date may be avoided. The contract drawings are not intended to show every vertical or horizontal offset which may be necessary to complete the systems. Having ductwork, pipe and fittings fabricated and delivered in advance of making actual measurements shall not be sufficient cause to avoid

making offsets and minor changes as may be necessary to install ductwork, piping and equipment.

- D. The Architect shall reserve the right to make minor adjustment in locations of system runs and components where considered desirable in the interest of concealing work or presenting a better appearance where exposed. Any such changes shall be anticipated and requested sufficiently in advance as to not cause extra work, or unduly delay the work. Coordinate work in advance with all other trades and report immediately any difficulties which can be anticipated.
- E. Equipment, ductwork or piping shall not be installed in the dedicated electrical space above or in the working space required around electrical switchgear, motor control centers or panelboards as identified by the National Electric Code (NEC).
- F. Where any system runs and components are so placed as to cause or contribute to a conflict, it shall be readjusted at the expense of the contractor causing such conflict. The Architect's decision shall be final in regard to the arrangement of ductwork, piping, etc., where conflict arises.
- G. Provide offsets in system runs, additional fittings, necessary drains and minor valves, traps, dampers and devices required to complete the installation, or for the proper operation of the system. Exercise due and particular caution to determine that all parts of the work are made quickly and easily accessible.
- H. Should overlap of work among the trades become evident, this shall be called to the attention of the Construction Manager. In such event, none of the trades or their suppliers shall assume that he is relieved of the work which is specified under his branch until instructions in writing are received from the Construction Manager.

#### 1.5 Coordination Drawings

- A. The Fire Suppression Contractor shall prepare and be responsible for 0.25inch scale electronic coordination drawings. These drawings shall be produced using a computer aided drafting software of a mutually agreed upon format with the HVAC, Plumbing, Fire Suppression and Electrical Contractors. Each Contractor shall prepare their own electronic drawings, using common backgrounds obtained from the Architect and Engineer. The HVAC Contractor shall be responsible for consolidating (merging) the drawings into combined coordination drawings, and lead the conflict resolution process, with all Contractors working together to obtain finished coordinated drawings. No work shall be installed until all Contractors have approved and signed-off with their approval, and drawings have been submitted for review.
- B. Review by the Engineer is cursory. It is the Contractors' responsibilities to ensure that all work is coordinated, including fit above ceilings, and that specified ceiling heights are maintained.

#### 1.6 Inspection

- A. All work shall be subject to inspection of Federal, State and local agencies as may be appropriate, and of the Architect and Engineer.

- B. Obtain final inspection certificates and turn over to the Construction Manager and Owner.

#### 1.7 Record Drawings

- A. Maintain a separate set of field prints of the contract documents and hand mark all changes or variations, in a manner to be clearly discernible, which are made during construction and the coordination process. Upon completion of the work these drawings shall be turned over to the Construction Manager. This shall apply particularly to underground and concealed work, and to other systems where the installation varies to a degree which would justify recording the change.

#### 1.8 Operating and Maintenance Manuals

- A. Assemble two copies each of operating and maintenance manuals for the HVAC work.
- B. All “approved” shop drawings and installation, maintenance and operating instruction pamphlets or brochures, wiring diagrams, parts list and other information, along with warranties, shall be obtained from each manufacturer of the principal items of equipment. In addition, prepare and include a chart listing all items of equipment which are furnished under this contract, indicating the nature of maintenance required, the recommended frequency of checking these points and the type of lubricating media or replacement material required. Name and address of a qualified service agency. A complete narrative of how each system is intended to operate.
- C. Final air balance reports and as-built automatic temperature controls drawings and specifications shall also be included.
- D. These shall be assembled into three-ring loose leaf binders or other appropriate binding. An index and tabbed sheets to separate the sections shall be included. These shall be submitted to the Engineer and Construction Manager for review. Upon approval, manuals shall be turned over to the Owner.

#### 1.9 Final Inspection and Punch List

- A. As the time of work completion approaches, survey and inspect Division 23 work and develop a punch list to confirm that it is complete and finished. Then notify the Construction Manager and request that a final inspection be made. It shall not be considered the Architect's or Engineer's obligation to perform a final inspection until the Contractor has inspected his work and so states at the time of the request for the final inspection.
- B. Requests to the Construction Manager for final inspection may be accompanied by a limited list of known deficiencies in completion, with appropriate explanation and schedule for completing these; this is in the interest of expediting acceptance for beneficial occupancy.
- C. The Construction Manager will inspect the work and prepare a punch list of items requiring correction, completion or verification. Corrective action shall be taken to the

satisfaction of the Construction Manager within 30 days of receipt of the Construction Manager's punch list.

#### 1.10 Warranty

- A. Warrant all workmanship, equipment and material entering into this contract for a period of one (1) year from date of final acceptance or date of beneficial use, as agreed to between Contractor and Construction Manager. Any materials or equipment proving to be defective during the warranty period shall be made good without expense to the Owner. Use of equipment for temporary heating or cooling is not the start of the warranty period.
  - 1. Certain items of equipment are specified to have multi-year parts and labor warranties. Refer to individual equipment specifications.
- B. This provision is intended specifically to cover deficiencies in contract completion or performance which are not immediately discovered after systems are placed in operation. Also included shall be supplementary assistance in balancing, adjusting or providing operating instructions as the need develops, and replacing overload heater elements in starters where necessary to keep systems in operation. Heater element sizes shall not exceed the motor manufacturer's recommendations.
- C. This provision shall not be construed to include maintenance items such as replacing filters, re-tightening or repacking glands, greasing, oiling, belt tightening and cleaning strainers after these have been done for final close-out.
- D. Provisions of this warranty shall be considered supplementary to warranty provisions under General Conditions.

### PART 2 - PRODUCTS

#### 2.1 Materials and Equipment

- A. Materials and equipment furnished shall be in strict accordance with the specifications and drawings and shall be new and of best grade and quality. When two or more articles of the same material or equipment are required, they shall be of the same manufacturer.

#### 2.2 Listing and Labeling

- A. All equipment and appliances shall be listed and labeled in accordance with the Mechanical Code. Testing shall be performed by an Approved Agency, with the seal or mark of the Agency affixed to each piece of equipment or appliance.

#### 2.3 Reference Standards

- A. Where standards (NFPA, NEC, ASTM, UL, etc.) are referenced in the specifications or on the drawings, the latest edition is to be used except, however, where the Authority Having Jurisdiction has not yet adopted the latest edition, the edition so recognized shall be used.



## 2.4 Equipment Selection

- A. The selection of materials and equipment to be furnished shall be governed by the following:
  1. Where trade names, brands, or manufacturers of equipment or materials are listed in the specification, the exact equipment listed shall be furnished. Where more than one name is used, the contractor shall have the option of selecting between any one of the several specified. All products shall be first quality line of manufacturers listed.
  2. Where the words "or approved equal" appear after a manufacturer's name, specific approval must be obtained from the Architect during the bidding period in sufficient time to be included in an Addendum. The same shall apply for equipment and materials not named in the specifications, where approval is sought.
  3. Where the words "equal to" appear, followed by a manufacturer's name and sometimes a model or series designation, such designation is intended to establish quality level and standard features. Approval of equal equipment by other manufacturers must be obtained per paragraph 2.4.A.2 above.
- B. Before bidding equipment, and again in the preparation of shop drawings, verify that adequate space is available for entry and installation of the item of equipment, including associated piping and accessories. Also verify that adequate space is available for servicing of the equipment.
- C. If extensive changes in pipe, duct or equipment layout or electrical wiring and equipment are brought about by the use of equipment which is not compatible with the layout shown on the drawings, necessary changes shall be deemed to be included in this Contract.

## 2.5 Shop Drawings

- A. Electronic copies of shop drawings and descriptive information of equipment and materials shall be furnished. Submit to the Construction Manager for review as stated in the General Conditions and Supplementary Conditions. These shall be submitted as soon as practicable and before equipment is installed and before special equipment is manufactured. Submittal information shall clearly identify the manufacturer, specific model number, approval labels, performance data, electrical characteristics, features, specified options and additional information sufficient to evidence compliance with the Contract Documents. Product catalogs, brochures, etc. submitted without project specific items marked as being submitted for review will be rejected and returned without review. Shop drawings for equipment, fixtures, devices and materials shall be labeled and identified same as on the Contract Documents. If compliance with the above criteria is not provided shop drawings will be subject to rejection and returned without review. Samples shall be submitted when requested or as specified here with-in.
- B. The review of shop drawings by the Construction Manager, Architect, or Engineer shall not relieve the Contractor from responsibility for errors in the shop drawings.

Deviations from specifications and drawing requirements shall be called to the Architect's and Engineer's attention in a separate clearly stated notification at the time of submittal for the Engineer's review.

- C. Shop drawings of the following HVAC equipment and materials shall be submitted:
  - 1. CO Monitoring System
  - 2. Automatic Temperature Controls.

### PART 3 - EXECUTION

#### 3.1 Operation and Adjustment of Equipment

- A. As each piping system and air distribution system is put into operation, all items of equipment included therein shall be adjusted to proper working order. This shall include balancing air and water systems, adjusting fan speeds, belts, pulleys, tightening packing glands, and adjusting all operating equipment.
- B. Caution: Verify that all bearings are lubricated, all motors are operating in the right direction, and correct drive settings and overload heater elements are provided on all motors. Do not depend wholly on the electrician's judgment in these matters. Follow specific instructions in regard to lubrication. Do not oil or grease presealed ball bearings unless upon manufacturer's specific instructions.
- C. Test relief valves, air vents and regulating valves to ensure proper operation.

#### 3.2 Operating Demonstration and Instructions

- A. Set the various systems into operation and demonstrate to the Owner, Architect, Engineer, and Construction Manager that the systems function properly and that the requirements of the Contract are fulfilled.
- B. Provide the Owner's representatives with detailed explanations of operation and maintenance of equipment and systems. A thorough review of the operating and maintenance manuals shall be included in these instructional meetings.
- C. O&M manuals shall be submitted, reviewed and approved prior to scheduling of demonstrations.

END OF SECTION

SECTION 23 05 02 AGREEMENT AND WAIVER FOR USE OF ELECTRONIC FILES

PART 1 - GENERAL

- 1.1 The Engineer, at his sole discretion and without obligation, makes graphic portions of the contract documents available for use by the contractor in electronic format. These electronic files are proprietary, and remain the Engineer's Instruments of Service and shall be for use solely with respect to this project, as provided in the Standard Form of Agreement between Architect and Engineer.
- 1.2 Electronic files shall be released only after bids have been received for the project and contracts have been signed with the Contractors.
- 1.3 The Contractor shall acknowledge receipt of electronic files in the requested format for this project. The electronic files are provided as a convenience to the User, for use in preparing shop drawings and/or coordination drawings related to the construction of only the project identified in the Agreement. The electronic files and the information contained within are the property of the Engineer and/or the Architect and/or the Owner, and may not be reproduced or used in any format except in conjunction with the project identified in the Agreement.
- 1.4 The User acknowledges that the information provided in the electronic files is not a substitution or replacement for the Contract Documents and does not become a Contract Document. The User acknowledges that neither the Engineer, the Architect, the Consultants, the Client or the Owner make any warrant or representation that the information contained in the electronic files reflect the Contract Documents in their entirety. The User assumes full responsibility in the use of the electronic files, including the responsibility to see that all manual modifications, addenda, bulletins, clarifications and Change Orders to the drawings executed as a part of the Contract Documents have been incorporated.
- 1.5 The User acknowledges that the receipt of electronic files in no way relieves the User from the responsibility for the preparation of shop drawings or other schedules as set forth in the Contract between the Contractor and the Owner.
- 1.6 Electronic files are available in a .DWG format for a cost as indicated in the Agreement and Waiver Form. Providing the documents in a .DWG version that differs from the product version that the .DWG files were initially created in will incur additional charges per sheet, as indicated in the Agreement and Waiver Form. Charges are for the Engineer's time to prepare the documents in the format stated. They are available through the Engineer's office on a C.O.D. basis only. A sample of the format will be provided by the Engineer upon request by the contractor, for the purpose of testing the compatibility of the format to the contractor's systems.
- 1.7 All drawings will be in an AutoCAD file format, when requested to be .DWG format.
- 1.8 All electronic files shall be stripped of the Project's name and address, the Architect's, Engineer's, and any consultant's name and address, and any professional licenses indicated on the contract documents, (and all dimensions, verbiage, and statistical

information). Use of these electronic files is solely at the contractor's risk, and shall in no way alter the contractor's Contract for Construction.

- 1.9 The User agrees to indemnify, hold harmless and defend the Engineer, the Architect, the Consultants, the Owner, the Client and any of their agents from any litigation resulting from the use of (by any means of reproduction or electronic media) these files. The Engineer makes no representation regarding fitness for any particular purpose, or suitability for use with any software or hardware, and shall not be responsible or liable for errors, defects, inexactitudes, or anomalies in the data, information, or documents (including drawings and specifications) caused by the Engineer's or its consultant's computer software or hardware defects or errors; the Engineer's or its consultant's electronic or disk transmittal of data, information or documents; or the Engineer's or its consultant's reformatting or automated conversion of data, information or documents electronically or disk transmitted from the Engineer's consultants to the Engineer.
- 1.10 The Contractor waives all claims against the Engineer, its employees, officers and consultants for any and all damages, losses, or expenses the Contractor incurs from such defects or errors in the electronic files. Furthermore, the Contractor shall indemnify, defend, and hold harmless the Engineer, and its consultants together with their respective employees and officers, harmless from and against any claims, suits, demands, causes of action, losses, damages or expenses (including all attorney's fees and litigation expenses) attributed to errors or defects in data, information or documents, including drawings and specifications, resulting from the Contractor's distribution of electronic files to other Contractors, persons, or entities.

#### PART 2 - PRODUCTS – NOT USED

#### PART 3 - EXECUTION

- 3.1 Attached "Agreement" shall be submitted with accompanying payment to the Engineer prior to delivery of electronic files.

END OF SECTION

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40



**ELECTRONIC FILES  
HEAPY RELEASE FORM TO CONTRACTORS**

**Project:** Banks Phase 3B  
Cincinnati, Ohio  
**Owner:** Hamilton County

**Heapy Engineering Project Number:** 2019-07091

**Heapy Engineering Project Manager:** Dave Madden

The Provider, named below, will furnish the Recipient, named below, certain documents prepared by the Provider or its sub consultants in an electronic format. These documents are hereinafter collectively referred to as "Electronic Files". The Electronic Files are instruments of the Provider services performed solely for the Owner's benefit and to be used solely for this Project. The Provider does not represent that the information contained in the Electronic Files are suitable for use on any other project or for any other purpose. If the Electronic Files are used for any other project or purpose without the Provider's specific written permission, the risk of such use shall be assumed solely by the Recipient or other user.

Prior to the use of the Electronic Files the Provider and the Recipient agree to the following terms and conditions:

1. The Provider and Recipient fully understand that the data contained in these electronic files are part of the Provider's Instruments of Service. The Provider shall be deemed the author of the drawings and data, and shall retain all common law, statutory law and other rights, including copyrights.
2. The Recipient confirms their request to the Provider for Electronic Files for the Project listed above, which the Recipient understands are to be provided only in accordance with, and conditioned upon, the terms and conditions of the Agreement and Waiver for Use of Electronic Files).
3. The Provider agrees that the Recipient may use the Electronic Files for the sole purpose of preparing shop drawings and/or coordination drawings for the above Project only. Any Electronic Files provided are strictly for the use of the Recipient in regard to the Project named above, and shall not be utilized for any other purpose or provided by the Recipient to any entity other than its subcontractors for the Project named above.
4. The Recipient acknowledges that the furnishing of Electronic Files in no way relieves the Recipient from the responsibility of shop drawings or other schedules as set forth in the Contract between the Contractor and the Owner.
5. The Recipient acknowledges:
  - a. That the Electronic Files do not contain all of the information of the Bid Documents or Contract Documents for the construction of the Project above.

- b. That information in the Bid Documents or Contract Documents may be revised or modified in the future.
  - c. The Provider does not have, and will not have, any duty or obligation to advise or give notice to the Recipient of any such revisions or modifications.
  - d. That the Recipient agrees that its use of the Electronic Files is at the Recipient's sole risk of liability, and that the Recipient shall make no claim or demand of any kind against the Provider arising out of Recipient's receipt or use of the Electronic Files.
6. The Provider makes no representation or warranty of any kind, express or implied, with respect to the Electronic Files and specifically makes no warranty that the Electronic Files shall be merchantable or fit for any particular purpose, or accurate or complete. Furthermore, any description of said Electronic Files shall not be deemed to create an implied or express warranty that such Electronic Files shall conform to said description.
7. Due to the unsecured nature of the Electronic Files and the inability of the Provider or the Recipient to establish controls over their use, the Provider assumes no responsibility for any consequences arising out of the use of the data. It is the sole responsibility of the Recipient to check the validity of all information contained within the Electronic Files. The Recipient shall at all times refer to the Construction Documents of the project during all phases of the project. The Recipient shall assume all risks and liabilities resulting from the use of this data, and the Recipient agree(s) to waive any and all claims and liability against the Provider and its sub consultants resulting in any way from the use of the Electronic Files.
8. Electronic Files are provided strictly as a courtesy by the Provider solely for the convenience of the Recipient, and are not part of the Bid Documents or Contract Documents for the Project. The Electronic Files do not replace or supplement the paper copies of any drawings, specifications, or other documents included in the Contract Documents for use on the project.
  - a. The Recipient assumes full responsibility in the use of Electronic Files, including the responsibility to see that all manual modifications, addenda, bulletins, clarifications and Change Orders to the drawings executed as a part of the Contract Documents have been incorporated.
9. As stated herein, the possibility exists that the Electronic Files provided may differ from the Bid Documents or Contract Documents for construction of the Project. The Provider shall not be responsible, nor be held responsible, for differences between Electronic Files, the Bid Documents, and Contract Documents. The Bid Documents or Contract Documents for the Project may be modified by the Provider at any time, either before or after construction begins. The Provider has no responsibility, either before or after any such modification, to determine or to advise the Recipient whether any such modification causes Electronic Files provided to the Recipient to be out of date, inconsistent with the Bid Documents or Contract Documents, or otherwise unsuitable or unfit for use in any way.
10. The Recipient assumes all risk and liability for any losses, damages, claims, or expenses (including defense and attorney fees) resulting from its receipt, use, or possession of Electronic Files furnished by the Provider. The Provider makes no representation, warranty or guarantee that the Electronic Files:
  - a. Are suitable for any other usage or purpose.
  - b. Have any particular durability.

- c. Will not damage or impair the Recipient's computer or software.
  - d. Contain no errors or mechanical flaws or other discrepancies that may render them unsuitable for the purpose intended by the Recipient.
11. Recipient agrees to indemnify, defend and hold harmless the Provider, agents, employees, and the Owner from, and against, any and all claims, suits, losses, damages or costs, of any kind or nature, including attorney's fees, arising from or by reason of the Recipient's use of Electronic Files provided by the Provider, and such defense and indemnification obligation duties shall survive any use under this Agreement and Waiver for Use of Electronic Files.
12. The Recipient agrees that the Provider shall have no responsibility whatsoever for problems of any nature arising from transmitting and storing electronic files at a Recipient requested FTP or project management site or the conversion of the Electronic Files by the Recipient or others for use in non-native applications. The Provider will not provide Electronic Files in compressed formats. Recipient agrees to accept the files in the format provided by the Provider, and that Recipient's conversion or electronic file storage at the Recipient's requested site, shall be at Recipient's sole risk.
13. Recipient acknowledges:
  - a. That the Electronic Files provided by the Provider are a graphical representation of the building in order to generate two-dimensional industry standard drawings.
  - b. That the data contained in the Electronic Files may not be 100% accurate and should not be used for dimensional control, building layout, shop drawings, or any other similar purpose
  - c. That any schedule of materials produced directly from the Electronic Files has not been checked for accuracy.
  - d. That the information in the Electronic Files should be used only for comparative purposes and shall not be relied upon for accurate quantity estimates or used in establishing pricing.
14. Electronic Files provided by the Provider will only contain elements and content that the Provider deems necessary and appropriate to share. No specific Level of Development (LOD) is implied or expected. The Recipient agrees that no proprietary content, MvParts or Revit Families or any other AutoCAD MEP or Revit MEP content shall be removed from the model and/or used for any other purpose but to support this specific project.
15. The Provider, at its sole discretion, may modify the Electronic files before they are provided to the Recipient. Such modifications may include, but are not necessarily limited to, removal of certain information. The Provider, at its sole discretion, may refuse to provide some or all Electronic Files requested by Recipient.
16. The availability of Electronic Files that were not prepared by the Provider is subject to the consent of the Owner or consultant that prepared those Electronic Files. The Provider will not negotiate with the Owner or consultant or repeatedly solicit the Owner or consultant to obtain such consent. Neither this Agreement and Waiver for Use of Electronic Files nor any such separate Consultant's consent may be assigned or transferred by Recipient to any other person or entity.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

Provider (Name of Company): \_\_\_\_\_

Recipient (Name of Company): \_\_\_\_\_

Recipient Address: \_\_\_\_\_

Name of authorized Recipient Representative: \_\_\_\_\_

Title of authorized Recipient Representative: \_\_\_\_\_

E-mail address of authorized Recipient Representative: \_\_\_\_\_

Signature of authorized Recipient Representative: \_\_\_\_\_

Date: \_\_\_\_\_



The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

NOTE: Select requested Electronic File Format, File Transfer Medium and complete applicable Cost Summary.

A. Electronic File Format (select one):

1.  .DWG Format - List of Drawings Requested: \_\_\_\_\_  
\_\_\_\_\_

2.  Revit Project Model Requested (Model only, no Views included)

B. File Transfer Medium (select one):

CD-ROM  DVD-ROM  Heapy FTP  User's FTP site  Flash Drive

C. Delivery of Electronic Files Cost Summary:

Available Electronic .DWG file format:

2014 DWG

If a different file version is required than the indicated available version state the requested version:  
\_\_\_\_\_ .DWG

Note that an additional charge per sheet will be incurred.

Cost of Preparation of Division 23 Electronic .DWG Files:

First Drawing: \$50.00 \$50.00

Additional Drawings \$15.00 each \_\_\_\_\_ x \$15.00 = \$ \_\_\_\_\_

Conversion to .DWG version different from available .DWG:  
\$5.00 additional/sheet \_\_\_\_\_ x \$ 5.00 = \$ \_\_\_\_\_

Total Cost: (Please make check payable to Heapy Engineering and include a copy of this form.)

\$ \_\_\_\_\_

All files will be bound together.

SECTION 23 05 04 BASIC HVAC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 Temporary Heating and Cooling

- A. The temporary heating and cooling for construction is provided by the Contractor. Refer to Division 01 - General Requirements.
- B. Warranty periods on equipment, materials and system shall commence upon Owner acceptance of the building or systems. Temporary heating or cooling use shall not jeopardize or alter the warranty requirements.

1.2 Continuity of Services

- A. Work shall be so planned and executed as to provide reasonably continuous service of existing systems throughout the construction period. Where necessary to disrupt services for short periods of time for connection, alteration or switch-over, the Owner and Construction Manager shall be notified in advance and outages scheduled at the Owner's reasonable convenience.
- B. Submit, on request, a written step-by-step sequence of operations proposed to accomplish the work. The outline must include tentative dates, times of day for disruption, downtime and restoration of services. Submit the outline sufficiently in advance of the proposed work to allow the Architect or Engineer and Construction Manager to review the information with the Owner. Upon approval, final planning and the work shall be done in close coordination with the Owner.
- C. Shutdown of systems and work undertaken during shutdowns shall be bid as being done during normal working hours.

PART 2 - PRODUCTS

2.1 Access Panels

- A. Provide ceiling and wall access panels where indicated on the drawings, or where otherwise required to gain access to concealed valves, traps, devices and equipment requiring service or adjustment.
- B. Access panels shall be steel construction (except where aluminum or stainless steel is specified) with concealed hinge and door with industrial grade lock set. Panels shall be 18 inches x 18 inches size unless larger panels are shown or required. Mounting frames shall be compatible with the material in which they are installed. Access panels shall be:
  - 1. Standard flush type with overlapping flange for masonry and tile walls, Milcor Style "M" or equal.
- C. Access panels in fire rated shaft walls and in fire rated ceilings shall be "B" label or greater to match the rating of the wall or ceiling.

- D. Materials used in plenums shall be rated for plenum use conforming to the ASTM E84 25/50 smoke development and flame spread restrictions.

### PART 3 - EXECUTION

#### 3.1 Workmanship

- A. Materials and equipment shall be installed and supported in a first-class and workmanlike manner by mechanics skilled in their particular trades. Workmanship shall be first-class in all respects, and the Architect and Engineer shall have the right to stop the work if highest quality workmanship is not maintained.

#### 3.2 Protection

- A. Each Contractor shall be entirely responsible for all material and equipment furnished in connection with their work. Special care shall be taken to properly protect all parts thereof from theft, damage or deterioration during the entire construction period in such a manner as may be necessary, or as directed by the Architect or Construction Manager.
- B. The Owner's property and the property of other contractors shall be scrupulously respected at all times. Provide drop cloths and visqueen or similar barriers where dust and debris is generated, to protect adjacent areas.

#### 3.3 Cutting and Patching

- A. Refer to Division 01 - General Requirements and Special Conditions for information regarding cutting and patching.
- B. Plan the work well ahead of the general construction. Where pipes and ducts are to pass thru walls, partitions, floors, roof or ceilings, place sleeves in these elements or arrange with the Construction Manager to provide openings where sleeves are not practical. Where sleeves or openings have not been installed, cut holes and patch as required for the installation of this work, or pay other trades for doing this work when so directed by the Architect or Construction Manager. Any damage caused to the building in this work shall be repaired or rectified.
- C. All sleeves and openings not used or partially used shall be closed to prevent passage of smoke and fire.

#### 3.4 Painting

- A. In addition to any painting specified for various individual items of equipment, the following painting shall be included:
  - 1. Ferrous metal which is not factory or shop painted or galvanized and which remains exposed to view shall be given a prime coat of paint.
  - 2. Ferrous metal installed outside which is not factory or shop painted or galvanized shall be given a prime coat of paint.

3. Equipment and materials which have been factory or shop coated (prime or finished painted or galvanized), on which the finish has been damaged or has deteriorated, shall be cleaned and refinished equal to its original condition. The entire surface shall be repainted if a uniform appearance cannot be accomplished by touch up.
  4. Apply Z.R.C. Galvilite cold galvanizing compound or approved equal, for touch-up of previously galvanized surfaces.
  5. Inside of ducts, behind grilles and registers, shall be painted flat black to eliminate the viewing of shiny surfaces.
- B. Paint, surface preparation and application shall conform to applicable portions of the Painting Section of Division 09 of the Specifications. All rust must be removed before application of paint.

### 3.5 Access Panels

- A. Coordinate installation of access panels with the Construction Manager. Final appearance is subject to approval by the Architect or Engineer.
- B. Location of access panels shall be planned to clear ceiling lights, ceiling support grids and other obstructions so as to allow, wherever possible, full shoulder clearance beside the device to be inspected, adjusted or repaired.

### 3.6 Miscellaneous Component Installations

- A. Certain miscellaneous items and components are furnished loose and require installation into the duct systems, piping systems, and other HVAC systems. These items shall be installed per the suppliers and manufacturers instructions.
- B. This shall include, but by no means be limited to, items such as balancing dampers, backdraft dampers, motorized dampers, gravity dampers, fire and/or smoke dampers, sound attenuation products, control valves and components and other similar items.
- C. Provide compatible connection means for all items being installed.
- D. Provide bulb wells for temperature control equipment, and coordinate accordingly. Other types of control devices (dp switches, flow switches, flow meters, etc.) shall also be installed, with devices, needed fittings (tees, weldolets, threadolets, etc.), locations and installation details closely coordinated.
- E. Provide all required access means (access doors, etc...) required for installation, service and inspection.

END OF SECTION

## SECTION 23 05 05 FIRESTOPPING

### PART 1 - GENERAL

- 1.1 Firestopping assemblies shall be provided at penetrations of piping and non-fire dampered ducts thru fire rated floors, fire rated floor-ceiling and roof ceiling assemblies, fire rated walls and partitions and fire rated shaft walls and partitions. In addition, firestopping assemblies shall be provided at penetrations thru 0-hour rated floors. Refer to the drawings for fire rated building elements and HVAC drawings for pipe and duct layouts.
- 1.2 Firestopping assemblies shall be tested and rated in accordance with ASTM E814, E119 and listed in accordance with UL 1479, as published in the UL Fire Resistance Directory. Firestopping shall provide a fire rating equal to that of the construction being penetrated.
- 1.3 Firestopping materials, assemblies and installation shall conform to requirements of the OBC and the Authority Having Jurisdiction.
- 1.4 For those firestopping applications that exist for which no UL tested system is available through any manufacturer, a manufacturer's engineering judgment derived from similar UL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgment drawings must follow requirements set forth by the International Firestop Council.
- 1.5 Shop drawings and product data shall be prepared and submitted for review and approval. Submittals shall include manufacturer's specifications and technical data of each material, documentation of U.L. firestopping assemblies and installation instructions. Submittals shall include all information required in OBC.

### PART 2 - PRODUCTS

- 2.1 Firestopping materials shall be manufactured and/or supplied by Hilti, 3M, Rectorseal-Metacaulk, Tremco, Nelson, Specified Technologies or other approved manufacturer.
- 2.2 Materials shall be in the form of caulk, putty, sealant, intumescent material, wrap strip, fire blocking, ceramic wool and other materials required for the UL listed assemblies. These shall be installed in conjunction with sleeves and materials for fill and damming.
- 2.3 Combination pre-set floor sleeve and firestopping assemblies shall be equal to Hilti CP 680.

### PART 3 - EXECUTION

- 3.1 Installation of all materials and assemblies shall be in accordance with UL assembly drawings and the manufacturer's instructions.
- 3.2 Installation shall be done by an experienced installer who is certified, licensed or otherwise qualified by the firestopping manufacturer as having the necessary training and experience.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- 3.3 Firestopping shall not be installed at fire dampers that would impair the needed free expansion of damper, sleeve and retaining angles in a fire condition. Refer to the installation instructions of the fire damper manufacturer.

END OF SECTION

## SECTION 23 05 53 IDENTIFICATION OF HVAC PIPING AND EQUIPMENT

### PART 1 - GENERAL

- 1.1 Identification of Division 23 equipment shall consist of equipment labeling as specified hereinafter.
- 1.2 Each item of major equipment shall be labeled. This shall include control panels and other similar equipment.
- 1.3 Labels, tags and markers shall comply with ANSI A13.1 for lettering size, colors and length of color field.
- 1.4 Equipment and device identification specified in other sections shall be provided as a part of those requirements.
- 1.5 Submit product data noting materials, sizes and dimensions for identification systems.

### PART 2 - PRODUCTS

- 2.1 Equipment labeling shall be either, or a mix, of the following:
  - A. Permanently attached engraved brass or plastic laminated signs with 1 inch high lettering. Signs on exterior equipment shall be brass.
  - B. Stencil painted identification, 2 inches high letters, with standard fiberboard stencils and standard black (or other appropriate color) exterior stencil enamel.
- 2.2 Labels, markings and tags shall be manufactured by W.H. Brady, Seton, Allen or Industrial Safety Supply.

### PART 3 - EXECUTION

- 3.1 Identification labeling, marking and tagging shall be applied after insulation and painting has been completed.
- 3.2 Coordinate names, abbreviations and other designations used in mechanical identification work, with corresponding designations shown, specified or scheduled on drawings.
- 3.3 The Contractors shall coordinate labeling, marking and tagging to attain coordinated and consistent systems of identification.
- 3.4 Equipment labeling shall consist of unit designation as shown on the drawings. .

END OF SECTION

SECTION 23 09 23 DIRECT DIGITAL CONTROL SYSTEM FOR HVAC

PART 1 - GENERAL

- 1.1 A complete system of automatic temperature controls shall be provided as required to accomplish the sequence of control for the various items of equipment and systems being installed. The system shall be a Direct Digital Control System (DDCS) utilizing electric actuation. The system shall be an extension of the existing Johnson Controls DDCS.
- 1.2 The following Sections constitute related work:
  - A. Section 23 09 25 – Instrumentation and Control Devices for HVAC
  - B. Section 23 09 47 – Control Power Wiring for HVAC
- 1.3 DDCS Overview
  - A. The intent of this specification and related sections is to provide a fully integrated, open, interoperable, peer-to-peer networked, distributed Direct Digital Control System. The following communication protocols are acceptable:
    1. ANSI/ASHRAE Standard 135-2007 BACnet - A Data Communication Protocol for Building Automation and Control Networks
    2. ANSI/TIA/EIA-568-B Commercial Building Telecommunications Cabling Standard
  - B. The DDCS shall be comprised of:
    1. Wide Area Network (WAN) Enterprise Server
    2. Network Control Engines (NCE)
    3. BACnet Operator Workstations (B-OWS)
    4. Personal computers/devices with Web browser software
    5. Routers
    6. Repeaters
    7. Equipment controllers (L-PCU, L-TDCU, B-AAC, B-ASC, MEC)
    8. Sensors (refer to Section 23 09 25)
    9. Controlled devices (refer to Section 23 09 25)
  - C. The NCE shall connect to the Owner's existing local or wide area network, depending on configuration. Access to the system, either locally in Central Riverfront Garage Admin Office, or remotely from a central site or sites, shall be accomplished through standard Web browsers and/or BACnet Operator Workstations (B-OWS), via the Internet and/or local area network.



- D. Each NCE shall communicate to BACnet (B-AAC, B-ASC) controllers and/or other open protocol systems/devices as described on the contract drawings and/or in the specifications.
- E. The DDCS shall be based on a Java-based framework. Provide an open automation infrastructure that integrates diverse systems and devices (regardless of manufacturer, communication standard or software) into a unified platform that can be easily managed in real time over the Internet using a standard Web browser.
- F. The owner shall provide a connection to the internet via high speed cable modem, ADSL, ISDN, T1 or through the facility ISP. The owner shall be responsible for all monthly internet access fees and connection charges.
- G. The DDCS shall be supplied with a complete web enabled package. The system shall support unlimited users using standard web browsers such as Internet Explorer and Mozilla Firefox. The web server software shall operate on standard industry PC servers. Proprietary servers or “black boxes” are not acceptable. Web browser software shall be manufactured by the control system manufacturer and shall have the same look and feel as the operating system. Third party web software is not acceptable.
- H. BACnet controllers (B-AAC, B-ASC) shall connect to the NCE via a BACnet Local Network (BLN). The BLN shall consist of a flat, open architecture utilizing ANSI/ASHRAE Standard 135-2007 BACnet Protocol.
- I. The basic control system includes all sensors, controllers, instruments, valves, actuators, devices, installation and service for a complete and functional control system. All control devices (valves, dampers, actuators, etc.) and associated power and control wiring shall be included. Refer to Section 23 09 47 Control Power and Wiring for HVAC. The DDCS shall be designed to allow easy field adjustment of all set points and parameters.
- J. Provide for future system expansion to include monitoring of the access, intrusion detection, fire alarm, and lighting control systems.
- K. Identify active or inactive control wiring, equipment, etc., and where requested assist in the actual removal. Remove all control wiring and control devices not required to accommodate the new control system.

#### 1.4 Provider Requirements

##### A. Manufacturer Qualifications

- 1. All products used in the installation shall be new, currently under manufacture, and shall be applied in standard off the shelf products. The installation shall not be used as a test site for any new products unless explicitly approved by the Engineer in writing. Spare parts shall be made available for at least 10 years after completion of this contract.

##### B. Installer Qualifications

1. Installing Contractor shall have an established working relationship with Control System Manufacturer of not less than 5 years.
2. Installing Contractor and his Sub-Contractors shall have successfully completed manufacturer's control system training. Provide certification of completed training, including hours of instruction and course outlines, within 10 days after bid date.
3. Installing Contractor shall have an office within 75 miles of the project site and provide 24 hour response in the event of a customer call, 7-days per week, 365 days per year.

#### 1.5 Approved Control System Manufacturers and Installing Contractors

- A. The following control system manufacturers' products that are certified by either the BACnet Testing Laboratory or LonMark are pre-qualified:
  1. Johnson Controls, Inc. – Metasys (NAE) [BACnet]
  2. Siemens Building Technologies, Inc. – Apogee [BACnet]
  3. Honeywell International – Excel 5000 Open [BACnet]
- B. The following Installing Contractors are pre-qualified:
  1. Johnson Controls Inc.
  2. Siemens Building Technologies
  3. Honeywell International
- C. Any manufacturer or Installing Contractor not pre-qualified above shall submit credentials for the Engineer's review seven or more days prior to the bid date. Applications submitted after seven days prior to the bid date will not be considered. Credentials must attest that the manufacturer and installer meet all requirements above. The Engineer's judgment in reviewing any manufacturer or contractor will be final.

#### 1.6 Codes and Standards

- A. Work, materials, and equipment shall comply with the most restrictive of local, state, and federal authorities' codes and ordinances or these plans and specifications. As a minimum, the installation shall comply with the current editions of the following codes and standards:
  1. National Electric Code (NEC)
  2. Ohio Building Code (OBC) and Ohio Mechanical Code (OMC)
  3. National Fire Protection Association (NFPA)
  4. ANSI/ASHRAE Standard 55 Thermal Environmental Conditions For Human Occupancy
  5. ANSI/ASHRAE Standard 62 Ventilation For Acceptable Indoor Air Quality

6. ANSI/ASHRAE Standard 90.1 Energy Standard For Buildings Except Low-Rise Residential Buildings
7. ANSI/ASHRAE Standard 135, BACnet - A Data Communication Protocol for Building Automation and Control Networks
8. FCC Regulation, Part 15
9. Underwriters Laboratories: Products shall be UL-916-PAZX Listed
10. Underwriters Laboratories: Products shall be UL-864-UUKL Listed

#### 1.7 System Performance

- A. Performance Standards. System shall conform to the following minimum standards over network connections:
  1. Graphic Display. A graphic with 20 dynamic points/objects shall display with current data within 10 seconds.
  2. Graphic Refresh. A graphic with 20 dynamic points/objects shall update with current data within 8 seconds.
  3. Object Command. Devices shall react to command of a binary object within 2 seconds. Devices shall begin reacting to command of an analog object within 2 seconds.
  4. Object Scan. Data used or displayed at a controller or workstation shall have been current within the previous 6 seconds.
  5. Alarm Response Time. An object that goes into alarm shall be annunciated at the workstation within 45 seconds
  6. Program Execution Frequency. Custom and standard applications shall be capable of running as often as once every 5 second. Select execution times consistent with the mechanical process under control.
  7. Performance. Programmable controllers shall be able to completely execute DDC PID control loops at a frequency adjustable down to once per second. Select execution times consistent with the mechanical process under control.
  8. Multiple Alarm Annunciation. Each workstation on the network shall receive alarms within 5 seconds of other workstations.
  9. Reporting Accuracy. System shall report values with the minimum end-to-end accuracy listed in Table 1 of Section 23 09 25 Instrumentation and Control Devices.
  10. Control Stability and Accuracy. Control loops shall maintain measured variable at setpoint within tolerances listed in Table 2 of Section 23 09 25 Instrumentation and Control Devices.

#### 1.8 Submittals

- A. Refer to Section 23 05 01 – Basic HVAC Requirements
- B. Begin no work until submittals have been approved for conformity with design intent. Provide drawings as AutoCAD 2009 (or newer) compatible files on optical disk (file format: .dwg, .dxf, .vsd, or compatible) with 11 inches x 17 inches prints of each drawing. When manufacturer's cutsheets apply to a product series rather than a specific product, clearly indicate applicable data by highlighting or by other means. Clearly reference covered specification and drawing on each submittal. General catalogs shall not be accepted as cut sheets to fulfill submittal requirements. Select and show submittal quantities appropriate to scope of work. Provide submittals within 12 weeks after contract award, including the following:
  1. Direct Digital Control System Hardware
    - a. Complete bill of materials indicating quantity, manufacturer, model number, and other technical data of equipment to be used.
    - b. Manufacturer's description and technical data such as performance curves, product specification sheets, and installation and maintenance instructions for items listed below and for relevant items not listed below:
      - 1) Direct digital controllers (controller panels)
      - 2) Transducers and transmitters
      - 3) Sensors (including accuracy data)
      - 4) Actuators
      - 5) Dampers
      - 6) Relays and switches
      - 7) Control panels
      - 8) Power supplies
      - 9) Batteries
      - 10) Operator interface equipment
      - 11) Wiring
    - c. Wiring diagrams and layouts for each control panel.
    - d. Floor plan schematic diagrams indicating field sensor, controller and power supply locations.
  2. Network and Workstation Hardware and Software
    - a. Complete bill of material indicating quantity, manufacturer, model number, and relevant technical data of equipment used.

- b. Manufacturer's description and technical data, such as product specifications and installation and maintenance instructions for items listed below and for relevant items furnished under this contract not listed below:
    - 1) Central Processing Unit (CPU)
    - 2) Monitors
    - 3) Keyboards
    - 4) Power supply
    - 5) Battery backup
    - 6) Interface equipment between CPU and control panels
    - 7) Routers
    - 8) Repeaters
    - 9) Operating System software
    - 10) Operator interface software
    - 11) Color graphic software
    - 12) Third-party software
  - c. Schematic diagrams of control, communication, and power wiring for central system installation. Label cables and ports with computer manufacturers' model numbers and functions. Show wiring to control system.
  - d. List of color graphics to be provided. Provide a conceptual layout of pictures and data for each graphic, showing or explaining which other graphics can be directly accessed.
3. Controlled Systems
- a. Riser diagrams showing control network layout, communication protocol, and wire types.
  - b. Schematic diagram of each controlled system. Label control points/objects with point/object names. Graphically show locations of control elements.
  - c. Schematic wiring diagram of each controlled system. Label control elements and terminals. Where a control element is also shown on control system schematic, use the same name.
  - d. Instrumentation list for each controlled system. List each control system element in a table. Show element name, type of device, manufacturer, model number, and product data sheet number.

- e. Mounting, wiring, and routing plan view drawing in ¼ inch scale. Take into account HVAC, electrical and other systems' design and elevation requirements. Show locations of concrete pads and bases and special wall bracing for panels to accommodate this work.
  - f. Complete description of control system operation including sequences of operation. Include and reference a schematic diagram of system.
  - g. Point/object list for each system controller including inputs and outputs (I/O), point/object numbers, controlled device associated with each I/O point/object, and location of I/O device. Indicate alarmed and trended points/objects.
4. Description of process, report formats, and checklists to be used in Part 3: "Control System Demonstration and Acceptance."
  5. BACnet Protocol Implementation Conformance Statement (PICS) for each submitted type of BACnet controller (B-BC, B-AAC, B-ASC) and operator interface (B-OWS).
- C. Schedules
1. Schedule of work provided within one month of contract award indicating:
    - a. Intended sequence of work items
    - b. Start date of each work item
    - c. Duration of each work item
    - d. Planned delivery dates for ordered material and equipment, and expected lead time
    - e. Milestones indicating possible restraints on work by other trades or situations
  2. Monthly written status reports indicating work completed and revisions to expected delivery dates. Include updated schedule of work.
- D. Project Record Documents. Submit three copies of record (as-built) documents upon completion of installation for approval prior to final completion. Submittal shall consist of:
1. Project Record Drawings.
    - a. As-built versions of the submittal shop drawings provided as AutoCAD 2009 (or newer) compatible files on optical media and as 11 inches x 17 inches prints.
    - b. Submittals to include complete electrical point-to-point wiring diagrams, component layouts, system and equipment component sequences of operation, start-up and checkout procedures. Include a list of all unit default safety and control settings, whether fixed or adjustable, as shipped from the factory. Where field modifications are required to meet the specification,

provide all modification labor and materials, and submit a complete, detailed, step-by-step procedure for the modifications.

2. Testing and Commissioning Reports and Checklists. Completed versions checklists and trend logs used to meet requirements of Part 3: “Control System Demonstration and Acceptance.”
3. Operation and Maintenance (O & M) Manual.
  - a. As-built versions of the submittal product data.
  - b. Names, addresses, and 24-hour telephone numbers of installing contractors and service representatives for equipment and control systems.
  - c. Operator’s manual with procedures for operating control systems: logging on and off, handling alarms, producing point/object reports, trending data, overriding computer control, and changing setpoints and variables.
  - d. Programming manual or set of manuals with description of the programming language and syntax of statements for algorithms and calculations used of point/object database creation and modification, of program creation and modification, and editor use.
  - e. Engineering, installation, and maintenance manual or set of manuals that explains how to design and install new points/objects, panels, and other hardware; how to perform preventive maintenance and calibration; how to debug hardware problems; and how to repair or replace hardware.
  - f. Documentation of all programs created using custom programming language including setpoints, tuning parameters, and object database.
  - g. Graphic files, programs and database on magnetic or optical media.
  - h. List of recommended spare parts with part numbers and suppliers.
  - i. Complete original-issue documentation, installation, and maintenance information for furnished third-party hardware, including computer equipment and sensors.
  - j. Complete original-issue copies of furnished software, including operating systems, custom programming language, operator workstation software, and graphics software.
  - k. Licenses, guarantee, and warranty documents for equipment and systems.
  - l. Recommended preventive maintenance procedures for system components, including schedule of tasks such as inspection, cleaning, and calibration; time between tasks; and task descriptions.
4. Training Materials: Provide course outline and manuals for each class at least six weeks before the first class. Engineer will modify course outlines and manuals if necessary to meet Owner’s needs. Engineer will review and approve course outlines and manuals at least three weeks before first class.

## 1.9 Warranty

### A. Warrant all work as follows:

1. Warrant labor and materials for specified control system free from defects for a period of 12 months after final acceptance. Control system failures during warranty period shall be adjusted, repaired, or replaced at no additional cost or reduction in service to the Owner. Respond during Owner's business hours within 24 hours of Owner's warranty service request.
2. Work shall have a single warranty date, even if Owner receives beneficial use due to early system start-up. If specified work is split into multiple contracts or a multi-phase contract, each contract or phase shall have a separate warranty start date and period.
3. If Engineer determines that equipment and systems operate satisfactorily at the end of the final start-up, testing, and commissioning phase, Engineer will certify in writing that control system operation has been tested and accepted in accordance with the terms of this specification. Date of acceptance shall begin warranty period.
4. Provide updates to operator workstation software, project-specific software, graphic software, database software, and firmware which resolve Contractor identified software deficiencies at no charge during warranty period. If available, Owner can purchase in-warranty service agreement to receive upgrades for functional enhancements associated with above mentioned items. Do not install updates or upgrades without Owner's written authorization.
5. Exception: Reused devices shall not be required to be warranted except those that have been rebuilt or repaired. Installation labor and materials shall be warranted. Demonstrate operable condition of reused devices at time of Engineer's acceptance.

## 1.10 Ownership Of Proprietary Material

- A. Project specific software and documentation shall become Owner's property. This includes, but is not limited to:
1. Graphics
  2. Record drawings
  3. Database
  4. Application programming code
  5. Documentation

## PART 2 - PRODUCTS

### 2.1 Materials



- A. The equipment specified shall be provided as defined herein, shown on the drawings and as required to accomplish the sequence of control.
- B. Use new products that the manufacturer is currently manufacturing and that have been installed in a minimum of 25 installations. Do not use this installation as a product test site unless explicitly approved in writing by Owner or Owner's Representative. Spare parts shall be available for at least five-years after completion of this contract.

## 2.2 BACnet Communications

- A. Control products, communication media, connectors, repeaters, hubs and routers shall comprise a BACnet internetwork. Controllers and operator interface communication shall conform to ANSI/ASHRAE Standard 135-2007, BACnet.
- B. Each controller shall have a communication port for connections to an interface.
- C. Project drawings indicate remote buildings or sites to be connected by a nominal 56,000 baud modem over voice-grade telephone lines. In each remote location, a modem and field device connection shall allow communication with each controller on internetwork as specified in Paragraph D below.
- D. Internetwork operator interface and value passing shall be transparent to internetwork architecture.
  - 1. An operator interface connected to a controller shall allow the operator to interface with internetwork controller as if directly connected. Controller information such as data, status, reports, system software, algorithms, and custom programs, shall be viewable and editable from each internetwork controller.
  - 2. Inputs, outputs, and control variables used to integrate control strategies across multiple controllers shall be readable by each controller on the internetwork. Program and test all cross-controller links required to execute specified control system operation. An authorized operator shall be able to edit cross-controller links by typing a standard object address via the internetwork.
- E. Controllers with real-time clocks shall use the BACnet Time Synchronization service. System shall automatically synchronize system clock daily from an operator designated device via the internetwork. If applicable, system shall automatically adjust for daylight saving and standard time.
- F. System shall be expandable to at least twice the required input and output objects with additional controllers, associated devices, and wiring. Expansion shall not require operator interface hardware additions or software revisions.

## 2.3 Controller Software

- A. Local system control shall be performed by a field programmable Direct Digital Controller microprocessor based, which incorporates Direct Digital Control, and all necessary energy management functions. Field programming shall be via a user programmable software package which allows the user (programmer) to write

unique programs thru the local operators terminal. Digital Control Systems which require off site software development or which are not programmable (burned in sequences) are not acceptable.

- B. The Direct Digital Controller shall perform its assigned control and energy management functions as a stand-alone unit, however it shall be incorporated into a DDCS local network (BACnet, LonTalk, MODBUS) for communication with local or remote operator workstations, web browsers, or servers. The digital controller shall perform its full control and energy management functions, regardless of the condition of communications link with local or remote operator workstations, web browsers, or servers. In addition, when more than one digital controller is required to meet these specifications, the digital control system shall be capable of sharing information between digital controllers to develop complex strategies and common point sensing. Permanently connect all controllers and system equipment displays, computers, modems, routers, etc., together via a communications network for a complete and interoperable system.
- C. Energy Management. The DDCS shall have software capable of performing all the energy management functions necessary to reduce energy consumption. These programs include, but are not limited to: supply air reset using space load demand, enthalpy economizer control, supply water reset, optimal start using an adaptive algorithm to prevent the need for manual adjustment of parameters.
- D. Owner tailored programs. A library of routines shall be resident in the digital control system, capable of generating additional programs thru the local program terminal as may be required for specified owner requirements. These include, in part: demand control, intermediate season (dead zone) control, variable air volume fan matching and supply fan control, trending of variables, historical data storage (60 values for 30 changes of value minimum), totalizing, holiday programming.
- E. Furnish the following applications software for building and energy management. All software applications shall reside and operate in the system controllers. Editing of applications shall occur at the operator workstation.
- F. System Security
  - 1. User access shall be secured using individual security passwords and user names.
  - 2. Passwords shall restrict the user to the objects, applications, and system functions as assigned by the system manager.
  - 3. User Log On/Log Off attempts shall be recorded.
  - 4. The system shall protect itself from unauthorized use by automatically logging off following the last keystroke. The delay time shall be user-definable.
- G. Scheduling. Provide the capability to schedule each object or group of objects in the system. Each schedule shall consist of the following:
  - 1. Weekly Schedule. Provide separate schedules for each day of the week. Each of these schedules should include the capability for start, stop, optimal start and

- night economizer. Each schedule may consist of up to 10 events. When a group of objects are scheduled together, provide the capability to adjust the start and stop times for each member.
2. Exception Schedules. Provide the ability for the operator to designate any day of the year as an exception schedule. Exception schedules may be defined up to one year in advance. Once an exception schedule is executed, it will be discarded and replaced by the standard schedule for that day of the week.
  3. Holiday Schedules. Provide the capability for the operator to define up to 99 special or holiday schedules. These schedules may be placed on the scheduling calendar and will be repeated each year. The operator shall be able to define the length of each holiday period.
- H. System Coordination. Provide a standard application for the proper coordination of equipment. This application shall provide the operator with a method of grouping together equipment based on function and location. This group may then be used for scheduling and other applications.
- I. Binary Alarms. Each binary object shall be set to alarm based on the operator-specified state. Provide the capability to automatically and manually disable alarming.
- J. Analog Alarms. Each analog object shall have both high and low alarm limits. Alarming must be able to be automatically and manually disabled.
- K. Alarm Reporting. The operator shall be able to determine the action to be taken in the event of an alarm. Alarms shall be routed to the appropriate workstations based on time and other conditions. An alarm shall be able to start programs, print, be logged in the event log, generate custom messages, and display graphics.
- L. Remote Communication. System shall automatically contact operator workstation or server on receipt of critical alarms. The system shall have the ability to dial out in the event of an alarm using BACnet Point-To-Point at a minimum of 56K baud. Receivers shall be BACnet workstations.
- M. Maintenance Management. The system shall monitor equipment status and generate maintenance messages based upon user-designated run-time, starts, and/or calendar date limits.
- N. Sequencing. Provide application software based upon the sequences of operation specified to properly sequence chillers, boilers, and pumps.
- O. PID Control. A PID (proportional-integral-derivative) algorithm with direct or reverse action and anti-windup shall be supplied. The algorithm shall calculate a time-varying analog value that is used to position an output or stage a series of outputs. The controlled variable, setpoint, and PID gains shall be user-selectable.
- P. Staggered Start. This application shall prevent all controlled equipment from simultaneously restarting after a power outage. The order in which equipment (or groups of equipment) is started, along with the time delay between starts, shall be user-selectable.

Q. Energy Calculations.

1. Provide software to allow instantaneous power (e.g., kW) or flow rates (e.g., L/s GPM) to be accumulated and converted to energy usage data.
2. Provide an algorithm that calculates a sliding-window average (e.g., rolling average). The algorithm shall be flexible to allow window intervals to be user specified (e.g., 15-minutes, 30-minutes, 60-minutes).
3. Provide an algorithm that calculates a fixed-window average. A digital input signal shall define the start of the window period (e.g., signal from utility meter) to synchronize the fixed window average with that used by the utility.

R. Anti-Short Cycling. All binary output objects shall be protected from short cycling. This feature shall allow minimum on-time and off-time to be selected.

S. On/Off Control with Differential. Provide an algorithm that allows a binary output to be cycled based on a controlled variable and setpoint. The algorithm shall be direct-acting or reverse-acting, and incorporate an adjustable differential.

T. Run-time Totalization. Provide software to totalize run-times for all binary objects. A high run-time alarm shall be assigned, if required, by the operator.

U. Demand-Controlled Ventilation. Provide a program to adjust the quantity of outdoor ventilation air supplied to a zone by a central air handling unit based on the ventilation rate required to provide adequate indoor air quality in accordance with ASHRAE Standard 62.

2.4 BACnet Building Controller (B-BC)

A. General. Provide an adequate number of BACnet Building Controllers (B-BC) to achieve the performance specified in the Part 1 Article on "System Performance." Each of these panels shall meet the following requirements.

1. The Building Automation System shall be comprised of one or more independent, standalone, microprocessor-based building controllers to manage the global strategies described in the System Software section.
2. The building controller shall have sufficient memory to support its operating system, database, and programming requirements.
3. Data shall be shared between networked building controllers.
4. The operating system of the building controller shall manage the input and output communication signals to allow distributed controllers to share real and virtual object information, and allow central monitoring and alarms.
5. Controllers that perform scheduling shall have a real-time clock.
6. The building controller shall continually check the status of its processor and memory circuits. If an abnormal operation is detected, the controller shall
  - a. Assume a predetermined failure mode,

b. Generate an alarm notification.

7. The building controller shall communicate with other BACnet devices on the internetwork using the Read (Execute and Initiate) and Write (Execute and Initiate) Property services as defined in Clauses 15.5 and 15.8, respectively, of ASHRAE Standard 135-2007.

Building Controller BACnet Services	Initiate	Execute
Acknowledge Alarms	--	X
Confirmed COV Notification	X	X
Confirmed Event Notification	X	X
Get Alarm Summary	X	X
Get Enrollment Summary	X	X
Subscribe COV	X	X
Unconfirmed COV Notification	X	X
Unconfirmed Event Notification	X	X
Atomic Read File	--	X
Atomic Write File	--	X
Add List Element	--	X
Remove List Element	--	X
Create Object	--	X
Delete Object	--	X
Read Property	X	X
Read Property Multiple	X	X
Write Property	X	X
Read Range	--	X
Write Property Multiple	X	X
Device Communication Control	--	X
Confirmed Private Transfer	X	X
Unconfirmed Private Transfer	X	X
Reinitialize Device	--	X
Time Synchronization	X	X
Who-Has	--	X
I-Have	X	X
Who-Is	X	X
I-Am	X	X

8. BACnet Functional Groups. The Building Controller shall support the following BACnet functional groups: Clock, Event Initiation, COV Event Response, Files, Device Communication and Time Master.

B. Communication

1. Each building controller shall reside on a BACnet network using the ISO 8802-3 (Ethernet) Data Link/ Physical layer protocol. Each building controller also shall perform BACnet routing if connected to a network of advanced application and application specific controllers.
2. The controller shall provide a service communication port using BACnet Data Link/Physical layer protocol for connection to a portable operator's terminal.

- C. Environment. Controller hardware shall be suitable for the anticipated ambient conditions.
  - 1. Controllers used outdoors and/or in wet ambient conditions shall be mounted within waterproof enclosures, and shall be rated for operation at 0 degrees C to 65 degrees C [32 degrees F to 150 degrees F] and 10 to 90 percent RH.
  - 2. Controllers used in conditioned space shall be mounted in dust proof enclosures, and shall be rated for operation at 0 degrees C to 50 degrees C [32 degrees F to 120 degrees F].
- D. Keypad. A local keypad and display shall be provided for each controller. The keypad shall be provided for interrogating and editing data. An optional system security password shall be available to prevent unauthorized use of the keypad and display. If the manufacturer does not provide this keypad and display, provide a portable operator terminal.
- E. Serviceability. Provide diagnostic LEDs for power, communication, and processor. All wiring connections shall be made to field-removable, modular terminal strips or to a termination card connected by a ribbon cable.
- F. Memory. The building controller shall maintain all BIOS and programming information in the event of a power loss for at least 72 hours.
- G. Immunity to power and noise. Controller shall be able to operate at 90 percent to 110 percent of nominal voltage rating and shall perform an orderly shutdown below 80 percent nominal voltage. Operation shall be protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W at 1 m [3 ft].

## 2.5 BACnet Advanced Application Controller (B-AAC)

- A. General. Provide an adequate number of BACnet Advanced Application Controllers (B-AAC) to achieve the performance specified in the Part 1 Article on “System Performance”. Each of these panels shall meet the following requirements.
  - 1. The B-AAC shall have sufficient memory to support its operating system, database, and programming requirements.
  - 2. Data shall be shared between networked B-AACs.
  - 3. The operating system of the controller shall manage the input and output communication signals to allow distributed controllers to share real and virtual object information, and allow central monitoring and alarms.
  - 4. Controllers that perform scheduling shall have a real-time clock.
  - 5. The B-AAC shall continually check the status of its processor and memory circuits. If an abnormal operation is detected, the controller shall
    - a. Assume a predetermined failure mode,
    - b. Generate an alarm notification.

6. The B-AAC shall communicate with other BACnet devices on the internetwork using the Read (Execute and Initiate) and Write (Execute and Initiate) Property services as defined in Clauses 15.5 and 15.8, respectively, of ASHRAE Standard 135-2007. All B-AACs shall bear the applicable BACnet Testing Laboratory logo on each product delivered.
7. The application control program shall be resident within the same enclosure as the input/output circuitry, which translates the sensor signals.
8. Provide documentation for each device, with the following information:
  - a. BACnet Device; MAC address, name, type and instance number,
  - b. BACnet Objects; name, type and instance number.

B. Communication

1. Each B-AAC shall reside on a BACnet network using the MS/TP or Ethernet Data Link/ Physical layer protocol.
2. The controller shall provide a service communication port using BACnet Data Link/Physical layer protocol for connection to a portable operator's terminal.

C. Environment. Controller hardware shall be suitable for the anticipated ambient conditions.

1. Controllers used outdoors and/or in wet ambient conditions shall be mounted within waterproof enclosures, and shall be rated for operation at 32 degrees F to 150 degrees F and 10 to 90 percent RH.
2. Controllers used in conditioned space shall be mounted in dust proof enclosures, and shall be rated for operation at 32 degrees F to 120 degrees F.

D. Keypad. A local keypad and display shall be provided for each controller. The keypad shall be provided for interrogating and editing data. An optional system security password shall be available to prevent unauthorized use of the keypad and display. If the manufacturer does not provide this keypad and display, provide a portable operator terminal.

E. Serviceability. Provide diagnostic LEDs for power, communication, and processor. All wiring connections shall be made to field-removable, modular terminal strips or to a termination card connected by a ribbon cable.

F. Memory. The custom application controller shall maintain all BIOS and programming information in the event of a power loss for at least 72 hours.

G. Immunity to power and noise. Controller shall be able to operate at 90 percent to 110 percent of nominal voltage rating and shall perform an orderly shutdown below 80 percent nominal voltage. Operation shall be protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W at 3 ft.

2.6 BACnet Application Specific Controller (B-ASC)

- A. General. BACnet Application Specific Controllers (B-ASCs) are microprocessor-based DDC controllers which through hardware or firmware design are dedicated to control a specific piece of equipment. They are not fully user-programmable, but are customized for operation within the confines of the equipment they are designed to serve. Application Specific Controllers shall communicate with other BACnet devices on the internetwork using the Read (Execute) Property service as defined in Clause 15.5 of ASHRAE Standard 135-2007. All B-ASCs shall bear the applicable BACnet Testing Laboratory logo on each product delivered.
1. Each B-ASC shall be capable of stand-alone operation and shall continue to provide control functions without being connected to the network
  2. Each B-ASC will contain sufficient I/O capacity to control the target system.
  3. The application control program shall be resident within the same enclosure as the input/output circuitry, which translates the sensor signals.
  4. Provide documentation for each device, with the following information:
    - a. BACnet Device; MAC address, name, type and instance number,
    - b. BACnet Objects; name, type and instance number.
- B. Communication
1. Each controller shall reside on a BACnet network using the MS/TP or Ethernet Data Link/ Physical layer protocol. Each network of controllers shall be connected to one building controller.
  2. Each controller shall have a BACnet Data Link/Physical layer compatible connection for a laptop computer or a portable operator's tool. This connection shall be extended to a space temperature sensor port where shown and allow access to the entire network.
  3. Each controller shall have a secondary sub network for communicating sensors or I/O expansion modules.
- C. Environment. Controller hardware shall be suitable for the anticipated ambient conditions.
1. Controllers used outdoors and/or in wet ambient conditions shall be mounted within waterproof enclosures, and shall be rated for operation at 32 degrees F to 150 degrees F and 10 to 90 percent RH.
  2. Controllers used in conditioned space shall be mounted in dust proof enclosures, and shall be rated for operation at 32 degrees F to 120 degrees F.
- D. Serviceability. Provide diagnostic LEDs for power, communication, and processor. All wiring connections shall be made to field-removable, modular terminal strips or to a termination card connected by a ribbon cable.
- E. Memory. The application specific controller shall use nonvolatile memory and maintain all BIOS and programming information in the event of a power loss.



- F. Immunity to power and noise. Controller shall be able to operate at 90 percent to 110 percent of nominal voltage rating and shall perform an orderly shutdown below 80 percent nominal voltage. Operation shall be protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W at 3 ft.
- G. Transformer. Power supply for the ASC must be rated at a minimum of 125 percent of ASC power consumption and shall be of the fused or current limiting type.

## 2.7 Input/Output Interface

- A. Hardwired inputs and output points/objects may be wired into the system through building, advanced application, or application specific controllers.
- B. All input and output points shall be protected such that shorting of the point to itself, to another point, or to ground, shall cause no damage to the controller. All input and output points shall be protected from voltage up to 24 volts of any duration, such that contact with this voltage will cause no damage to the controller.
- C. Binary inputs shall allow the monitoring of ON/OFF signals from remote devices. The binary inputs shall provide a wetting current of at least 12 mA to be compatible with commonly available control devices and shall be protected against the effects of contact bounce and noise. Binary inputs shall sense “dry contact” closure without external power (other than that provided by the controller) being applied.
- D. Pulse accumulation input objects. This type of object shall conform to all the requirements of binary input objects and also accept up to 10 pulses per second for pulse accumulation.
- E. Analog inputs shall allow the monitoring of low-voltage (0-10 VDC), current (4-20 mA), or resistance signals (thermistor, RTD). Analog inputs shall be compatible with – and field configurable to – commonly available sensing devices.
- F. Binary outputs shall provide for ON/OFF operation or a pulsed low-voltage signal for pulse width modulation control. Binary outputs on building and custom application controllers shall have three-position (On/Off/Auto) override switches, and status lights. Outputs shall be selectable for either normally open or normally closed operation.
- G. Analog outputs shall provide a modulating signal for the control of end devices. Outputs shall provide either a 0 to 10 VDC signal or a 4 to 20 mA signal as required to provide proper control of the output device. Analog outputs on building or custom application controllers shall have status lights and a two-position (AUTO/MANUAL) switch and manually adjustable potentiometer for manual override. Analog outputs shall not exhibit a drift of greater than 0.4 percent of range per year.
- H. Tri-State Outputs. Provide tri-state outputs (two coordinated binary outputs) for control of three-point floating type electronic actuators without feedback. Use of three-point floating devices shall be limited to zone control and terminal unit control applications (VAV terminal units, duct mounted heating coils, zone dampers, radiation, etc.) Control algorithms shall run the zone actuator to one end of its stroke once every 24 hours for verification of operator tracking.

- I. Input/Output points shall be universal type, i.e., controller input or output may be designated (in software) as either a binary or analog type point with appropriate properties. Application specific controllers are exempted from this requirement.
- J. System Object Capacity. The system size shall be expandable to at least twice the number of input/output objects required for this project. Additional controllers (along with associated devices and wiring) shall be all that is necessary to achieve this capacity requirement. The operator interfaces installed for this project shall not require any hardware additions or software revisions in order to expand the system.
- K. Each controlled device or function shall be a separate output of the digital controller (i.e., Economizer, Heating Valve, Cooling Valve are three (3) separate output points). When a points' list is provided the greater number of points and their configuration shall govern. Multiplexers or programmable logic controllers utilized with digital controller input and output points to expend the digital controller I/O capabilities will not be allowed.
- L. Refer to section 23 09 13 Instrumentation and Control Devices for HVAC.

### PART 3 - EXECUTION

#### 3.1 Examination

- A. The project plans shall be thoroughly examined for control device and equipment locations. Any discrepancies, conflicts, or omissions shall be reported to the Engineer for resolution before rough-in work is started.
- B. Inspect the site to verify that equipment may be installed as shown. Any discrepancies, conflicts, or omissions shall be reported to the Engineer for resolution before rough-in work is started.
- C. Examine the drawings and specifications for other parts of the work. If head room or space conditions appear inadequate or if any discrepancies occur between the plans and the Contractor's work and the plans and the work of others, then report these discrepancies to the Engineer and obtain written instructions for any changes necessary to accommodate the temperature control work with the work of others. Any changes in the work covered by this specification made necessary by the failure or neglect to report such discrepancies shall be made by and the costs borne by this Contractor.

#### 3.2 Protection

- A. Protect all work and material from damage by his work or employees, and shall be liable for all damage thus caused.
- B. The installing contractor shall be responsible for his work and equipment until finally inspected, tested, and accepted. Protect any material that is not immediately installed. Close all open ends of work with temporary covers or plugs during storage and construction to prevent entry of foreign objects.

#### 3.3 Coordination

- A. Site

1. Where the temperature control work will be installed in close proximity to, or will interfere with work of other trades, assist in working out space conditions to make a satisfactory adjustment. If temperature control work is installed before coordinating with other trades, so as to cause any interference with work of other trades, the temperature control work shall be re-worked to correct the condition without extra charge.
2. Coordinate and schedule work with all other work in the same area, or with work which is dependent upon other work, to facilitate mutual progress.

B. Test and Balance

1. Furnish all tools necessary to interface to the control system for test and balance purposes.
2. Provide training in the use of these tools. This training will be planned for a minimum of 4 hours.
3. In addition provide a qualified technician to assist in the test and balance process, until the first 20 terminal units are balanced.
4. The tools used during the test and balance process will be returned at the completion of the testing and balancing.

C. Coordination with controls specified in other sections or divisions. Other sections and/or divisions of this specification include controls and control devices that are to be part of or interfaced to the control system specified in this section. These controls shall be integrated into the system and coordinated as follows:

1. All communication media and equipment shall be provided as specified in Part 2: "Communication" of this specification.
2. Each supplier of controls product is responsible for the configuration, programming, start-up, and testing of that product to meet the sequences of operation described in this section.
3. Coordinate and resolve any incompatibility issues that arise between the control products provided under this Section and those provided under other sections or divisions of this specification.

D. Revise equipment tagging and nomenclature, room numbering, etc. to reflect as-built conditions or an Owner's preference for integration into his existing naming numbering convention.

3.4 Field Quality Control

- A. All work, materials, and equipment shall comply with the rules and regulations of applicable local, state, and federal codes and ordinances as identified in Part 1 of this specification.
- B. Continually monitor the field installation for code compliance and quality of workmanship.

- C. Have work inspected by authorities having jurisdiction over the work.

### 3.5 Controllers

- A. Provide a separate controller for each AHU or other HVAC system. A DDC controller may control more than one system provided that all points/objects associated with the system are assigned to the same DDC controller. Points/objects used for control loop reset such as outside air or space temperature are exempt from this requirement.
- B. Building Controllers and Custom Application Controllers shall be selected to provide a minimum of 15 percent spare I/O point/object capacity for each point/object type found at each location. If input /objects are not universal, 15 percent of each type is required. If outputs are not universal, 15 percent of each type is required. A minimum of one spare is required for each type of point/object used.
  - 1. Future use of spare capacity shall require providing the field device, field wiring, point/object database definition, and custom software. No additional controller boards or point/object modules shall be required to implement use of these spare points.

### 3.6 Programming

- A. Provide sufficient internal memory for the specified sequences of operation and trend logging. There shall be a minimum of 25 percent of available memory free for future use.
- B. Point/object Naming: System point/object names shall be modular in design, allowing easy operator interface without the use of a written point/object index. Use the following naming convention:

AAABBBCCCDDDEEE where:

AAA is used to designate the location of the point/object within the building such as mechanical room, wing, or level, or the building itself in a multi-building environment.

BBB is used to designate the mechanical system with which the point/object is associated (e.g., A01, HTG, CLG, LTG).

CCC represents the equipment or material referenced (e.g., SAF for supply air fan, EXF for exhaust fan, RAF for return air fan).

D or DD or DDD may be used for clarification or for identification if more than one of CCC exists (e.g., SAF10, EXF121).

EE represents the action or state of the equipment or medium (e.g., T for temperature, RH for humidity, CO/NO2 for control, S for status, D for damper control, I for current).

- C. Software Programming

- 1. Provide programming for the system and adhere to the sequences of operation provided. All other system programming necessary for the operation of the

system, but not specified in this document, also shall be provided. Imbed into the control program sufficient comment statements to clearly describe each section of the program. The comment statements shall reflect the language used in the sequences of operation. Use the appropriate technique based on the following programming types:

a. Text-based:

- 1) must provide actions for all possible situations
- 2) must be modular and structured
- 3) must be commented

b. Graphic-based

- 1) must provide actions for all possible situations
- 2) must be documented

c. Parameter-based

- 1) must provide actions for all possible situations
- 2) must be documented

2. After submittal and review of control software, offer to schedule a meeting with the Engineer and Commissioning Agent (CxA) to review system function.

D. Operator Interface

1. Standard Graphics. Provide graphics for all controlled systems and floor plans of the building. Point/object information on the graphic displays shall dynamically update. Show on each graphic all input and output points/objects for the system. Also show relevant calculated points/objects such as setpoints.
2. Show terminal equipment information on a “graphic” summary table. Provide dynamic information for each point/object show.
3. Provide all the labor necessary to install, initialize, start up, and troubleshoot all operator interface software and their functions as described in this section. This includes any operating system software, the operator interface database, and any third-party software installation and integration required for successful operation of the operator interface.

3.7 Control System Checkout And Testing

- A. Start-up Testing: All testing listed in this article shall make up part of the necessary verification of an operating control system. This testing shall be completed before the Owner’s Representative is notified of the system demonstration.

1. Upon completion of the control system, adjust all components of the system. Make all adjustments in the control system required and as directed by the

balancer to achieve the desired air balance quantities. All instruments shall be carefully calibrated and each control function shall be demonstrated to function properly, to the satisfaction of the Engineer and the Owner. Provide a complete instruction manual covering the function and operation of all components. At the time of demonstration, each function shall be simulated to ensure that controls respond properly to all signals, and the Owner shall be instructed in the proper operation of the system.

2. Furnish all labor and test apparatus required to calibrate and prepare for service of all instruments, controls, and accessory equipment furnished under this specification.
3. Verify that all control wiring is properly connected and free of all shorts and ground faults. Verify that terminations are tight.
4. Enable the control systems and verify calibration of all input devices individually. Perform calibration procedures per manufacturers' recommendations.
5. Verify that all binary output devices (relays, solenoid valves, two position actuators and control valves, magnetic starters, etc.) operate properly and that the normal positions are correct.
6. Verify that all analog output devices (transducers, actuators, etc.) are functional, that start and span are correct, and that direction and normal positions are correct. Check all control valves and automatic dampers to ensure proper action and closure. Make any necessary adjustments to valve stem and damper blade travel.
7. Verify that the system operation adheres to the Sequences of Operation. Simulate and observe all modes of operation by overriding and varying inputs and schedules. Tune all DDC loops and optimum Start/Stop routines.
8. Alarms and Interlocks
  - a. Check each alarm separately by including an appropriate signal at a value that will trip the alarm.
  - b. Interlocks shall be tripped using field contacts to check the logic, as well as to ensure that the fail-safe condition for all actuators is in the proper direction.
  - c. Interlock actions shall be tested by simulating alarm conditions to check the initiating value of the variable and interlock action.
9. Each unit and associated controls, safeties and wiring shall be checked out, started and adjusted by a factory trained service technician. Submit a startup report including a list of all unit safety and control settings, whether fixed or adjustable, as field checked and setup per the specified design conditions five days after unit startup. Submit service technician certification upon request.

### 3.8 Control System Demonstration And Acceptance

#### A. Demonstration

1. Prior to acceptance, the control system shall undergo a series of performance tests to verify operation and compliance with this specification. These tests shall occur after the temperature controls have been completed, started up and performed its own tests.
2. The tests described in this section are to be performed in addition to the tests that are performed as a necessary part of the installation, startup, and debugging process and as specified in the “Control System Checkout and Testing” Article in Part 3 of this specification. The Engineer may be present to observe and review these tests. The Engineer shall be notified at least 10 days in advance of the start of the testing procedures.
3. The demonstration process shall follow that approved in Part 1: “Submittals.” The approved checklists and forms shall be completed for all systems as part of the demonstration.
4. Provide at least two persons equipped with two way communication, and demonstrate actual field operation of each control and sensing point for all modes of operation including day, night, occupied, unoccupied, fire/smoke alarm, seasonal changeover, and power failure modes. The purpose is to demonstrate the calibration, response, and action of every point/object and system. Provide and operate any test equipment required to prove the proper operation.
5. As each control input and output is checked, a log shall be completed showing the date, technician’s initials, and any corrective action taken or needed.
6. Demonstrate compliance with Part 1: “System Performance.
7. Demonstrate compliance with Sequences of Operation through all modes of operation.
8. Demonstrate complete operation of Operator Interface.
9. Additionally, the following items shall be demonstrated:
  - a. Optimum Start. Supply a trend data output showing the capability of the algorithm. The hour by hour trends shall include the output status of all optimally started equipment, as well as temperature sensor inputs of affected areas.
  - b. Interface to the building fire alarm system.
  - c. Operational logs for each system that indicate all setpoints, operating points, valve positions, mode, and equipment status shall be submitted to the Engineer. These logs shall cover three 48 hour periods and have a sample frequency of not more than 10 minutes. The logs shall be provided in both printed and disk formats.
10. Any tests that fail to demonstrate the operation of the system shall be repeated at a later date, and any necessary repairs or revisions to the hardware or software to successfully complete all tests shall be made.

B. Acceptance

1. All tests described in this specification shall have been performed to the satisfaction of both the Engineer and Owner prior to the acceptance of the control system as meeting the requirements of Completion. Any tests that cannot be performed due to circumstances beyond the control of the contractor may be exempt from the Completion requirements if stated as such in writing by the Engineer. Such tests shall then be performed as part of the warranty.
  2. The system shall not be accepted until all forms and checklists completed as part of the demonstration are submitted and approved as required in Part 1: Submittals.
- C. During the first year of operation, after acceptance by the Owner, provide complete service to adjust or assist the Owner in adjusting the equipment to obtain optimum performance from the control equipment and from the heating and air conditioning systems in general. This shall be done without additional expense to the Owner. This work shall include revisions to DDC software programs and controller, and all PC front end software upgrades. All software shall be provided to the Owner in disk form, including back-ups of final field programs.

### 3.9 Cleaning

- A. Clean up all debris resulting from its activities daily. Remove all cartons, containers, crates, etc., under its control as soon as their contents have been removed. Waste shall be collected and placed in a designated location.
- B. At the completion of work in any area, clean all work, equipment, etc., keeping it free from dust, dirt, and debris, etc.
- C. At the completion of work, all equipment furnished under this section shall be checked for paint damage, and any factory-finished paint that has been damaged shall be repaired to match the adjacent areas. Any cabinet or enclosure that has been deformed shall be replaced with new material and repainted to match the adjacent areas.

### 3.10 Training

- A. Provide a minimum of one onsite training classes 8 hours in length during the construction period for personnel designated by the owner.
- B. Train the designated staff of Owner's Representative and Owner to enable them to:
  1. Day-to-day Operators:
    - a. Proficiently operate the system
    - b. Understand control system architecture and configuration
    - c. Understand DDC system components
    - d. Understand system operation, including DDC system control and optimizing routines (algorithms)
    - e. Operate the workstation and peripherals



- f. Log on and off the system
  - g. Access graphics, point/object reports, and logs
  - h. Adjust and change system setpoints, time schedules, and holiday schedules
  - i. Recognize malfunctions of the system by observation of the printed copy and graphical visual signals
  - j. Understand system drawings, and Operation and Maintenance manual
  - k. Understand the job layout and location of control components
  - l. Access data from DDC controllers
  - m. Operate portable operator's terminals
2. Advanced Operators:
- a. Make and change graphics on the workstation
  - b. Create, delete, and modify alarms, including annunciation and routing of these
  - c. Create, delete, and modify point/object trend logs, and graph or print these
  - d. Create, delete, and modify reports
  - e. Add, remove, and modify system's physical points/objects
  - f. Create, modify, and delete programming
  - g. Add panels when required
  - h. Add operator interface stations
  - i. Create, delete, and modify system displays — both graphical and otherwise
  - j. Perform DDC system field checkout procedures
  - k. Perform DDC controller unit operation and maintenance procedures
  - l. Perform workstation and peripheral operation and maintenance procedures
  - m. Perform DDC system diagnostic procedures
  - n. Configure hardware including PC boards, switches, communication, and I/O points/objects
  - o. Maintain, calibrate, troubleshoot, diagnose, and repair hardware
  - p. Adjust, calibrate, and replace system components

3. System Managers/Administrators:
    - a. Maintain software and prepare backups
    - b. Interface with job-specific, third-party operator software
    - c. Add new users and understand password security procedures
  - C. Provide course outline and materials as per “Submittals” Article in Part 1 of this specification. The instructor(s) shall provide one copy of training material per student.
  - D. The instructor(s) shall be factory-trained instructors experienced in presenting this material.
  - E. Classroom training shall be done using a network of working controllers representative of the installed hardware.
- 3.11 Outdoor temperature and humidity sensors shall be mounted on the north face of the building unless otherwise approved by the Engineer. Exact location shall be approved by the Architect.
- 3.12 In addition to the adjustments and fine tuning, include as a part of this contract the equivalent of five (5) man days of service technician time for work as may be specified by the Engineer.

END OF SECTION

SECTION 23 09 25 INSTRUMENTATION AND CONTROL DEVICES FOR HVAC

PART 1 - GENERAL

- 1.1 This Section describes all sensors, controllers, instruments, valves, actuators, devices, for use with the control system specified in Section 23 09 23 Direct Digital Control System (DDCS) for HVAC. All control devices (valves, dampers, actuators, etc.) shall be included.
- 1.2 Refer to the HVAC Drawings, Section 23 09 23 Direct Digital Control System (DDCS) for HVAC for sensor and device requirements.
- 1.3 All products used in the installation shall be new, currently under manufacture, and shall be applied in standard off the shelf products. This installation shall not be used as a test site for any new products unless explicitly approved by the Engineer in writing. Spare parts shall be available for at least 10 years after completion of this contract.
- 1.4 System shall conform to the following minimum standards over network connections:
  - A. Reporting Accuracy. System shall report values with the minimum end-to-end accuracy listed in Table 1.
  - B. Control Stability and Accuracy. Control loops shall maintain measured variable at setpoint within tolerances listed in Table 2.

TABLE 1: Reporting Accuracy

Measured Variable	Reported Accuracy
Electrical (A, V, W, Power factor)	±1% of reading
(see Note 3)	
Carbon Monoxide (CO/NO <sub>2</sub> )	±5% of reading

Notes:

- (1) Accuracy applies to 10 percent - 100 percent of scale.
- (2) For both absolute and differential pressure.
- (3) Not including utility supplied meters.

PART 2 - PRODUCTS

2.1 Sensors and Transmitters

A. Relays

1. Control relays shall be UL Listed plug-in type with dust cover and LED “energized” indicator. Contact rating, configuration, and coil voltage shall be suitable for application.
2. Time delay relays shall be UL Listed solid-state plug-in type with adjustable time delay. Delay shall be adjustable ±200 percent (minimum) from setpoint shown on plans. Contact rating, configuration, and coil voltage shall be suitable for application. Provide NEMA enclosure suitable for location when not installed in local control panel.

B. Override Timers

1. Override timers shall be electronic UL Listed, with contact rating and configuration as required by application. Provide 0-to-6-hour calibrated type with LCD display unless otherwise specified.

C. Current Transformers

1. AC current transformers shall be UL/CSA recognized and completely encased (except for terminals) in approved plastic material.
2. Transformers shall be available in various current ratios and shall be selected for  $\pm 1$  percent accuracy at 5 A full scale output.
3. Transformers shall be split-core type for installation on new or existing wiring.

D. Voltage Transmitters

1. AC voltage transmitters shall be self-powered single loop (two-wire) type, 4 to 20 mA output with zero and span adjustment.
2. Ranges shall include 100 to 130 VAC, 200 to 250 VAC, 250 to 330 VAC, and 400 to 600 VAC full-scale, adjustable, with  $\pm 1$  percent full-scale accuracy with 500 ohm maximum burden.
3. Transmitters shall be UL/CSA recognized at 600 VAC rating and meet or exceed ANSI/ISA S50.1 requirements.

E. Voltage Transformers

1. AC voltage transformers shall be UL/CSA recognized, 600 VAC rated, complete with built-in fuse protection.
2. Transformers shall be suitable for ambient temperatures of 4 to 55 degrees C [40 to 130 degrees F] and shall provide  $\pm 0.5$  percent accuracy at 24 VAC and a 5 VA load.
3. Windings (except for terminals) shall be completely enclosed with metal or plastic material.

F. Surge and Transient Protection

1. Provide each digital controller with surge and transient power protection. Surge and transient protection shall consist of the following devices, installed externally to the controllers.
2. Power Line Surge Protection
  - a. Provide surge suppressors on the incoming power at each controller or grouped terminal controllers. Surge suppressors shall be rated in accordance with UL 1449, have a fault indicating light, and conform to the following:

- 1) The device shall be a transient voltage surge suppressor, hard-wire type individual equipment protector for 120 VAC/1 phase/2 wire plus ground.
  - 2) The device shall react within 5 nanoseconds and automatically reset.
  - 3) The voltage protection threshold, line to neutral, shall be no more than 211 volts.
  - 4) The device shall have an independent secondary stage equal to or greater than the primary stage joule rating.
  - 5) The primary suppression system components shall be pure silicon avalanche diodes.
  - 6) The secondary suppression system components shall be silicon avalanche diodes or metal oxide varistors.
  - 7) The device shall have an indication light to indicate the protection components are functioning.
  - 8) All system functions of the transient suppression system shall be individually fused and not short circuit the AC power line at any time.
  - 9) The device shall have an EMI/RFI noise filter with a minimum attenuation of 13 dB at 10 kHz to 300 MHz.
  - 10) The device shall comply with IEEE C62.41, Class "B" requirements and be tested according to IEEE C62.45.
  - 11) The device shall be capable of operating between -20 degrees F and +122 degrees F.
3. Telephone and Communication Line Surge Protection
- a. Provide surge and transient protection for DDCCS controllers and DDCCS network related devices connected to phone and network communication lines, in accordance with the following:
    - 1) The device shall provide continuous, non-interrupting protection, and shall automatically reset after safely eliminating transient surges.
    - 2) The protection shall react within 5 nanoseconds using only solid-state silicon avalanche technology.
    - 3) The device shall be installed at the distance recommended by its manufacturer.
4. Controller Input/Output Protection
- a. Provide controller inputs and outputs with surge protection via optical isolation, metal oxide varistors (MOV), or silicon avalanche devices. Fuses are not permitted for surge protection.

G. Current Switches and Relays

1. Current-operated switches shall be self-powered, solid-state with adjustable trip current. The switches shall be selected to match the current of the application and output requirements of the DDC System.
2. Current relays for fan or pump proof shall be fully adjustable from 1.5 amps to 150 amps and shall have L.E.D. indicators. Form "A" (normally open) relays shall not be polarity sensitive. Current relays shall accommodate variable frequency drive outputs down to 6 HZ without contact chatter. Motor loads of less than 1.5 amps shall be multi-wound around current relay to increase "sensed" amperage to minimum setpoint for activation.

H. Local Control Panels

1. All indoor control cabinets shall be fully enclosed NEMA construction, suitable to the installed location, with [hinged door], key-lock latch, removable sub-panels. A single key shall be common to all field panels and sub-panels. Panels shall be unitized design for transducers, relays, gauges, etc.
2. Interconnections between internal and face-mounted devices pre-wired with color coded stranded conductors neatly installed in plastic troughs and/or tie wrapped. Terminals for field connections shall be UL Listed for 600 volt service, individually identified per control/interlock drawings, with adequate clearance for field wiring. Control terminations for field connection shall be individually identified per control drawings.
3. Provide ON/OFF power switch with overcurrent protection for control power source to each local panel.
4. Provide 120V receptacle at each local panel location.

2.3 CO/NO<sub>2</sub> Detection System – Toxic and Hazardous Gas Monitoring

- A. Toxic and hazardous gas detection system supplier/installer shall be familiar with standard practices of safety and installation for hazardous gas detection systems and shall provide these systems as a normal course of business. Acceptable gas detection supplier shall supply a list of last 12 similar projects. Acceptable suppliers:
  1. O.I. Analytical.
  2. MSA.
  3. Aircuity.
  4. Or Engineer approved equal.
- B. System shall be of traditional life safety stand alone configuration, hardwired to safety alarm and control devices, detecting presence of the specific carbon monoxide/nitrogen dioxide (CO/NO<sub>2</sub>) or other hazardous target gas specified. System shall indicate, alarm, initiate purge vent and shut down equipment as specified below and in governing regulations. Hazardous gas monitor system shall shut down any employed combustion or other dangerous process condition in event

of excessive target gas level, if other code acceptable conditions are not applied. Oxygen deficiency monitoring is not acceptable in lieu of PPM concentration monitoring for human safety exposure, nor is it code compliant.

- C. Sequential sampling multi-point monitoring shall be employed where airflow currents and room size prohibit a representative sample from one sensing point. Diluted samples due to ventilation airflow currents shall employ multi-point monitoring strategically located according to regulation guidelines. Multiple zone area applications shall consider whether zone size and layout can adequately be monitored to comply with regulations with a single point or a multi-point system. System design considerations shall also be incorporated in hazardous gas monitor sensing location(s) for early warning diagnostics and alarm to prevent any low level health impacting or threatening situation, either small or catastrophic or any ventilation energy loss, should a breach occur.

#### Control Panel and Control Panel Equipment

1. Analyzer: Microprocessor-based and employ pyroelectric infrared (PIR) sensor technology which is not sensitive to vibration and therefore requires no field calibration for startup or for the first year of operation. Compound specific monitor shall alarm to the target gas only and shall not sense, display or false alarm to any interfering gases. Accurately sense down to five parts per million (ppm) level with 1 ppm accuracy and 1 ppm sensitivity. The analyzer and sensor shall be compound specific and/or monitor multiple compounds, and be calibrated for CO Carbon Monoxide/nitrogen dioxide NO<sub>2</sub> or other hazardous or toxic target gas as specified. Monitor's target gas can be switched, at a future date, to another infrared responsive target gas by changing one or two parts and re-calibrating. Auto zero calibration shall be initiated at one hour intervals (adjustable), or manually, with uncontaminated air source. Response time shall be twenty (20) seconds to ninety-nine (99%) percent typical. Electrochemical or solid state sensing technology employing depletion sensors or short term life sensors which deplete, poison or self consume in normal operation or storage shelf life, are not acceptable.
2. Display: Provide alphanumeric green backlit LCD display, 1/2" characters, low energy level type, easily visible across darkened mechanical room. Display shall automatically scroll all ppm concentration levels for each sample point and alternately scroll display any alarm or malfunction messages without operator initiated keypad intervention. Alarm display shall sequentially scroll to annunciate and define each alarm by sample point zone number and specific alarm level.
3. Diagnostics: Provide self-diagnostics with on-board malfunction data log and a malfunction contact for BAS annunciation. Display flow loss of sample or ZERO line and electrical malfunction.
4. Alarms: Initial alarm shall comply with recommended Permissible Exposure Level (PEL), Allowable Exposure Level (AEL) or Threshold Limit Value (TLV-TWA). Provide three level alarms with each one adjustable for each point with three common alarm output contacts. The system shall monitor, accurately analyze and display within the range of 0 - 35 ppm gas concentration for early warning trouble alarm and diagnostics of worsening concentration conditions, and for toxic and hazardous gas emergency alarm and staged purge vent fan control.

5. Sample Pump System: Pyroelectric infrared technology shall be provided for fast analyzing time and continuous sampling. Include built-in sample pump for continuous sample draw and differential pressure switch for low flow indication. Sample draw line capability: not more than 500 feet excluding exhaust tubing. Intermittent trap, dump and purge, batch type sample systems with long response times and complicated pump control are not be acceptable.
6. Sequential Sampling System: Four point (or more) sequential sampling system shall be integrated into one analyzer enclosure. Microprocessor shall sequentially control required flow valves and coordinate signals to/from multiple remote sampling locations; continually display ppm values of all infrared sensor points, control sampling assembly. Individually adjustable sample transport times and alarm levels for each point.
7. The monitor shall have add-on sample point expansion modules where required and available for future expansion. Provide the number of sampling points as shown on the drawings.
8. Enclosure: NEMA-4 wall mount steel enclosure with baked enamel with no external keypads for tampering. Power supply shall have multiple tap isolating transformer, on/off switch / circuit breaker and require no more than 75 watts (main unit and expansion units combined).
9. Alarms and Other outputs: Provide four separate 4-20 mA dc analog outputs and one RS-485 output of refrigerant level(s) for input into Direct Digital Control (DDC) for centralized facility data logging and trending. Provide dry alarm contacts, rated 5 amp 120 vac, for each of three alarm levels to control alarms and stage purge vent/zone fans and for interface to BAS. Contacts field selectable: NO/NC and Latched (manual reset)/Non-latched (auto reset).
10. Description of Operation: System shall be configured to provide for an optional relay board, with dry contacts for each channel, to initiate output signal for three level alarms at local panel, interface with both the BAS and the building ventilation system. An early warning low level alarm shall be set at 25 ppm, regardless of gas type, to prevent eventual health or life threatening condition and vent system energy loss. Other alarms shall be set at or below the TLV-TWA level for 3 5 ppm mid alarm and at the STEL 50 ppm high alarm (200 ppm ceiling for CO). Low alarm: energize ventilation stage one; Mid alarm: energize the strobe light(s) and purge vent fan stage two; High alarm: energize the selectable tone horn and purge vent fan stage three; vacate the area. Program selectable tone horn audio: different sound than other life safety alarm system (i.e. as fire alarm). Horn tone different from other life safety alarm systems (i.e. as fire alarm), 15 dBA higher than zone ambient noise.

Alarm Setpoints	Low	Mid	High	
Carbon Monoxide	25	35	50	ppm
Nitrogen Dioxide	2	4	5	ppm



11. Separate Alarm Areas: Configure monitor for optional relay board to alarm and purge control separately up to four mechanical room areas, three alarm levels contacts each.
  12. Commissioning and Startup: Unit must be factory calibrated. No field calibration is acceptable at time of installation.
  13. Maintenance & Calibration: No calibration shall be required for a period of one (1) year from date of shipment. Zero filter and end of line filters shall be included with initial system and should be replaced every six months or sooner, based on usage. Monitors which frequently nuisance alarm or which require frequent calibration or sensor replacement will be replaced in entirety by this contractor at no additional cost to owner.
- D. Sample Tubing: Install 1/4" OD sample tubing to each zone monitored. Tubing shall be Nylon non-plasticized 1/4" OD tubing, similar to Parker Hannifin, installed or bundled in 3/4" EMT conduit, or larger, 80% free area.
- 1) Location and Termination: Sample tubing field assembled with compression fittings, terminate 6-12" from ceiling (heavier than air gases, 12-18" above the floor level) with .1 micron particulate/coalescent filters furnished by the monitor manufacturer. Locate sensing terminations down wind, in the direction of convection airflow, or centered within the area to be monitored and where shown on the drawings, run in areas not subject to damage. Identify each sample tube, both ends, with stamped (non-ferrous) metal zone number tags. Maximum coverage for Carbon Monoxide not to exceed 4000-6000 square feet per sensing point.

Control wiring by Automatic Temperature Controls Contractor. Analog / signal wiring shall be shielded.

Power wiring by Electrical Contractor. Provide 120v isolated dedicated power circuit.

Zone sensor wiring mounts and risers: if required (for other than infrared sample draw sensing technology), shall be in shielded wire nut in screwed rigid conduit.

- E. Conduct the complete installation and startup in accordance with manufacturers recommendations. Become familiar with manufacturers complete instruction book. Conduct a minimum one hour instruction of Owner's authorized operating personnel in the proper operation / maintenance of the system. If monitor requires keystrokes or programming to query information in normal daily operation, conduct additional programming instruction to owner's satisfaction, at no additional Owner cost. Operating and Maintenance Instructions: provide three hard copies to Owner.

## PART 3 - EXECUTION

### 3.1 Examination

- A. The project plans shall be thoroughly examined for control device and equipment locations. Any discrepancies, conflicts, or omissions shall be reported to the Engineer for resolution before rough-in work is started.
- B. Inspect the site to verify that equipment may be installed as shown. Any discrepancies, conflicts, or omissions shall be reported to the Construction Manager for resolution before rough-in work is started.
- C. Examine the project drawings and specifications. If head room or space conditions appear inadequate, or if any discrepancies occur between the plans and the temperature controls work and the plans and the work of others, then report these discrepancies to the Construction Manager and obtain written instructions for any changes necessary to accommodate the temperature controls work with the work of others. Any changes in the work made necessary by the failure or neglect to report such discrepancies shall be made by and costs borne by this Contractor.

### 3.2 Installation Of Sensors

- A. Install all sensors in accordance with the manufacturer's recommendations.
- B. Mount sensors rigidly and adequately for the environment within which the sensor operates.
- C. Room temperature sensors shall be installed on concealed junction boxes properly supported by the wall framing.
- D. All wires attached to sensors shall be air sealed in their raceways or in the wall to stop air transmitted from other areas affecting sensor readings.

### 3.3 Local Control Panels

- A. Local control panels shall be provided for the equipment being controlled. Panel shall be mounted in mechanical, electrical rooms or electrical closets. Mount panels on wall, columns or independent supports near each respective unit. Do not mount on the unit proper unless the unit has internal jam isolation and the control panel and unit have been designed for direct mounting.

### 3.4 Identification Of Hardware And Wiring

- A. All wiring and cabling, including that within factory fabricated panels, shall be labeled at each end within 2 inches of termination with the DDC address or termination number.
- B. Permanently label or code each point/object of field terminal strips to show the instrument or item served.
- C. Identify control panels with minimum 0.50 inch letters on laminated plastic nameplates.
- D. Identify all other control components with permanent labels. All plug-in components shall be labeled such that removal of the component does not remove the label.
- E. Identify room sensors relating to terminal box or valves with nameplates.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- F. Manufacturers' nameplates.
- G. Identifiers shall match record documents.
- H. Upon completion of the project, furnish a complete set of these drawings and diagrams, framed under clear plastic, and hang on the wall of the Mechanical Equipment Room where directed.

END OF SECTION

SECTION 23 09 47 CONTROL POWER AND WIRING FOR HVAC

PART 1 - GENERAL

- 1.1 Provide all electrical wiring, both line voltage and low voltage, which is required to perform the automatic control functions.
- 1.2 Where power sources are required beyond sources explicitly shown on the Division 26 drawings, these shall be provided under the Division 23 Contract. Where auxiliary contacts are required on starters to perform the required functions these, too, shall be provided under the Division 23 Contract. Where not provided under Division 26, auxiliary external relays may be provided in lieu of auxiliary contacts.
- 1.3 Wiring, both line and low voltage, shall comply with The National Electric Code (NEC) and shall be subject to approval of the local code enforcing authorities.
- 1.4 Provide sufficient slack and flexible connections to allow for vibration of piping and equipment.
- 1.5 Install all equipment in readily accessible locations as defined by the National Electrical Code (NEC).
- 1.6 Do not install Class 2 wiring in conduit containing Class 1 wiring. Boxes and panels containing high voltage may not be used for low voltage wiring except for the purpose of interfacing the two (e.g., relays and transformers).
- 1.7 All wires attached to sensors shall be air sealed in their raceways or in the wall to stop air transmitted from other areas affecting sensor readings.
- 1.8 Provide tagging or labeling of conduit so that it is always readily observable which conduit was installed or used in implementation of this Work.
- 1.9 All wiring and cabling, including that within factory fabricated panels, shall be labeled at each end within 5 cm [2 inches] of termination with the DDC address or termination number.
- 1.10 Communication conduits shall not be installed closer than six feet from high power transformers or run parallel within six feet of electrical high power cables. Care shall be taken to route the cable as far from interference generating devices as possible. Where communication wire must cross high power wire (deemed as 110VAC or greater) it must do so at right angles.
- 1.11 All shields shall be grounded (earth ground) at one point only to eliminate ground loops. All shield grounding shall be done at the controller location with the shield at the sensor/device end of the applicable wire being left long and "safed" off in an appropriate manner.
- 1.12 There shall be no power wiring, in excess of 30 VAC rms, run in conduit with communications wiring. In cases where signal wiring is run in conduit with communication wiring, all communication wiring and signal wiring shall be run using separate twisted pairs (24awg) in accordance with the manufacturer's wiring practices.

## PART 2 - PRODUCTS

- 2.1 Wire, conduit and installation methods shall conform to applicable provisions of Division 26 - Electrical except that wiring smaller than No. 12 and conduit smaller than 0.75 inch are permitted as appropriate for the application.
- 2.2 Communication wire shall meet the following requirements as a minimum. Control system manufacturers recommendations which exceed these requirements shall govern.
- A. Category 6 plenum rated, 4 twisted pair, non-shielded (UTP) station cable (capable of transmission speeds up to 100 Mb/s) shall be used for control system networking. Cable shall be insulated with FEP material and sequentially marked at 2 foot intervals. Color as selected by Owner.

Gauge	24 AWG
Nominal O.D.	.17 in.
Min. Bend Radius	.5 in.
Standards/Certification	UL 444, UL 13 EIA/TIA 568, Cat. 5 PN-2841
DC Resistance	9.38 ohm/100 m
Maximum mutual capacitance of a pair @ 1 KHz	5.6 nF/100 m
Unbalanced Capacitance per pair to ground @ 1 KHz	330 pF/100 m
Impedance	100 ohm $\pm$ 15%
Structured Return Loss 10/100 Mhz	23/16 dB/100 m
Attenuation (max at 100 m)	4.1 dB @ 4 Mhz 8.2 dB @ 16 Mhz 22.0 dB @ 100 Mhz
NEXT (min. at 100 m)	53.0 dB @ 4 Mhz 44.0 dB @ 16 Mhz 32.0 dB @ 100 Mhz
Propagation Delay (min. @ 10 Mhz)	5.7 ns/m

### 2.3 Wiring and Raceways

- A. General: Provide copper wiring, plenum cable, and raceways as specified in the applicable sections of Division 26.
- B. All insulated wire to be copper conductors, UL labeled for 90 degrees C minimum service.
- C. Conduit for Control Wiring, Control Cable and Transmission Cable: Electrical metallic tubing (EMT) with compression fittings, cold rolled steel, zinc coated or zinc-coated rigid steel with threaded connections.
- D. Outlet Boxes (Dry Location): Sheradized or galvanized drawn steel suited to each application, in general, four inches square or octagon with suitable raised cover.
- E. Outlet Boxes (Exposed to Weather): Threaded hub cast aluminum or iron boxes with gasket device plate.

- F. Pull and Junction Boxes: Size according to number, size, and position of entering raceway as required by National Electrical Codes. Enclosure type shall be suited to location.
- G. Sensor and/or signal cabling for controller I/O shall be multi-conductor type, stranded copper conductors, shielded, with plenum rated outer jacket. Conductor size shall be as recommended by the manufacturer for cable length and device power consumption.

### PART 3 - EXECUTION

- 3.1 All line voltage wiring and low voltage wiring shall be run in conduit. Sensors and other devices shall be installed on a single gang box with conduit.
- 3.2 Provide electrical circuits from the nearest appropriate electrical panel to serve control panels, transformers, and other control equipment and devices. Circuits serving control panels and transformers for low voltage service shall be independent and used for no other purpose. Provide circuit wiring from the electrical panel. These circuits shall be clearly identified at the panels. Coordinate with Division 26.

END OF SECTION

## SECTION 26 05 01 BASIC ELECTRICAL REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 Special Note

- A. All provisions of the Bidding Requirements, General Conditions and Supplementary Conditions, including Division 00 and Division 01, apply to work specified in this Division.
- B. The scope of the Division 26 work includes furnishing, installing, testing and warranty of all Division 26 and 28 work and complete systems as shown on the Division 26 and 28 drawings and as specified in Division 26 and 28 and elsewhere in the project documents.

#### 1.2 Permits and Regulations

- A. Include payment of all permit and inspection fees applicable to the work in this Division. Furnish for the Owner certificates of approval from the governing inspection agencies, as a condition for final payment.
- B. Work must conform to the National Electrical Code, National Electrical Safety Code and other applicable local, state and federal laws, ordinances and regulations. Where drawings or specifications exceed code requirements, the drawings and specifications shall govern. Install no work contrary to minimum legal standards.
- C. All electrical work shall be inspected and approved by the local jurisdictional authority.
- D. All Electrical work shall be inspected and approved by the City of Cincinnati who will issue the Inspection Certificates.

#### 1.3 Inspection of Site

- A. Inspect the project site and the premises of the existing building. Conditions shall be compared with information shown on the drawings. Report immediately to the Construction Manager any significant discrepancies which may be discovered. After the contract is signed, no allowance will be made for failure to have made a thorough inspection.

#### 1.4 Drawings and Specifications

- A. The drawings indicate the general arrangement of the work and are to be followed insofar as possible. The word "provide", as used, shall mean "furnish and install". If significant deviations from the layout are necessitated by field conditions, detailed layouts of the proposed departures shall be submitted to the Construction Manager for approval before proceeding with the work.
- B. Make all necessary field measurements to ensure correct fitting. Coordinate work with all other trades in such a manner as to cause a minimum of conflict or delay. Refer to Division 21 for required coordination and coordination drawings involving all trades.

- C. The drawings and specifications shall be carefully studied during the course of bidding and construction. Any errors, omissions or discrepancies encountered shall be referred immediately to the Construction Manager for interpretation or correction, so that misunderstandings at a later date may be avoided. The contract drawings are not intended to show every vertical or horizontal offset which may be necessary to complete the systems. Having bus duct, wireways and fittings fabricated and delivered in advance of making actual measurements shall not be sufficient cause to avoid making offsets and minor changes as may be necessary to install bus duct, wireways, fittings and equipment.
- D. The Architect shall reserve the right to make minor adjustment in locations of system runs and components where he considers such adjustments desirable in the interest of protecting and concealing work or presenting a better appearance where exposed. Any such changes shall be anticipated and requested sufficiently in advance as to not cause extra work, or unduly delay the work. Coordinate work in advance with all other trades and report immediately any difficulties which can be anticipated.
- E. Equipment, ductwork and piping shall not be installed in the dedicated electrical space above or in the working space required around electrical switchgear, motor control centers or panelboards as identified by NEC 110.26 Spaces about Electrical Equipment – 600 Volts Nominal or Less. For equipment rated over 600 volts nominal – 110.32 Work Space About Equipment – 110.33 Entrance to Enclosures and Access to Work Space – 110.34 Work Space and Guarding. Caution other trades to comply with this stipulation.
- F. Where any system runs and components are so placed as to cause or contribute to a conflict, it shall be readjusted at the expense of the contractor causing such conflict. The Architect's decision shall be final in regard to the arrangement of bus duct, conduit, etc., where conflict arises.
- G. Provide offsets in system runs, additional fittings, necessary conduit, pull boxes, conductors, switches and devices required to complete the installation, or for the proper operation of the system. Exercise due and particular caution to determine that all parts of the work are made quickly and easily accessible.
- H. Should overlap of work among the trades become evident, this shall be called to the attention of the Construction Manager. In such event, none of the trades or their suppliers shall assume that he is relieved of the work which is specified under his branch until instructions in writing are received from the Construction Manager.

#### 1.5 Inspection

- A. All work shall be subject to inspection of Federal, State and local agencies as may be appropriate, and of the Architect and Engineer.
- B. Obtain final inspection certificates and turn over to the Construction Manager and the Owner.

#### 1.6 Record Drawings



- A. Maintain a separate set of field prints of the contract documents and hand mark all changes or variations, in a manner to be clearly discernible, which are made during construction. Upon completion of the work and within 90 days of system acceptance, these hand marked drawings shall be turned over to the Construction Manager. This shall apply particularly to underground and concealed work, and to other systems where the installation varies to a degree which would justify recording the change.

#### 1.7 Operating and Maintenance Manuals

- A. Assemble two copies each of operating and maintenance manuals for the Electrical work.
- B. All “approved” shop drawings and installation, maintenance and operating instruction pamphlets or brochures, wiring diagrams, parts list, and other information, along with warranties, shall be obtained from each manufacturer of the principal items of equipment. In addition, prepare and include a chart listing all items of equipment which are furnished under this contract, indicating the nature of maintenance required, the recommended frequency of checking these points and the type of lubricating media or replacement material required. Name and address of a qualified service agency. A complete narrative of how each system is intended to operate. Major items of equipment shall consist of not less than the following:
  - 1. Motor controllers.
  - 2. Specialty equipment.
  - 3. Fire alarm, communications and sound systems.
  - 4. Lighting equipment and lighting controls.
  - 5. Company switches.
- C. Standard NEMA publications on the operation and care of equipment may be furnished in lieu of manufacturer's data where the manufacturer's instructions are not available.
- D. Original purchase order number; date of purchase; name, address, and phone number of the vendor; warranty information.
- E. Copy of required test reports.
- F. These shall be assembled into three-ring loose leaf binders or other appropriate binding. An index and tabbed sheets to separate the sections shall be included. These shall be submitted to the Engineer and Construction Manager for review. Upon approval manuals shall be turned over to the Owner.

#### 1.8 Final Inspection and Punch List

- A. As the time of work completion approaches, survey and inspect Division 26 work and develop a punch list to confirm that it is complete and finished. Then notify the Construction Manager and request that a final inspection be made. It shall not be considered the Architect's or Engineer's obligation to perform a final inspection until the Contractor has inspected the work and so states at the time of the request for the final inspection.

- B. Requests to the Construction Manager for final inspection may be accompanied by a limited list of known deficiencies in completion, with appropriate explanation and schedule for completing these; this is in the interest of expediting acceptance for beneficial occupancy.
- C. The Construction Manager will inspect the work and prepare a punch list of items requiring correction, completion or verification. Corrective action shall be taken by the Contractor to the satisfaction of Construction Manager within 30 days of receipt of the Construction Manager's punch list.

#### 1.9 Warranty

- A. Warrant all workmanship, equipment and material entering into this contract for a period of one (1) year from date of final acceptance or date of beneficial use, as agreed to between Contractor and Construction Manager. Any materials or equipment proving to be defective during the warranty period shall be made good without expense to the Owner. Use of equipment for temporary electric is not the start of the warranty period.
- B. This provision is intended specifically to cover deficiencies in contract completion or performance which are not immediately discovered after systems are placed in operation. These items include, but are not limited to, motor controller malfunction, heater element changes required for motor controller, fuse replacement where fuses blow due to abnormal shorts, adjustments and/or replacement of malfunctioning equipment and adjusting special equipment and communication systems to obtain optimum performance.
- C. This provision shall not be construed to include maintenance items such as making normally anticipated adjustments or correcting adjustment errors on the part of the Owner's personnel.
- D. Provisions of this warranty shall be considered supplementary to warranty provisions under General Conditions.

### PART 2 - PRODUCTS

#### 2.1 Materials and Equipment

- A. Materials and equipment furnished shall be in strict accordance with the specifications and drawings and shall be new and of best grade and quality. When two or more articles of the same material or equipment are required, they shall be of the same manufacturer.
- B. All electrical equipment and wiring shall bear the Underwriters Laboratories, Inc. label where UL labeled items are available, and shall comply with NEC (NFPA-70) and NFPA requirements.

#### 2.2 Reference Standards

- A. Where standards (NFPA, NEC, ASTM, UL, etc.) are referenced in the specifications or on the drawings, the latest edition is to be used except, however, where the

Authority Having Jurisdiction has not yet adopted the latest edition, the edition so recognized shall be used.

### 2.3 Equipment Selection

- A. The selection of materials and equipment to be furnished shall be governed by the following:
  - 1. Where trade names, brands, or manufacturers of equipment or materials are listed in the specification, the exact equipment listed shall be furnished. Where more than one name is used, the Contractor shall have the option of selecting between any one of the several specified. All products shall be first quality line of manufacturers listed.
  - 2. Where the words "or approved equal" appear after a manufacturer's name, specific approval must be obtained from the Architect during the bidding period in sufficient time to be included in an Addendum. The same shall apply for equipment and materials not named in the specifications, where approval is sought.
  - 3. Where the words "equal to" appear, followed by a manufacturer's name and sometimes a model or series designation, such designation is intended to establish quality level and standard features. Approval of equal equipment by other manufacturers must be obtained per paragraph 2.3.A.2 above.
- B. Before bidding equipment, and again in the preparation of shop drawings, verify that adequate space is available for entry and installation of the item of equipment, including associated accessories. Also verify that adequate space is available for servicing of the equipment and that required NEC clearances are met.
- C. If extensive changes in conduit, equipment layout or electrical wiring and equipment are brought about by the use of equipment which is not compatible with the layout shown on the drawings, necessary changes shall be deemed to be included in this contract.

### 2.4 Shop Drawings

- A. Electronic copies of shop drawings and descriptive information of equipment and materials shall be furnished. Submit to the Construction Manager for review as stated in the General Conditions and Supplementary Conditions. These shall be submitted as soon as practicable and before equipment is installed and before special equipment is manufactured. Submittal information shall clearly identify the manufacturer, specific model number, approval labels, performance data, electrical characteristics, features, specified options and additional information sufficient to evidence compliance with the Contract Documents. Product catalogs, brochures, etc. submitted without project specific items marked as being submitted for review will be rejected and returned without review. Shop drawings for equipment, fixtures, devices and materials shall be labeled and identified same as on the Contract Documents. If compliance with the above criteria is not provided shop drawings will be subject to rejection and returned without review. Samples shall be submitted when requested or as specified here with-in.

- B. The review of shop drawings by the construction Manager, Architect or Engineer shall not relieve the Contractor from responsibility for errors in the shop drawings. Deviations from specifications and drawing requirements shall be called to the Architect and Engineer's attention in a separate clearly stated notification at the time of submittal for the Architect's and Engineer's review.
- C. Shop drawings of the following equipment and materials shall be submitted:
  - 1. Raceways and boxes for electrical systems including expansion joints.
  - 2. Miscellaneous cabinets.
  - 3. Wiring devices and coverplates.
  - 4. Fire stopping and fire stop assemblies.
  - 5. Surge suppression.
  - 6. Switchboards
  - 7. Labels, markings and tags.
  - 8. Panelboards.
  - 9. Cabinets and enclosures.
  - 10. Fuses.
  - 11. Motor controllers.
  - 12. Grounding and bonding components.
  - 13. Sleeves.
  - 14. Lighting fixtures and lamps.
  - 15. Lighting controls/contactors and photocell.

### PART 3 - EXECUTION

#### 3.1 Testing

- A. As each wiring system is completed, it shall be tested for continuity and freedom from grounds.
- B. As each electrically operated system is energized, it shall be tested for function.
- C. On all electric services including change-outs, backfeeds, etc. the Contractor shall verify phase rotation and voltage readings to ensure the final installation is proper. Submit in writing a record of voltage readings and current readings taken at no-load and fully loaded conditions.
- D. The Contractor shall perform megger and resistance tests and special tests on any circuits or equipment when an authorized inspection agency suspects the system's integrity or when requested by the Architect or Engineer.
- E. All signaling and communications systems shall be inspected and tested by a qualified representative of the manufacturer or equipment vendor. Submit four (4) copies of reports indicating results.
- F. Tests shall be witnessed by field representatives of the Architect or Engineer or shall be monitored by a recorder. Furnish a written record of each system test indicating date, system, test conditions, duration and results of tests. Copies of all test reports shall be included in the O&M manuals.

G. Instruments required for tests shall be furnished by the Contractor.

### 3.2 Equipment Cleaning

- A. Before placing each system in operation, the equipment shall be thoroughly cleaned; cleaning shall be performed in accordance with equipment manufacturer's recommendations.
- B. Refer to appropriate Sections for cleaning of other equipment and systems for normal operation.

### 3.3 Operation and Adjustment of Equipment

- A. As each system is put into operation, all items of equipment included therein shall be adjusted to proper working order. This shall include balancing and adjusting voltages and currents; verifying phase rotation; setting breakers, ground fault and other relays, controllers, meters and timers; and adjusting all operating equipment.
- B. Caution: Verify that all bearings of equipment furnished are lubricated, all motors are operating in the right direction, and correct drive settings and overload heater elements are provided on all motors. Do not depend wholly on the other trades judgment in these matters. Follow specific instructions in regard to lubrication of equipment furnished under this Contract.

### 3.4 Operating Demonstration and Instructions

- A. The Contractor shall set the various systems into operation and demonstrate to the Owner and Construction Manager that the systems function properly and that the requirements of the Contract are fulfilled.
- B. The Contractor shall provide the Owner's representatives with detailed explanations of operation and maintenance of equipment and systems. A thorough review of the operating and maintenance manuals shall be included in these instructional meetings.
- C. A minimum of 8 hours shall be allowed for instructions to personnel selected by the Owner. Instructions shall include not less than the following:
  - 1. Show location of items of equipment and their purpose.
  - 2. Review binder containing instructions and equipment and systems data.
  - 3. Coordinate written and verbal instructions so that each is understood by personnel.
  - 4. Separate instructions shall be given by manufacturer's representatives for the various special and communications systems.
- D. A minimum of 48 hours continuous trouble-free operating time shall be acceptable to prove that the systems function properly.

END OF SECTION

## SECTION 26 05 02 AGREEMENT AND WAIVER FOR USE OF ELECTRONIC FILES

### PART 1 - GENERAL

- 1.1 The Engineer, at his sole discretion and without obligation, makes graphic portions of the contract documents available for use by the contractor in electronic format. These electronic files are proprietary, and remain the Engineer's Instruments of Service and shall be for use solely with respect to this project, as provided in the Standard Form of Agreement between Architect and Engineer.
- 1.2 Electronic files shall be released only after bids have been received for the project and contracts have been signed with the Contractors.
- 1.3 The Contractor shall acknowledge receipt of electronic files in the requested format for this project. The electronic files are provided as a convenience to the User, for use in preparing shop drawings and/or coordination drawings related to the construction of only the project identified in the Agreement. The electronic files and the information contained within are the property of the Engineer and/or the Architect and/or the Owner, and may not be reproduced or used in any format except in conjunction with the project identified in the Agreement.
- 1.4 The User acknowledges that the information provided in the electronic files is not a substitution or replacement for the Contract Documents and does not become a Contract Document. The User acknowledges that neither the Engineer, the Architect, the Consultants, the Client or the Owner make any warrant or representation that the information contained in the electronic files reflect the Contract Documents in their entirety. The User assumes full responsibility in the use of the electronic files, including the responsibility to see that all manual modifications, addenda, bulletins, clarifications and Change Orders to the drawings executed as a part of the Contract Documents have been incorporated.
- 1.5 The User acknowledges that the receipt of electronic files in no way relieves the User from the responsibility for the preparation of shop drawings or other schedules as set forth in the Contract between the Contractor and the Owner.
- 1.6 Electronic files are available in a .DWG or .RVT format for a cost as indicated in the Agreement and Waiver Form. **Providing the documents in a .DWG version that differs from the product version that the .DWG files were initially created in will incur additional charges per sheet, as indicated in the Agreement and Waiver Form.** Charges are for the Engineer's time to prepare the documents in the format stated. They are available through the Engineer's office on a C.O.D. basis only. A sample of the format will be provided by the Engineer upon request by the contractor, for the purpose of testing the compatibility of the format to the contractor's systems.
- 1.7 All drawings will be in an AutoCAD file format, when requested to be .DWG format.
- 1.8 All project models will be furnished without views.
- 1.9 All electronic files shall be stripped of the Project's name and address, the Architect's and Engineer's and any consultant's name and address, and any professional licenses indicated on the contract documents, (and all dimensions, verbiage, and statistical

information). Use of these electronic files is solely at the contractor's risk, and shall in no way alter the contractor's Contract for Construction.

- 1.10 The User agrees to indemnify, hold harmless and defend the Engineer, the Architect, the Consultants, the Owner, the Client and any of their agents from any litigation resulting from the use of (by any means of reproduction or electronic media) these files. The Engineer makes no representation regarding fitness for any particular purpose, or suitability for use with any software or hardware, and shall not be responsible or liable for errors, defects, inexactitudes, or anomalies in the data, information, or documents (including drawings and specifications) caused by the Engineer's or its consultant's computer software or hardware defects or errors; the Engineer's or its consultant's electronic or disk transmittal of data, information or documents; or the Engineer's or its consultant's reformatting or automated conversion of data, information or documents electronically or disk transmitted from the Engineer's consultants to the Engineer.
- 1.11 The Contractor waives all claims against the Engineer, its employees, officers and consultants for any and all damages, losses, or expenses the contractor incurs from such defects or errors in the electronic files. Furthermore, the contractor shall indemnify, defend, and hold harmless the Engineer, and its consultants together with their respective employees and officers, harmless from and against any claims, suits, demands, causes of action, losses, damages or expenses (including all attorney's fees and litigation expenses) attributed to errors or defects in data, information or documents, including drawings and specifications, resulting from the contractor's distribution of electronic files to other contractors, persons, or entities.

## PART 2 - PRODUCTS – NOT USED

## PART 3 - EXECUTION

- 3.1 Attached "Agreement" shall be submitted with accompanying payment to the Engineer prior to delivery of electronic files.

END OF SECTION



# HEAPY

**ELECTRONIC FILES  
HEAPY RELEASE FORM TO CONTRACTORS**

**Project:** Banks Lot 28  
Cincinnati, Ohio

**Owner:** Hamilton County

**Heapy Engineering Project Number:** 2021-07091

**Heapy Engineering Project Manager:** Dave Madden

The Provider, named below, will furnish the Recipient, named below, certain documents prepared by the Provider or its sub consultants in an electronic format. These documents are hereinafter collectively referred to as "Electronic Files". The Electronic Files are instruments of the Provider services performed solely for the Owner's benefit and to be used solely for this Project. The Provider does not represent that the information contained in the Electronic Files are suitable for use on any other project or for any other purpose. If the Electronic Files are used for any other project or purpose without the Provider's specific written permission, the risk of such use shall be assumed solely by the Recipient or other user.

**Prior to the use of the Electronic Files the Provider and the Recipient agree to the following terms and conditions:**

1. The Provider and Recipient fully understand that the data contained in these electronic files are part of the Provider's Instruments of Service. The Provider shall be deemed the author of the drawings and data, and shall retain all common law, statutory law and other rights, including copyrights.
2. The Recipient confirms their request to the Provider for Electronic Files for the Project listed above, which the Recipient understands are to be provided only in accordance with, and conditioned upon, the terms and conditions of the Agreement and Waiver for Use of Electronic Files).
3. The Provider agrees that the Recipient may use the Electronic Files for the sole purpose of preparing shop drawings and/or coordination drawings for the above Project only. Any Electronic Files provided are strictly for the use of the Recipient in regard to the Project named above, and shall not be utilized for any other purpose or provided by the Recipient to any entity other than its subcontractors for the Project named above.
4. The Recipient acknowledges that the furnishing of Electronic Files in no way relieves the Recipient from the responsibility of shop drawings or other schedules as set forth in the Contract between the Contractor and the Owner.
5. The Recipient acknowledges:
  - a. That the Electronic Files do not contain all of the information of the Bid Documents or Contract Documents for the construction of the Project above.



- b. That information in the Bid Documents or Contract Documents may be revised or modified in the future.
  - c. The Provider does not have, and will not have, any duty or obligation to advise or give notice to the Recipient of any such revisions or modifications.
  - d. That the Recipient agrees that its use of the Electronic Files is at the Recipient's sole risk of liability, and that the Recipient shall make no claim or demand of any kind against the Provider arising out of Recipient's receipt or use of the Electronic Files.
6. The Provider makes no representation or warranty of any kind, express or implied, with respect to the Electronic Files and specifically makes no warranty that the Electronic Files shall be merchantable or fit for any particular purpose, or accurate or complete. Furthermore, any description of said Electronic Files shall not be deemed to create an implied or express warranty that such Electronic Files shall conform to said description.
7. Due to the unsecured nature of the Electronic Files and the inability of the Provider or the Recipient to establish controls over their use, the Provider assumes no responsibility for any consequences arising out of the use of the data. It is the sole responsibility of the Recipient to check the validity of all information contained within the Electronic Files. The Recipient shall at all times refer to the Construction Documents of the project during all phases of the project. The Recipient shall assume all risks and liabilities resulting from the use of this data, and the Recipient agree(s) to waive any and all claims and liability against the Provider and its sub consultants resulting in any way from the use of the Electronic Files.
8. Electronic Files are provided strictly as a courtesy by the Provider solely for the convenience of the Recipient, and are not part of the Bid Documents or Contract Documents for the Project. The Electronic Files do not replace or supplement the paper copies of any drawings, specifications, or other documents included in the Contract Documents for use on the project.
  - a. The Recipient assumes full responsibility in the use of Electronic Files, including the responsibility to see that all manual modifications, addenda, bulletins, clarifications and Change Orders to the drawings executed as a part of the Contract Documents have been incorporated.
9. As stated herein, the possibility exists that the Electronic Files provided may differ from the Bid Documents or Contract Documents for construction of the Project. The Provider shall not be responsible, nor be held responsible, for differences between Electronic Files, the Bid Documents, and Contract Documents. The Bid Documents or Contract Documents for the Project may be modified by the Provider at any time, either before or after construction begins. The Provider has no responsibility, either before or after any such modification, to determine or to advise the Recipient whether any such modification causes Electronic Files provided to the Recipient to be out of date, inconsistent with the Bid Documents or Contract Documents, or otherwise unsuitable or unfit for use in any way.
10. The Recipient assumes all risk and liability for any losses, damages, claims, or expenses (including defense and attorney fees) resulting from its receipt, use, or

possession of Electronic Files furnished by the Provider. The Provider makes no representation, warranty or guarantee that the Electronic Files:

- a. Are suitable for any other usage or purpose.
  - b. Have any particular durability.
  - c. Will not damage or impair the Recipient's computer or software.
  - d. Contain no errors or mechanical flaws or other discrepancies that may render them unsuitable for the purpose intended by the Recipient.
11. Recipient agrees to indemnify, defend and hold harmless the Provider, agents, employees, and the Owner from, and against, any and all claims, suits, losses, damages or costs, of any kind or nature, including attorney's fees, arising from or by reason of the Recipient's use of Electronic Files provided by the Provider, and such defense and indemnification obligation duties shall survive any use under this Agreement and Waiver for Use of Electronic Files.
12. The Recipient agrees that the Provider shall have no responsibility whatsoever for problems of any nature arising from transmitting and storing electronic files at a Recipient requested FTP or project management site or the conversion of the Electronic Files by the Recipient or others for use in non-native applications. The Provider will not provide Electronic Files in compressed formats. Recipient agrees to accept the files in the format provided by the Provider, and that Recipient's conversion or electronic file storage at the Recipient's requested site, shall be at Recipient's sole risk.
13. Recipient acknowledges:
- a. That the Electronic Files provided by the Provider are a graphical representation of the building in order to generate two-dimensional industry standard drawings.
  - b. That the data contained in the Electronic Files may not be 100% accurate and should not be used for dimensional control, building layout, shop drawings, or any other similar purpose
  - c. That any schedule of materials produced directly from the Electronic Files has not been checked for accuracy.
  - d. That the information in the Electronic Files should be used only for comparative purposes and shall not be relied upon for accurate quantity estimates or used in establishing pricing.
14. Electronic Files provided by the Provider will only contain elements and content that the Provider deems necessary and appropriate to share. No specific Level of Development (LOD) is implied or expected. The Recipient agrees that no proprietary content, MvParts or Revit Families or any other AutoCAD MEP or Revit MEP content shall be removed from the model and/or used for any other purpose but to support this specific project.
15. The Provider, at its sole discretion, may modify the Electronic files before they are provided to the Recipient. Such modifications may include, but are not necessarily

limited to, removal of certain information. The Provider, at its sole discretion, may refuse to provide some or all Electronic Files requested by Recipient.

16. The availability of Electronic Files that were not prepared by the Provider is subject to the consent of the Owner or consultant that prepared those Electronic Files. The Provider will not negotiate with the Owner or consultant or repeatedly solicit the Owner or consultant to obtain such consent. Neither this Agreement and Waiver for Use of Electronic Files nor any such separate Consultant's consent may be assigned or transferred by Recipient to any other person or entity.

Provider (Name of Company): \_\_\_\_\_

Recipient (Name of Company): \_\_\_\_\_

Recipient Address: \_\_\_\_\_

Name of authorized Recipient Representative: \_\_\_\_\_

Title of authorized Recipient Representative: \_\_\_\_\_

E-mail address of authorized Recipient Representative: \_\_\_\_\_

Signature of authorized Recipient Representative: \_\_\_\_\_

Date: \_\_\_\_\_

NOTE: Select requested Electronic File Format, File Transfer Medium and complete applicable Cost Summary.

**A. Electronic File Format (select one):**

1.  .DWG Format - List of Drawings Requested: \_\_\_\_\_

2.  Revit Project Model Requested (Model only, no Views included)

**B. File Transfer Medium (select one):**

- CD-ROM     DVD-ROM     Heapy FTP     User's FTP site     Flash Drive

**C. Delivery of Electronic Files Cost Summary:**

Available Electronic .DWG file format:

- 20XX DWG

If a different file version is required than the indicated available version state the requested version:

\_\_\_\_\_ .DWG

**Note that an additional charge per sheet will be incurred.**

Cost of Preparation of Division 26 Electronic .DWG Files:

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

First Drawing: \$50.00 \$50.00

Additional Drawings \$15.00 each \_\_\_\_\_ x \$15.00 = \$ \_\_\_\_\_

Conversion to .DWG version different from available .DWG:  
\$5.00 additional/sheet x \$ 5.00 = \$ \_\_\_\_\_

Total Cost: (Please make check payable to Heapy Engineering  
and include a copy of this form.) \$ \_\_\_\_\_

All files will be bound together.

Available electronic Revit file format:

2020 .RVT

Cost of Preparation of Division 26 Electronic Revit Model Files:

Revit Project Model without Views \$500.00

Total Cost: (Please make check payable to Heapy Engineering  
and include a copy of this form.) \$ \_\_\_\_\_

SECTION 26 05 04 BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 Temporary Electric Services

- A. The temporary service and temporary lighting for construction is provided by the Contractor. Refer to Division 01 - General Requirements.
- B. The Contractor is cautioned to carefully consider the possible sources of temporary electric service and the probable location of the Contractor's office.
- C. The Construction Manager will make application to the local utility company for the temporary electric service but Electrical Contractor will pay for all electric power used during construction, including electric heating.
- D. The Contractor shall furnish, install and pay for all necessary conduit, wire, metering, poles, switches, receptacles, lights and accessories to provide a 200 amp, 120/208 volt, 3 phase, 4 wire temporary electric service with the main disconnect switch, meter, and a 42 circuit load center at a location specified by the Construction Manager.
- E. Consult the utility company for fees required and include same in Electrical Contract.
- F. Labor, receptacles, boxes, fixtures, wire, etc. required by the various Contractors inside their offices shall be paid for by the respective Contractors.
- G. Lighting fixtures shall be placed every 40 ft. along each corridor or where corridors do not occur, along the long axis of all rooms and areas greater than 25 ft. in length. Provide a 200 watt lamp in a rubber coated socket with wire guard, spliced into branch feeder conductor at every 20 ft. The branch circuit wiring may be 3 wire type "NMC" and the wire guard shall be bonded to the ground conductor. Receptacle circuits shall consist of 1 gang handy box with grounded duplex receptacles a maximum of 50 ft. on center with a maximum of 4 per circuit. All receptacle circuits shall be protected by its own overcurrent device in a panelboard. Install wiring and equipment above 6 feet 6 inches and below the finished ceiling. Extend circuits as required and protect in an appropriate panelboard on each floor level. Provide GFCI protected receptacles and circuits as required by NEC and OSHA.
- H. Contractors requiring extension cords shall provide their own cords and plugs up to capacity of 20 amperes. For services to larger items of equipment and welders, this Contractor shall extend proper feeders as requested at the expense of the Contractors requiring the service.
- I. The Contractor shall maintain the temporary light and power system for the duration of the work and shall remove it from the site when directed. Temporary wiring and equipment shall remain the property of the Contractor.
- J. The use of the permanent electrical system for temporary services during the latter stages of construction shall be allowed. Expedite completion of system as practicable to this end. Maintain the system during this period.

- K. Warranty periods on equipment, materials and systems shall commence upon Owner acceptance of the building or systems. Temporary use shall not jeopardize or alter warranty requirements.
- L. The complete temporary service shall comply with Power Company, OSHA, and all Code requirements.

## 1.2 Continuity of Service

- A. Work shall be so planned and executed as to provide reasonable continuous service of existing systems throughout the construction period. Where necessary to disrupt services for short periods of time for connection, alteration or switch over, the Owner and Construction Manager shall be notified in advance and outages scheduled at the Owner's reasonable convenience.
- B. Submit, on request, a written step-by-step sequence of operations proposed to accomplish the work. The outline must include tentative dates, times of day for disruption, downtime and restoration of services. Submit the outline sufficiently in advance of the proposed work to allow the Architect or Engineer and Construction Manager to review the information with the Owner. Upon approval, final planning and the work shall be done in close coordination with the Owner.
- C. Shutdown of systems and work undertaken during shutdown shall be bid as being done outside of normal working hours.

## PART 2 - PRODUCTS

### 2.1 Access Panels

- A. Provide ceiling and wall access panels where indicated on the drawings, or where otherwise required to gain access to concealed valves, traps, devices and equipment requiring service or adjustment.
- B. Access panels shall be stainless steel construction with concealed hinge and door with tamperproof screws. Panels shall be 18 inches x 18 inches size unless larger panels are shown or required. Mounting frames shall be compatible with the material in which they are installed. Access panels shall be:
  - 1. Standard flush type with overlapping flange for masonry and tile walls, Milcor Style "M" or equal.
  - 2. Standard flush type for drywall ceilings and walls, Milcor Style "M" or equal.
- C. Access panels in fire rated shaft walls and in fire rated ceilings shall be "B" label or greater to match the rating of the wall or ceiling.
- D. Materials used in plenums shall be rated for plenum use conforming to the ASTM E84 25/50 smoke development and flame spread restrictions.

## PART 3 - EXECUTION

### 3.1 Workmanship

- A. Materials and equipment shall be installed and supported in a first-class and workmanlike manner by mechanics skilled in their particular trades. Workmanship shall be first-class in all respects, and the Architect shall have the right to stop the work if highest quality workmanship is not maintained.
- B. Electrical work shall be performed by a licensed Electrical Contractor in accordance with requirements of the jurisdiction.

### 3.2 Protection

- A. The Contractor shall be entirely responsible for all material and equipment furnished in connection with his work. Special care shall be taken to properly protect all parts thereof from theft, damage or deterioration during the entire construction period in such a manner as may be necessary, or as directed by the Architect, or Construction Manager.
- B. The Owner's property and the property of other contractors shall be scrupulously respected at all times. Provide drop cloths and visqueen or similar barriers where dust and debris is generated, to protect adjacent areas.

### 3.3 Cutting and Patching

- A. Refer to Division 01 - General Requirements for information regarding cutting and patching.
- B. Plan the work well ahead of the general construction. Where conduits, wireways, cable trays and bus ducts are to pass thru walls, partitions, floors, roof or ceilings, place sleeves in these elements or arrange with the Construction Manager to provide openings where sleeves are not practical. Where sleeves or openings have not been installed, sawcut or core drill holes and patch as required for the installation of this work, or pay other trades for doing this work when so directed by the Architect. Any damage caused to the building in this work shall be repaired or rectified.
- C. All sleeves and openings not used or partially used shall be closed to prevent passage of smoke and fire.

### 3.4 Painting

- A. In addition to any painting specified for various individual items of equipment, the following painting shall be included in Division 26 Electrical Contract:
  - 1. Ferrous metal which is not factory or shop painted or galvanized and which remains exposed to view shall be given a prime coat of paint and two finish coats of paint.
  - 2. Ferrous metal installed outside the building which is not factory or shop painted or galvanized shall be given a prime coat of paint and two finish coats of paint.

3. Equipment and materials which have been factory or shop coated (prime or finished painted or galvanized), on which the finish has been damaged or has deteriorated, shall be cleaned and refinished equal to its original condition. The entire surface shall be repainted if a uniform appearance cannot be accomplished by touch up.
  4. Apply Z.R.C. Galviline or Galvicon cold galvanizing compound, or Engineer approved equal, for touch-up and repair of previously galvanized surfaces.
  5. Each backboard shall be painted with a minimum of two coats of flame retardant paint, all sides; gray enamel primer with gray matte enamel finish.
- B. Paint, surface preparation and application shall conform to applicable portions of the Painting Section of Division 09 of the Specifications. All rust must be removed before application of paint.
- C. Finish painting is included as described in Division 01 Trade Contractor Descriptions.

### 3.5 Access Panels

- A. Access panels shall be turned over to the Construction Manager for installation.
- B. Access locations thru HVAC ductwork must be coordinated with the ductwork installer. Location of the hinged access door with latch must be coordinated in advance with the HVAC Contractor.
- C. Location of access panels shall be planned to clear ceiling lights, ceiling support grids and other obstructions so as to allow, wherever possible, full shoulder clearance beside the device to be inspected, adjusted or repaired.

### 3.6 Backboards

- A. Where shown on the drawings, backboards shall be provided for wall mounting of disconnect switches, devices and communications equipment. The Contractor may opt to mount additional groups of disconnect switches on backboards.
- B. General
  1. Backboard shall be 0.75 inch thick waterproof flame retardant plywood secured to structure.
  2. Each board shall be painted.
  3. Telephone backboards shall be normally 4 ft. x 8 ft. mounted 6 inches above floor where located on drawings. Where other sizes are required, they will be noted on the drawings.
- C. Each terminal cabinet for communication systems, relays, etc., shall be fitted with a full size 0.50 inch thick backboard for mounting terminal strips, equipment, etc.

END OF SECTION



## SECTION 26 05 05 FIRESTOPPING

### PART 1 - GENERAL

- 1.1 Firestopping assemblies shall be provided at penetrations of conduits, bus ducts, cables, cable trays and other electrical items thru fire rated floors, fire rated floor-ceiling and roof ceiling assemblies, fire rated walls and partitions and fire rated shaft walls and partitions. In addition, firestopping assemblies shall be provided at penetrations thru 0-hour rated floors. Refer to the drawings for fire rated building elements.
- 1.2 Firestopping assemblies shall be tested and rated in accordance with ASTM E814, E119 and listed in accordance with UL 1479, as published in the UL Fire Resistance Directory. Firestopping shall provide a fire rating equal to that of the construction being penetrated.
- 1.3 Firestopping materials, assemblies and installation shall conform to requirements of the OBC / Chapter 1, Section 106 and Chapter 7, Section 712 and the Authority Having Jurisdiction.
- 1.4 For those firestopping applications that exist for which no UL tested system is available through any manufacturer, a manufacturer's engineering judgment derived from similar UL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment drawings must follow requirements set forth by the International Firestop Council.
- 1.5 Shop drawings shall be prepared and submitted for review and approval. Submittals shall include manufacturer's specifications and technical data of each material, documentation of U.L. firestopping assemblies and installation instructions. Submittals shall include all information required in OBC Chapter 1, Section 106 and Chapter 7, Section 712.

### PART 2 - PRODUCTS

- 2.1 Firestopping materials shall be manufactured and/or supplied by Hilti, 3M, Rectorseal-Metacaulk, Tremco, Nelson, Specified Technologies or other approved manufacturer.
- 2.2 Materials shall be in the form of caulk, putty, sealant, intumescent material, wrap strip, fire blocking, ceramic wool and other materials required for the UL listed assemblies. These shall be installed in conjunction with sleeves and materials for fill and damming.
- 2.3 Combination pre-set floor sleeve and firestopping assemblies shall be equal to Hilti CP 680.

### PART 3 - EXECUTION

- 3.1 Installation of all materials and assemblies shall be in accordance with UL assembly drawings and the manufacturer's instructions.
- 3.2 Installation shall be done by an experienced installer who is certified, licensed or otherwise qualified by the firestopping manufacturer as having the necessary training and experience.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- 3.3 Refer to 26 05 33 Raceway and Boxes for Electrical Systems for sleeve requirements and treatment of penetrations not requiring firestopping.

END OF SECTION

## SECTION 26 05 19 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS

### PART 1 - GENERAL

1.1 This Section pertains to the use of copper conductors, 600V insulation class.

### PART 2 - PRODUCTS

2.1 All conductors shall be copper: conductors shall be insulated for 600 volts.

2.2 Insulation types referenced are those of NEC. All conductors shall be UL labeled and shall be marked for size and type at regular intervals on its length. Conductors #8 and larger shall be stranded; #10 and smaller may be stranded provided approved terminations are used.

2.3 Types of conductor insulation for general use may be any of the following, subject to limitations listed, in addition to those in the NEC:

- A. Type THHN - restrictions - do not use for conductors in slab. Do not use in wet locations.
- B. Type THWN - no restrictions.
- C. Type XHHW - no restrictions.

2.4 Use Type THHN or XHHW, (90 degrees C. rated) types for connecting fluorescent fixtures and for running thru fixture housings.

2.5 Use conductors such as type FEP with high temperature insulation as identified in the NEC for connections to resistance heating elements or in other areas subject to temperature exceeding the rating of THWN, XHHW or THHN.

2.6 Color Coding – The use of colored commercial building wire is encouraged.

- A. On 208/120 volt, three phase and 240/120 volt, single phase grounded systems, wires colored black, red and blue shall be used for phase conductors. Neutral wires on these systems shall be white. If conductors No. 4 AWG or larger are not available in white or white stripes, the neutral may be a black wire identified with white tape, minimum size 0.50 inch wrapped twice around at the following points:
  - 1. At each terminal.
  - 2. At each conduit entrance.
  - 3. At intervals not more than 12 inches apart in all accessible enclosures.
- B. On 480/277 volt, three phase system, wires colored brown, orange and yellow shall be used for phase conductors. Neutral wires on these systems shall be gray or other NEC acceptable means for distinguishing each system grounded conductor from another. If conductors No. 4 AWG or larger are not available in the proper colors, black wire may be used with 0.50 inch tape bands of the proper color at the following points:
  - 1. At each terminal.

2. At each conduit entrance.
  3. At intervals not more than 12 inches apart in all accessible enclosures.
- C. Equipment grounding conductors shall be green, or for 4 AWG and larger may be completely taped green, at all accessible points.
- D. All control circuits shall be red with individual wire identification on each conductor.
- E. Where existing wiring systems (remodel work or building additions) have different color coding, consult the Engineer concerning matching existing wire color coding and phasing.
- 2.7 Wire size ampacity shall equal or exceed its overload protective device. Where wire sizes shown on the drawings are greater than the apparent ampacity requirements, the size shown shall prevail to compensate for voltage drop. In no instance shall conductors be installed that are less than required by N.E.C. Minimum conductor size shall be No. 12 AWG except No. 14 AWG may be used only for control wiring or where otherwise specifically shown.
- 2.8 When necessary to use a lubricant for pulling wires, lubricant must be listed by Underwriters' Laboratories, Inc. Only cable lubricants approved for the type of jacket material or insulation shall be used, and must be of such consistency that it will dry completely when exposed to air. Lubricant must leave no obstruction or tackiness that will prevent pulling out old wires or pulling in new wires or additional wires, and, after drying, must leave a film of lubrication which will promote easy movement of the wires. The lubricant shall contain no waxes, greases, silicones, or polyalkylene glycol oils or waxes. Lubricant shall be Ideal "Yellow 190", 3M "WL" Wire Pulling Lubricant, or approved equal.
- 2.9 Splices No. 10 AWG and smaller shall be made using the following:
- A. Preinsulated spring pressure connectors as follows: ITT Holub "Freespring", with metal grip threads 3M "Scotch-Lok", Ideal "Wingnut", Thomas and Betts Type "PT", or Buchanan "B Cap". Other hard insulated wire connectors which have bakelite or ceramic insulation are prohibited. (Non-metallic thread connectors shall not be used.)
- 2.10 Splices No. 8 AWG and larger shall be made using the following:
- A. Approved crimp type connectors with special crimping tool; T&B, Burndy, Buchanan or approved equal. Joints and free ends shall be covered with tape or approved moistureproof insulating kits. Applied insulation shall exceed 150 percent of conductor insulation voltage rating.
  - B. For two or more taps use Power Distribution Blocks by Square D, Gould, Taylor, IlSCO or Connectron.
- 2.11 Wiring in vertical raceways shall be supported with strain relief devices; Kellem's grips or approved equal.
- 2.12 Connections to equipment shall be made with pressure type terminals. On stranded wire, use spade type terminals or terminals approved for use with stranded wire. Connections shall contain only single conductors unless approved for multiples.

- A. For conductors No. 10 AWG and smaller, applied crimp type terminals shall be T&B "Sta Kon" or approved equal.
  - B. For No. 8 AWG and larger conductors, applied crimp type terminals shall be Burndy, T&B or approved equal.
- 2.13 Where tape is applied over wires and connectors on 600 volt or lower voltage applications, it shall consist of a minimum of two (2) half lapped layers of Scotch "88" or Plymouth No. 4240 for both indoor and outdoor applications, except Scotch 33 Plus or Plymouth No. 4453 is acceptable for use indoors.
- 2.14 Where fireproofing of cables is noted on the drawings or required by Code, each cable shall be arc and fireproofed with one (1) half lapped layer of Scotch Brand 77 Electric Arc and Fireproofing Tape. Tape shall be secured with a 2 layer band of Scotch Brand 69 Glass Electrical Tape over the last wrap. Installation shall comply with manufacturer's recommendation.
- 2.15 Where installed underground, splices and terminations shall be listed and approved for waterproof application. Utilize kits approved for the application.

### PART 3 - EXECUTION

- 3.1 Branch circuit conductor identification means shall be permanently posted at each panelboard and switchboard. This identification shall be installed on the inside of the door and shall identify conductor colors for each voltage system in the building. Provide identification at all new panelboards and existing panelboards utilized within this project.
- 3.2 Conduit systems shall be clear and clean before pulling wire. Branch circuit conductors shall be pulled without resorting to levers or heavy pulling devices.
- 3.3 Cable pulling tensions shall not exceed recommended values.
- 3.4 Group ungrounded and grounded circuit conductors for each multiwire branch circuit by cable ties in panelboards and tap boxes.
- 3.5 Each branch circuit or multiwire branch circuit shall have its own dedicated neutral. Group neutral conductors with phase conductors by wire ties in each enclosure where multiple neutrals provided.
- 3.6 Control conductors shall not be run in same raceway with branch circuit or motor circuit conductors.
- 3.7 Unless noted otherwise on the drawings, a maximum of 8 conductors shall be installed in a branch circuit conduit. This maximum is a count of all phase and neutral conductors only, ground conductors are not counted when determining maximum fill for this purpose.
- 3.8 Wire tags shall be provided on all main and feeder conductors in all pull boxes, wireways and panelboard and switchboard wiring gutters. Tags shall identify wire or cable number and/or equipment served. Tags shall be of flame resisting adhesive material, T&B Type WSL or approved equal.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- 3.9 Perform meggar tests on all feeders and motor branch circuit conductors prior to energization of circuits. Provide documentation in standard NETA format to the Engineer for review. Do not run meggar check on solid state equipment.

END OF SECTION

## SECTION 26 05 26 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

- 1.1 Work includes grounding and bonding of system neutral, equipment and conduit systems to conform to requirements of NEC and as detailed on the plans and in the specifications.

### PART 2 - PRODUCTS

- 2.1 Clamps and continuity devices shall be non-ferrous material, UL approved. Connections to ground rods and all underground connections shall be "Thermoweld" or "Cadweld" or Engineer approved equal.
- 2.2 Ground conductors shall be insulated, identified by green insulation or by painting or taping green at all accessible locations and shall be connected with approved connectors and terminators to boxes, devices, equipment, etc. and to ground bars in panels.

### PART 3 - EXECUTION

- 3.1 Wiring devices shall be connected with grounding jumper from ground pole on device to grounding screw in the outlet box.
- 3.2 Grounding Bus:
  - A. Bus shall be minimum 3/8 inch x 2 inches x 12 inches L. solid copper.
  - B. Install bus on insulated spacers 1 inch, minimum, from wall 6 inches above finished floor, unless otherwise indicated.
  - C. The grounding bars shall be bonded to the building grounding mat and the building ground loop.
- 3.3 The complete metal conduit system shall be used for the equipment grounding system. Conduit systems and associated fittings and terminations shall be made mechanically tight to provide a continuous electrical path to ground and shall be safely grounded at all equipment by bonding all metallic conduit to the equipment enclosures with locknuts cutting thru paint or enclosures. Conductors shall be sized per NEC Tables 250.66, 250.102 and 250.122. Bond all communications conduit systems to ground.
- 3.4 Ground neutral of all transformers for separately derived systems. Grounding electrode conductor shall be to the street side of the main water service, a bond ground ran to nearest water piping and structural steel in area or to other NEC approved electrodes. A common grounding electrode size #3/0 may be used for multiple separately derived systems.
- 3.5 Motor frames shall be bonded to the equipment grounding system by an independent green wire, sized to match equipment grounding conductor.
- 3.6 Cord connected appliance frames shall be grounded to the equipment grounding system thru a green wire in the cord.

- 3.7 Equipment mounted on vibration isolation hanger and supports shall be bonded so bond does not transmit vibration. Size bond to match equipment ground conductor.
- 3.8 A green grounding conductor shall be installed in each non-metallic conduit and all flexible conduits, including exterior underground conduits.
- 3.9 System neutral connections shall be insulated from metal enclosures except at the neutral of the service entrance equipment and on the neutral of a separately derived system. Connections to the main switchgear enclosure shall be by means of bonding jumpers.
- 3.10 The building neutral shall be identified throughout with white conductors. Where there are neutral conductors from a separately derived system (such as 120/208 volt, 3 phase, 4 wire where the main building service is 277/480 volt, 3 phase, 4 wire) the neutrals of the two systems shall be separately identifiable per NEC Article 200.
- 3.11 Steel frame buildings and metal exterior coverings on buildings that are not effectively grounded shall be grounded thru a low resistance grounding system whether or not a lightning protection system is required. Ground metal exterior coverings and metal roofs with minimum #4 copper conductor at a minimum of two points, intervals not exceeding 100 feet. Ground steel frame buildings at each corner with maximum of every 60 ft. around the outside perimeter by cadwelding #2/0 (#4/0 for buildings over 75 ft. tall) copper conductor to steel columns and extending below ground to driven ground rods; top of 0.625 inch x 10 ft. ground rod shall be minimum of 12 inches below finished grade and 3 ft. out from building foundation. Bond the water service, street side of water meter, to the adjacent perimeter steel column with #4/0 insulated copper conductor. Sleeve all concrete foundations and masonry walls with PVC sleeve.
- 3.12 Where metal covers on pull boxes and junction boxes are used, they shall comply with the grounding and bonding requirements of NEC Article 250.
- 3.13 Connections to driven ground rods or other such electrodes shall be a minimum of three feet from the foundation wall or beyond the roof drip line, whichever is greater.
- 3.14 The electrodes (driven ground rods) of the electrical grounding system shall not be used for the electrodes for the lightning protection system, and vice versa. However, these two systems shall be bonded together at one point per NEC.
- 3.15 Provide sign at normal service “WARNING – SHOCK HAZARD EXISTS IF GROUNDING ELECTRODE CONDUCTOR OR BONDING JUMPER CONNECTION IN THIS EQUIPMENT IS REMOVED WHILE ALTERNATE SOURCES(S) IS ENERGIZED”.

END OF SECTION



## SECTION 26 05 33 RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

- 1.1 This specification section covers common conduit systems, boxes, firestopping and sleeves. Where other methods are specified under separate sections for specific applications, the specific application requirements shall govern.
- 1.2 Refer to Section 26 05 05 Firestopping and Division 07 for firestopping requirements.
- 1.3 Refer to Section 26 05 28 Communication System Pathways and Support Equipment for future communication system.

### PART 2 - PRODUCTS

- 2.1 Conduit Type - Application (Use only conduit types listed)
  - A. Conduit - Rigid or Intermediate Grade Galvanized Threaded.  
Application - restrictions - (Not to be used in):
    1. Direct buried in corrosive soils.
    2. Corrosive atmospheres.
  - B. Conduit - Thinwall EMT.  
Application - restrictions - (Not to be used in):
    1. Poured concrete.
    2. Exposed to weather.
    3. Underground.
    4. Exposed in mechanical equipment or other equipment/process rooms below 48 inches.
    5. Hazardous or corrosive atmospheres.
    6. Not to be used for medium voltage (2001 volts or higher) cable.
    7. Not to be used in areas exposed to the public.
  - C. Conduit - PVC Type 40 (Schedule 40) rigid, conforming to ANSI, NEMA specifications and each length UL labeled.  
Application - use limited to:
    1. In or under concrete slabs on grade where permitted by electric legend on the drawings.
    2. Exterior use when encased in 3 inch concrete.
    3. Direct buried, underground when indicated on drawings.
  - D. Conduit - PVC, NEMA Type TC 6, rigid, conforming to ANSI, NEMA specifications and each length UL labeled.  
Application - use limited to:
    1. Exterior use when encased in 3 inch concrete, for duct bank use only.
  - E. Conduit - Flexible Metal (Greenfield type), galvanized steel or aluminum.  
Application - use limited to:

1. Connection to lighting fixtures; not over 6 ft. in length.
2. Connections to transformers, dynamic equipment and motors only in air streams or plenums.

F. Conduit - Liquidtight Flexible Metal.

Application - use and limitations:

1. Connections to all motors, except in air stream or plenum.
2. Connections to controls on dynamic equipment, transformers, etc., outdoors and indoors in wet locations.
3. Use not permitted underground or where subject to physical damage.

## 2.2 Conduit sizes

- A. Conduits shall be 0.75 inch minimum size except 0.50 inch size may be used for switch legs and flexible connections to lighting fixtures.

## 2.3 Conduit Fittings

- A. Fittings and workmanship shall ensure electrical continuity. All conduit systems in poured concrete shall be concrete tight.
- B. Application of bushings, locknuts and insulated fittings shall comply with NEC requirements.
- C. Use conduit fittings as manufactured by Efcor, Steel City, Raco, Midwest, Appleton, ETP / O-Z / Gedney, American Fitting Corporation or T&B, equal to the following catalog numbers:
1. Rigid and intermediate conduit
    - all fittings, couplings and connectors shall be threaded type.
    - grounding bushings, malleable iron; insulated; Steel City BG-801; Midwest Series GLL.
  2. EMT
    - fittings shall be all steel, set screw or compression type, concrete tight.
    - set-screw type couplings; Midwest Series 460; Steel City TK 121; Appleton TW 50S.
    - compression type couplings; Midwest series 660S; Steel City TK111; Appleton TWC50CS.
    - set-screw type connectors; Midwest Series 450; Steel City TC 121; Appleton TWC 50S.
    - compression type connectors; Midwest Series 650; Steel City TC111; Appleton TW50CS.
  3. Flexible metal conduit
    - malleable iron, "squeeze" type, non-insulated; Midwest series 1708; Steel City XC 901; Appleton 7481V. (For lighting fixture whips only - all steel or die cast screw in connector; Midwest 771; Steel City XC 241; Appleton SGC 50DC).
  4. Liquid tight conduit
    - steel or malleable iron; Midwest Series LT; Steel City LT 100; Appleton ST.

- D. All conduit straps and supports in open garage area shall be galvanized steel and designed for use in damp locations.

#### 2.4 Boxes

- A. Junction boxes and pull boxes shall be code gauge galvanized steel with multiple screw fasteners and galvanized steel covers. All boxes in the garage area shall be water tight to prevent moisture damage.
- B. Outlet boxes all steel construction with galvanized or plated finish or otherwise all metal, by Steel City, Appleton, Crouse Hinds, R&S or Raco.
  - 1. Lighting fixture outlet boxes 4 inches square or octagonal, 2.125 inches deep, with 0.375 inch fixture studs. Equal to Steel City Series 54171; Series 52171 with FE 421 stud. Fixtures weighing more than 50 lbs. shall be supported independently of the outlet box.
  - 2. Flush mounted device outlet boxes shall be minimum 4 inches square. Provide extension rings as required. Use Erico Caddy No. H2-3 mounting support plate where metal studs are used.
  - 3. Device rings in finished masonry or tile walls shall be square corner masonry type with no extended ears, to allow flush mounting of plates.
  - 4. Surface mounted device boxes shall be cast "FS" type or special surface mounted boxes for use with surface raceway systems.
- C. Provide water tight boxes, slip expansions and bonding jumpers where dictated by construction conditions.
- D. Terminations at boxes shall be secured by locknuts or approved bushings.
- E. All boxes in the garage area shall be water tight to prevent moisture damage.

#### 2.5 Surface Metal Raceways

- A. Snap on cover types by Mono-Systems, Panduit or Wiremold / Walkermold with prime gray finish (enamel finish coat to match room finishes in remodel areas). Application - permitted only when specifically shown on the drawings.
  - 1. Fittings, boxes and extension rings: Furnish manufacturer's standard accessories; match finish of raceway.

#### 2.6 Sleeves and Openings

- A. Sleeves and formed openings shall be placed in walls, partitions, floor slabs and poured concrete roof decks for the passage of conduit, cable, wireway, cable tray and bus duct. Sleeves and formed openings are not required:
  - 1. In floor slabs on grade.
  - 2. Where conduit is installed before the wall, partition or slab is constructed.
  - 3. Openings are cut for conduit passage and patched with equal or comparable material to close the space around the conduit.
  - 4. In stud and gypsum board or plaster walls and partitions which are not fire rated.

5. For conduit passing thru masonry walls and partitions and stud and gypsum board or plaster walls and partitions. Sleeves are required however, for which expansion, contraction and other movement can be expected.
6. In core drilled openings in solid concrete not requiring water protection. Sleeves are required, however, at core drilling thru hollow pre-cast slabs and concrete block walls, to facilitate containment of required firestopping material.
7. In large floor openings for multiple pipe and duct risers which are within a fire rated shaft, unless the opening is to be closed off with concrete or other material after conduits are set.
8. Sleeves for passage of conduit and cables shall be schedule 40 galvanized steel pipe or galvanized rigid conduit. Rectangular sleeves for cables, wireway, cable tray and bus duct shall be 18 gauge galvanized steel in poured concrete floors, walls and roof decks; 26 gauge galvanized sheet steel in other than poured concrete.
9. Sleeves shall be sized to afford 0.25 inch to 0.75 inch clearance space.
10. All other sleeves : schedule 40 PVC, Type 1, ASTM D2466, Color Gray.

2.7 Escutcheon plates shall be split-ring chromium plated pressed steel. Plates shall be sized to cover the surface penetration and sleeve. Plates shall be installed on exposed piping in finished rooms and areas where conduits penetrate walls, floors, ceilings or overhead structure.

#### 2.8 Anchors and Fasteners

- A. Anchors and fasteners shall be of a type designed and intended for use in the base material to which the material support is to be attached and shall be capable of supporting the intended load and withstanding any associated stresses and vibrations.
- B. In general, screws shall be used in wood, masonry anchors on concrete or brick, toggle bolts in hollow walls, and machine screws, bolts or welded studs on steel.
- C. In outdoor locations or garage and any other corrosive atmospheres, the anchors and fasteners shall be non-corrosive or have suitable corrosion resisting coatings.

### PART 3 - EXECUTION

3.1 All conduit shall parallel building lines.

3.2 Conduits exposed in the parking garage or to the public shall be rigid or intermediate rigid type conduits. No EMT conduits shall be installed in any public areas.

3.3 Where feeders are permitted to be run below grade slab on grade, they shall be installed in non-metallic conduit encased in 3 inch concrete using galvanized rigid steel or RTRC (equal to Champion Fiberglass) elbows with all necessary fittings and couplers. (NOTE: Where not required to be run overhead, branch circuits may be installed in 1 inch or smaller Schedule 40 PVC conduit below the vapor barrier, shall have a minimum of 6-inch fill over the conduit below the vapor barrier without concrete encasing the PVC. This PVC conduit shall not stub up more than 18 inches above the finished floor and shall be concealed in walls. The 90 degree elbow and stub up shall be galvanized rigid steel).

- 3.4 All conduits installed below concrete slab on grade shall have a minimum of 6-inches fill over the conduits in order to prevent accidental damage to conduits should the floor be saw-cut in the future.
- 3.5 Conduit crossing building expansion joints shall have expansion provisions with grounding continuity; use special expansion fittings or other NEC approved method. Refer to the Architectural and Structural floor plans and details for locations of expansion joints.
- 3.6 Do not install wall-mounted boxes back-to-back in opposite sides of wall; in stud walls, boxes shall be on opposite side of studs. In acoustic rated and fire rated walls boxes shall be separated a minimum of 24 inches.
- 3.7 Boxes not otherwise accessible in ceilings and walls shall be made accessible by installation of hinged door access panels. Refer to Section 26 05 04 - Basic Electrical Materials and Methods.
- 3.8 Work shall be so planned as to:
  - A. Minimize the number of offsets and junction boxes. For feeder conduits, use all long radius conduit bends or accessibly located large junction boxes with screw covers.
  - B. Generally run conduit and conductors as high as practicable against underside of floor slab in concrete construction or immediately below the top chord of bar joist construction unless otherwise shown. This high level zone shall be used for running electrical raceways. Running conduits promiscuously at various levels and directions will not be acceptable. Runs at bottom chord level or ceiling grid level will not be acceptable.
  - C. Where spray on fireproofing is used, coordinate with the General Contractor about installing supports, panel feeders and larger conduits before fireproofing is applied. Branch circuit conduits and smaller size conduits may be run as high as possible on stud walls that go all the way up to the structure; this will minimize damage to spray on fireproofing. Patch and repair damaged spray on fireproofing caused by electrical installation; conduits shall not be fully covered with fireproofing.
  - D. Coordinate activity in advance to avoid interference with other trades.
  - E. Provide access to all junction and pull boxes.
  - F. Maintain 6 inches from conduit to paralleled hot water piping and 4 inches from cross piping and 12 inches from generator exhaust piping.
- 3.9 Secure feeder conduit to basic structural elements with galvanized strap hangers and clamps; use of trapeze type hangers is encouraged for multiple conduits where space will permit. Galvanized metal clamps and screws may be used for attaching and supporting branch circuit conduit. Non-metallic fasteners shall not be used except plastic inserts may be used in concrete for small conduits. Vertical conduits shall be supported at each floor by clamps.
- 3.10 Surface mounted horizontal and vertical conduit supports on walls up to a height of 7 feet-0 inches above the floor shall be one or two hole sheet metal pipe straps. Pinch type

hangers similar to Minerallac type may only be used at heights greater than 8 feet-0 inches. The use of pinch type hangers similar to Minerallac type are expressly prohibited on ductwork, air handling units and other mechanical equipment below 8 feet-0 inches.

- 3.11 During construction temporarily cap open ends of conduit. Caution trades to take special care of runs in concrete slabs during pouring.
- 3.12 Empty conduit installed for communications use or for future systems shall have an insulated pull wire or heavy nylon cord inserted for use in pulling wires.
- 3.13 Pull mandrel or large swab thru conduit to ensure freedom from debris before pulling wires. Use pulling lubricants sparingly.
- 3.14 Sleeves for passage of conduit, cables, wireway, cable tray and bus duct shall be placed in the initial stages of construction before concrete, masonry and other general construction activity. Means shall be taken to ensure that the sleeve will not move during or after construction. Beams, columns and other structural members shall not be sleeved except upon approval of the Architect.
- 3.15 Length of wall sleeves shall be such that the sleeve ends are substantially flush with both sides of the wall or partition. Floor sleeves shall be flush with the bottom and top of the floor slab except, in mechanical rooms and other areas which might have water on the floor, sleeves shall project a minimum of 1 inch above finished floor. Refer to the following paragraph for qualifications and exceptions relating to firestopping.
- 3.16 Refer to 26 05 05 Firestopping. Sleeves which are a part of firestopping assemblies shall conform to the requirements of the assembly with particular emphasis regarding size, annular space, length, passage or non-passage of insulation and the installation of the sleeves.
- 3.17 Where firestopping is not required, the annular space between the sleeve, core drilling or opening and the conduit, cable, cable tray, bus duct and raceway shall be closed with caulking to retard the passage of smoke.
- 3.18 Where permitted by OBC Section 712 Penetrations, metallic conduits requiring no pipe sleeves in passing thru concrete floors or concrete or masonry walls and partitions, the annular space shall be closed full depth of the penetration with materials and methods compatible with the floor, wall or partition material (concrete, grout or mortar).
- 3.19 Conduits, wire and cables entering from outside the building or bath tub planting areas shall be sealed water and moisture tight. Seal between conduit and sleeves, conduits and core drilled holes and around conductors inside conduits.
- 3.20 Power actuated fasteners of any type are prohibited in occupied buildings. This includes anchors which are driven into place by any device which produces an impact force by use of a powder charge, compressed air, gas or any other propellant.
- 3.21 Provide four (4) 1 inch diameter spare conduits for each flush mounted branch circuit panelboard; extend from top of panelboard to above an accessible ceiling for future use.

- 3.22 All conduit terminations to be equipped with locknuts and bushings. Conduits 1-1/2 inches and larger shall have insulating bushings, grounding lug and shall have locknuts inside and outside the enclosure.
- 3.23 Outlet Box Installation
- A. Set box square and true with finished building surfaces and trim.
  - B. Secure boxes firmly to building structure.
  - C. Locate light switches on latch side of door and verify door hinge location in field prior to switch outlet installation.
  - D. The Owner reserves the right to relocate any device as much as 10 feet-0 inches (measured horizontally) from its indicated location at no additional cost, provided the contractor is notified prior to roughing that device in.
- 3.24 Contractor shall record carefully on a set of "as built" prints the exact location of all feeder conduits.
- 3.25 Unless noted otherwise on the drawings, a maximum of 8 conductors shall be installed in a branch circuit conduit. This maximum is a count of all phase and neutral conductors only - ground conductors are not counted when determining maximum fill for this purpose.

END OF SECTION

## SECTION 26 05 53 IDENTIFICATION FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 Equipment Identification

- A. Identify all the following items with laminated plates:
  - 1. Every motor, lighting and equipment controller and disconnect switch.
  - 2. Transformers.
- B. Nameplate on motor controllers, disconnect switches and transformers shall indicate source, voltage disconnect location, and load served.
- C. Equipment on the emergency systems shall be identified with nameplates having a red background. Outlets on the emergency systems shall be identified red. This shall be accomplished by using red devices.
- D. Branch circuit panelboards:
  - 1. Identify panel designation on directory card within the panel.
  - 2. Fill out branch circuit directory indicating circuit number and area served, rooms, group of rooms, lighting, convenience outlets, motors, etc. Card index shall be neatly typed.
  - 3. Update or replace branch circuit directory in existing panelboards in areas of alteration.
  - 4. Branch circuit phase conductor color format shall be permanently identified inside each panelboard.
- E. Wire identification:
  - 1. Identify communications and signaling system wiring and branch circuit wiring by circuit number in panels and motor control center wiring gutters by means of permanent durable wire markers wrapped around or fastened to conductors. This shall be done concurrently with pulling of conductors.
  - 2. Wiring or fiber cabling installed by Contractor for termination by Owner's vendor such as for telephone or data systems shall be identified at both ends utilizing the alpha/numerical identification schedule established by the system vendor.

### PART 2 - PRODUCTS

#### 2.1 Nameplates

- A. Nameplates shall be laminated phenolic with black surface (red surface for emergency) and white core. Use 0.0625 inch thick material for plates up to 2 inches x 4 inches and 0.125 inch thick for larger sizes. The lettering shall be Condensed Gothic with space between the lines equal to the width of the letters. Use 0.25 inch minimum height letters on the small plates increasing the size proportionately to plate size.
- B. The lettering on the plate shall indicate the name of equipment, the specific unit number, voltage, phases, which panel, switchboard or motor control center the



The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

equipment is served from, and any other reference data pertinent to the operation. Names and numbers shall coincide with those listed on the drawings. Sample: Panel 3A; 277/480 V, 3 phase, 4 wire, served from unit substation USI.

### PART 3 - EXECUTION

3.1 Nameplates shall be secured with screws, one on each end.

END OF SECTION

## SECTION 26 05 65 SPECIFIC WIRING APPLICATIONS

### PART 1 - GENERAL

- 1.1 Specific wiring applications are identified. Refer to applicable sections of the specifications.

### PART 2 - PRODUCTS

- 2.1 Materials and equipment shall be as indicated on the drawings and in the specifications.

### PART 3 - EXECUTION

- 3.1 Final connections to fixture pigtails shall be made with approved pressure connectors such as 3M "Scotchlok" or Engineer Approved equals.

#### 3.2 Miscellaneous Wiring and Interlocks

- A. Various items of work in connection with interlocking motor and starter operations and providing wiring to serve equipment which is furnished by other trades.
- B. Interlocks between motor controllers for purposes of accomplishing sequence control or simultaneous operation of motors are all to be included by the Contractor. Requirements for a simple simultaneous motor operation interlock are indicated by a schedule on the drawings. These interlocks consist of auxiliary contacts on the starter of the lead motor wired in, according to standard diagrams of the motor starter manufacturer to energize the holding coil of the starter for the motor. These interlocks shall be thru the "automatic" position only of the starter where HOA switches are supplied. Where interlocks, other than the simple sequence above are required, these shall be as described hereinafter. This Contractor shall inquire of the Engineer during bidding, or at the earliest practical date, regarding any questions which may arise regarding the intention and scope of this work. This Contractor shall furnish extra contacts for his starters where required, in lieu of which he may furnish externally mounted relays to accomplish the specified function.
- C. The following is a list of equipment and systems requiring wiring, this is in addition to equipment shown on the plans.
1. Independently mounted controllers, furnished by others: where starters are furnished by other trades, and are required to be mounted remote from the motor, the Electrical Contractor shall accept and mount them and perform all power and control wiring between controls and motors as indicated. Motor controllers equipped with automatic alternators shall have two independent circuits and control sources to preclude loss of operation when one circuit fails.
  2. Provide 120 volt power to the irrigation system head end controller. Extend conduit raceways as required to facilitate the irrigation system installation. Coordinate quantities and routings closely with the irrigation system provider and approved shop drawings.

END OF SECTION

SECTION 26 09 23 LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 Lighting control devices are identified on the drawings per legend symbols or as specifically noted. Catalog numbers from acceptable manufacturers for the common wiring devices shall be as listed herein. Catalog numbers are not listed for all devices. Other devices, such as key switches, clock hanger outlets, etc. shall be furnished by one of the manufacturers listed and shall be equal in quality to the device series listed.

PART 2 - PRODUCTS

2.1 Toggle type AC switches shall be listed by Underwriters Laboratories, Inc. Switches shall be 20 ampere, 120/277 volt AC and ivory in color unless noted otherwise.

Acceptable Manufacturer	General Purpose	Red Pilot Lighted	Illuminated Handle	Momentary
Cooper	1221-I series	1991 PL series	1991 IL series	1995 series
Bryant	4901-I series	4901 PL series	4901 GLI series	4921 series
Hubbell	HBL1221-I series	HBL1221 PL series	HBL1221 IL series	HBL1557 series
Leviton	1221-2I series	1221 PL series	1221 LH series	1257 series
P&S	20AC1-I series	20AC1 RPL series	20AC1 ISL series	

2.2 Ceiling/Wall Mount Occupancy Sensor

- A. Sensor shall be dual technology to detect human presence in controlled area by ultrasound and passive infrared. Dual sensing with both technologies must occur to activate lighting system. Sensor to be fully adaptive with self-adjusting and self-calibration.
- B. Sensor shall have signal processing to respond to only those signals caused by human motion. Sensor to operate instantly for room motion and time off delay adjustable for 5 – 30 minutes. Sensor to be equipped with a walk-thru mode.
- C. Sensor area coverage to be minimum of 1000 SF for one sensor. Provide multiple sensors where needed for space coverage.
- D. Sensor shall have provisions for manual-off function for lighting circuit from remote momentary switch (reset when not occupied) or maintained (off override).
- E. Provide an additional single-pole, double throw isolated contact with each power pack for remote interface.
- F. Power pack for remote mounting to match occupancy sensor.
- G. Verify color with Architect.
- H. All components to have 5-year warranty.
- I. Manufactured by Watt-Stopper, Greengate (Cooper Controls), Hubbell Building Automation, Leviton, Sensor Switch, Lutron, or Hubbell Wiring Device.

## 2.3 Daylight Harvesting Systems

### A. Single Channel Continuous Dimming Daylighting Controller

1. Ceiling mounted 0-10VDC closed loop photo sensor, greater than 1 inch accuracy to measure total light at task plane. Full range dimming, spectral response similar to human eye, set points adjustable from 20-60FC, 50 ballast control, five-year warranty.
2. Occupant adjustment handheld remote control for raise/lower and auto functions.
3. Wattstopper #LS-301 or equal by Hubbell Building Automation or Sensor Switch.
4. Single Channel Switching Daylighting Controller
5. Ceiling mounted 0-10VDC closed loop photo sensor, controller and LCD Display. Set points adjustable from 1-1400FC, five year warranty.
6. 100 degree peak sensitivity cone of vision, optional LV override switch input, test mode, 4 user selectable set points, and LED status indicator.
7. Wattstopper #LS-102 or equal by Hubbell, Building Automation or Sensor Switch.

### B. Multi-Channel Continuous Dimming Daylighting Controller

1. Ceiling mounted 0-10VDC open loop photo sensor to detect incoming natural daylight, 3-300FC, 30-3000FC and 60-6000FC selectable ranges, five year warranty; Wattstopper #LS-290C or equal by Hubbell Building Automation.
2. Three zone low voltage daylight harvesting dimming controller, 0-10VDC, 7 adjustable parameters for each zone (set point, min output, max output, ramp rate, fade rate, cutoff time delay and load shed limit). Menu driven programming, internal calculations for dimming, wall switch inputs, and DIN rail mounting; Wattstopper #LCD-203 with #BT-203 power pack or equal by Hubbell Building Automation.
3. Low voltage wall switch with “AUTO”, “ON/OFF”, “RAISE” AND “LOWER” buttons and single gang faceplate; Wattstopper #LS5C or equal by Hubbell Building Automation.
4. Mount controller and power pack in a NEMA 1 enclosure with DIN rail above accessible ceiling near line voltage wall switches (or near door); Wattstopper #LS-E8 or equal.

- C. Submit manufacturer designed 1/8 inch scale floor plans with cut sheets for shop drawing review showing model numbers, coverage pattern of photo sensors, zones and control, mounting instructions, etc. Submittals missing this information will be rejected.

2.4 Provide a device plate to suit each particular application. Cover all empty outlet boxes with a blank plate. Coverplates shall be manufactured by Pass and Seymour, Hubbell, Cooper, Bryant, Leviton or Mulberry; Taymac is an acceptable manufacturer for weatherproof non-metallic coverplates Multi-Mac Series, “While-In-Use” type, 3.5 inches depth, opaque grey, locking tab marked “EXTRA Duty”.

2.5 In finished spaces, wall plates shall be nominal .032 inch thick, made of 302 high nickel stainless steel with brushed satin finish and beveled edges. Screws shall be metal with countersunk heads and finished to match plates. Sectional plates will not be permitted.

- 2.6 Installations consisting of three or more wall switches or wall box dimmers mounted together with either separate coverplates or a common coverplate shall have each coverplate engraved so as to identify the circuits or fixtures being controlled by each switch or dimmer. Refer to the drawings for special instructions.
- 2.7 Switches controlling luminaires served by emergency circuits shall be red and covered by a red plate.

### PART 3 - EXECUTION

- 3.1 Locate devices as shown on the drawings, coordinate exact location with other trades, to avoid interference. Check for potential interference from door swings, cabinets, HVAC equipment and other wall mounted devices.
- 3.2 Clean debris from device boxes prior to installation of devices. Adjust devices and coverplates to be flush and level.
- 3.3 Occupancy Sensor Installation
  - A. Verify location of occupancy sensor(s) with selected manufacturer prior to rough-in to minimize false activation of the device. Locate sensor and adjust activation field to avoid nuisance activation by movement outside of the controlled space. Sensors shall sense any human motion in the space and allow turn on with entrance into the space.
  - B. Provide all material and labor for a complete and operational system including power and slave packs, auxiliary relay modules and backboxes. Verify application voltage rating and provide proper rated devices.
  - C. Low voltage wiring can be open wired above accessible ceilings, utilize plenum rated cabling. Installation in exposed or inaccessible locations shall be installed in conduit.
  - D. Coordinate time delay off setting of each occupancy sensor with the Owner. Maximum time delay off shall be 30 minutes. Minimum off delay is 10 minutes for intermittent use spaces.
  - E. Maintain 6 feet (minimum) to 8 ft. distance from an HVAC air outlet.
- 3.4 Daylight Harvesting Installation and Commissioning
  - A. Prior to installation, during installation and after installation manufacturer shall coordinate proper mounting locations, aiming, set up, calibration, etc. of every device. At completion of project, manufacturer shall submit proof every device is calibrated and commissioned and in good working order.
  - B. Minimum of 2 hours of Owner training shall be provided by manufacturer's representative on use of remote controls, low voltage wall switch, system components (accessible and concealed), maintenance and how to maximize energy savings. Submit outline and Owner signature sheet that this has been completed at completion of project.

- C. Provide 2 spare photo sensors of each type used on project, 2 spare remotes and 2 spare multi-channel dimming controllers/power packs used on the project. Submit proof of spares turnover to Owner with O&M Manuals.
- 3.5 Functional Testing – Lighting control devices and control system shall be tested to ensure the control hardware and software are calibrated, adjusted, programmed and in proper working condition in accordance with the construction documents and manufacturer's installation instructions.
- A. Confirm that the placement, sensitivity and time-out adjustments for occupant sensors yield acceptable performance, lights turn off only after space is vacated and do not turn on unless space is occupied.
  - B. Confirm that the placement, sensitivity and adjustments of daylight sensors yield acceptable performance.
  - C. Testing shall be performed by equipment supplier. Provide report to Engineer.

END OF SECTION

## SECTION 26 22 13 DISTRIBUTION TRANSFORMERS

### PART 1 - GENERAL

- 1.1 Transformers shall be dry type, air cooled, two winding, insulated, high efficiency units, size and voltage as listed on drawings.
- 1.2 Construction and testing in accordance with NEMA, IEEE and ANSI Standards. Transformers shall bear the UL label for the specified temperature rise.

### PART 2 - PRODUCTS

- 2.1 Manufacturer Square D, Acme, AFP Transformers, Hammond Power Solutions, G.E. or Eaton.

#### 2.2 Transformer Construction

- A. Core: The magnetic circuit shall be 3 phase core type. Laminations are to be manufactured from non-aging silicon steel with high magnetic permeability, and low hysteresis and eddy current losses; the core shall be grounded by means of a flexible grounding conductor.
- B. Coils: Coils shall be wound of continuous copper magnet wire of the barrel wound design.
- C. Impregnation: Core and coil with core brackets shall be thoroughly dried followed by impregnation with a silicone varnish or non-hygroscopic thermosetting varnish.
- D. Construction: Individual core and coil assemblies shall be mounted adjacent to one another but isolated from transformer case and base by means of vibration isolators. Vertical assemblies one above the other will not be acceptable. The conduit entrance and terminal board shall be located at the bottom of the enclosure. The taps must be accessible when the cover is removed.
- E. Taps: Transformers 25 kVA and above shall be equipped with NEMA Standard full capacity 2.5 percent taps:
  1. Up to 500 kVA (2) FCAN and (4) FCBN taps
  2. Above 500 kVA (2) FCAN and (2) FCBN taps
- F. Three phase transformers shall be 480 volt delta primary and 208Y/120 volt secondary.
- G. Ground system termination bar for terminating coil, housing and system bonding jumpers and feeder equipment grounds shall not be installed on or over ventilation openings.

#### 2.3 Performance:

- A. Temperature Rise: Transformers 25 kVA and above shall have Class H (220 degrees C.) insulation system. When the transformer is delivering the full kVA load

continuously, the temperature rise shall not exceed a 115 degree C. rise above 40 degrees C. ambient.

- B. Short Circuit Strength: Transformers shall be capable of withstanding without injury, stresses caused by short circuits on the secondary with rated voltage applied to the transformer provided the short circuit duration does not exceed time limits as specified by NEMA.
- C. Audible Sound Level: Sound levels shall be guaranteed by the manufacturer not to exceed the following when tested per NEMA and ANSI Standards:

kVA	Max. DB
0 - 9	40
10 - 50	45
51 - 150	50
151 - 300	55
301 - 500	60

- 2.4 Efficiency: Minimum efficiency shall be per NEMA TP-1. Efficiency shall be marked on label.
- 2.5 Housing: All live parts of the transformer shall be enclosed with a heavy gauge steel enclosure. Ventilation openings shall be protected against falling dirt and drip, shielded against actual touching of live parts. Top of case temperature shall not exceed 35 degrees C. above ambient. The terminal compartment shall be so designed to permit the use of 75 degrees C. wire. Lifting eyes or other provisions for lifting shall be provided.
- 2.6 Obtain from the transformer manufacturer and submit to the Architect and Engineer, eight (8) copies of guaranteed performance data on NEMA forms. The minimum efficiency to meet NEMA TP-1. Data shall be based on transformers of identical design to those specified. These copies shall be included with shop drawings. The data shall include the following:
  - A. Efficiency at 25 percent, 35 percent, 50 percent, 75 percent, 100 percent, 125 percent and 133 percent of load.
  - B. Percent regulation shall be given at 100 percent and 80 percent power factor.
  - C. Core loss in watts.
  - D. Conductor loss in watts based on reference temperature 20 degrees C. above the temperature rise of the transformer.
  - E. Impedance at reference temperature.
  - F. Sound level.
  - G. Average temperature rise with 40 degrees C. ambient.
  - H. Hot spot temperature rise with 40 degrees C. ambient.



- 2.7 A vibration isolation pad shall be field installed between the transformer enclosure and the concrete base or wall mounting supports, one at each of the four corners. The isolator pad shall be a one-bolt assembly with 0.75 inch minimum thickness neoprene isolation pad, galvanized 16 gauge minimum metal plate bonded to the neoprene pad, rubber isolator washer, flat plated steel washer, plated steel bolt; McGregor and Associates Series "TRANS-Y-PAD" (Tel. No. 1-614-451-8719) or approved equal. Size isolation pad for transformer weight and mounting configuration.

### PART 3 - EXECUTION

- 3.1 Where indicated as floor set, mount transformer on and bolt to a 4 inch high concrete base furnished by this Contractor. For wall mounted units, provide all necessary mounting hardware.
- 3.2 Mount each transformer and enclosure on the vibration isolator pad (TRANS-Y-PAD).
- 3.3 All raceway connections to the transformer shall be made with liquid-tight flexible metallic conduit.
- 3.4 Clean the inside of the transformer of any debris or dirt before energizing the unit.
- 3.5 Measure primary and secondary voltages at no load and full building load and make appropriate tap adjustments to within 2 percent of rated voltage.
- 3.6 Electrical Tests
- A. Perform insulation resistance tests, winding-to-winding and windings-to-ground, utilizing a megohmmeter with test voltage output as recommended by manufacturer and International Electric Testing Association. Test duration shall be for 10 minutes with resistance tabulated at 30 seconds, 1 minute and 10 minutes. Dielectric absorption ration and polarization index will be calculated.
  - B. Perform a turns ratio test between windings at all tap settings.
  - C. Perform winding resistance tests for each winding at nominal tap position.
  - D. Perform individual excitation current tests on each phase in accordance with established manufacturer's procedures.
  - E. Measure secondary voltage phase-to-phase and phase-to-ground after final energization and prior to loading.
  - F. Provide copy of test report to Engineer.
- 3.7 Temporary heating: Apply temporary heating according to manufacturer's written instructions inside the enclosure throughout periods during which equipment is not energized and is not in a space that is continuously under normal control of temperature and humidity.

END OF SECTION

## SECTION 26 24 16 PANELBOARDS

### PART 1 - GENERAL

- 1.1 Each panelboard shall comply with all applicable codes, recommended practices and standards of IEEE, NEMA and UL. Panelboard shall be UL labeled.
- 1.2 A number of general purpose panelboards are existing Square D panels and located in Lot 24. These existing panels shall be utilized for the Lot 23 project.

### PART 2 - PRODUCTS

#### 2.1 Panelboard Types

##### A. 240 Volt (Maximum) AC Panelboards

1. New breakers shall be “bolt-on” type and in sizes thru 100 amp shall be minimum 10,000 amp, I.C. rated with adequate rating to interrupt the available fault current for the existing equipment.
2. GFCI breaker – UL Class A (5 milliampere sensitivity, combination type). Ground fault circuit protection shall be an integral part of the branch circuit breaker which also provides overload and short circuit protection. Space required in panelboard shall be same as standard single pole circuit breaker.
3. Panelboard is existing by Square D Type “NQOD”.
4. New 240 Volt (Maximum) AC panelboards shall be manufactured by Square D, Eaton, or General Electric.

##### B. 277/480 Volt AC Panelboards

1. Breakers shall be “bolt-on” type and in sizes thru 100 amps shall be minimum 14,000 amp I.C. rated with adequate rating to interrupt the available fault current; for a fully rated system or similar to:
2. Panelboards existing by Square D

##### C. Circuit Breaker Distribution Panelboard

1. Main and branch breakers shall be solid state trip molded case type with long time, short time, instantaneous trip and ground fault protection – with zone interlocking with the main solid state trip molded case breaker or remote switchgear feeder circuit breaker./Breakers shall be molded case type, thermal-magnetic protection, 80 percent rated.
2. Power and distribution panelboards are existing by Square D.

- 2.2 Refer to "Identification for Electrical System" Section 26 05 53, for nameplate requirements.

#### 2.3 General Construction

- A. Circuit breakers shall be thermo magnetic, bolted type and where more than one pole is used, they shall employ a common trip.

- B. Breakers in panelboards used for switching of 120 and 277V. fluorescent lighting circuits shall be rated for switching duty UL "SWD" or "HID" type; for switching high-intensity discharge lighting shall be "HID" type.
  - C. Breakers used for protection of heating, air conditioning and refrigeration equipment shall be UL "HACR" type.
- 2.4 Any new breaker placed in an existing panelboard shall have an AIC rating equal to or greater than that of the existing equipment in that panelboard. In no case shall the overall AIC rating of the existing equipment be reduced by the addition of new breakers.

### PART 3 - EXECUTION

- 3.1 Mount top of wall mounted cabinets 6 feet 0 inches above floor. Coordinate location of recessed panels so they are accessible and to avoid interference with other equipment and trades. Mount and anchor floor set panelboards on a 4 inch high concrete pad furnished by this Contractor.
- 3.2 The position of breakers in each panel shall be arranged in the field for sequence phasing by this Contractor to best suit wiring conditions and balancing of phases. Fill in, typewritten, the directory of each branch circuit panelboard.
- 3.3 For multi-wire branch circuit group circuit breaker together and provide breaker handle tie. Group conductors together with tie-wrap.
- 3.4 Adjust circuit breaker trip and time delay settings to values as indicated in the coordination study.

END OF SECTION

## SECTION 26 27 16 ELECTRICAL CABINETS AND ENCLOSURES

### PART 1 - GENERAL

- 1.1 Work includes all special cabinets and enclosures; equipment shall conform to requirements of N.E.C. and shall be UL labeled.

### PART 2 - PRODUCTS

#### 2.1 Telephone Miscellaneous Cabinets

- A. Indoor cabinets shall match panelboard finish and construction and shall be manufactured by Siemens, Square D, Eaton, Tanco Inc., G.E. or Engineer approved equal.
- B. Provide backboard for mounting equipment, ¾ inch plywood. Paint matte white.

#### 2.2 Indoor Cabinets - NEMA 1

- A. Cabinets shall be galvanized code gauge steel, finished gray enamel or manufacturer's standard equivalent finish, of sizes shown with flush painted hinged door and master keyed cylinder locks keyed to match panelboard locks. Cabinets in finished areas shall be designed for flush mounting with separable front overlapping flange. Cabinets in concealed areas shall be surface mounted types.
- B. Each cabinet shall be equipped with a 0.75 inch thick waterproof fir plywood backboard painted gray.

### PART 3 - EXECUTION

- 3.1 Mount the cabinets and enclosures as indicated on the drawings and in accordance with manufacturer's instructions.
- 3.2 Mount top of wall mounted cabinets 6 feet-0 inches above floor. Coordinate location of recessed cabinets so they are accessible and to avoid interference with other equipment and trades.
- 3.3 Mount and anchor floor set enclosures on a concrete pad furnished by this Contractor. Indoor pads shall be 4 inches high; outdoor pads shall be steel reinforced as indicated on the drawings.
- 3.4 Refer to Section 26 05 53 "Identification for Electrical System" Section for nameplate requirements.

END OF SECTION

SECTION 26 27 26 WIRING DEVICES AND COVERPLATES

PART 1 - GENERAL

- 1.1 Wiring devices are identified on the drawings per legend symbols or as specifically noted. Receptacles are identified in the legend by NEMA configuration numbers only. Catalog numbers from acceptable manufacturers for the common wiring devices shall be as listed herein. Catalog numbers are not listed for all devices. Other devices, such as clock hanger outlets, etc. shall be furnished by one of the manufacturers listed and shall be equal in quality to the device series listed.
- 1.2 When shop drawings are required for wiring devices and coverplates, the submittal shall be comprehensive for all wiring device configurations listed in the legend and for devices specifically noted on the drawings.

PART 2 - PRODUCTS

- 2.1 Extra hard use specification grade receptacles shall be listed by Underwriters Laboratories, Inc. Receptacles shall be minimum 20 ampere, 125 volt, NEMA configuration 5 20R and ivory in color unless noted otherwise.

Acceptable Manufacturer	Single	Duplex	Ground Fault	Isolated Ground
Cooper	5361-V	AH5362V	VGF20V	IG5362-V 3
Bryant	5361-I	5362-I	GF20ILA	5362IG-I
Hubbell	HBL5361-I	HBL5362-I	GF20ILA	IG8300
Leviton	8361-I	5362A-I	7899-I	8300-IGI
P&S	8301-I	5362A-I	2095-I	IG5362-I

- 2.2 Receptacles installed in a damp or wet location shall be a listed weather-resistant (WR) type.
  - A. Receptacle shall be installed in a listed weatherproof enclosure, whether or not the attachable plug cap is inserted.
- 2.3 Provide GFCI devices as shown on drawings and in compliance with NEC 210.8 for type and location.
- 2.4 Transient voltage surge suppressors (SPD-ANSI/IEEE Category A and B), UL 1449 suppression (clamping) rating of 400 V, 3 mode protection (LN/LG/NG) for 120 V branch circuits:
  - A. Duplex receptacles, 120 V, 20 A shall be Pass and Seymour 6362-ISP, Hubbell HBL5362ISA, Leviton 5380-I, Bryant SP53-TIGIA or Cooper/Arrow Hart 5362IS. Receptacle to be listed UL 1449 Type 3.
  - B. Suppression strip with a heavy duty 6 ft. 14-2 AWG power cord, 6 electrical NEMA 5-15R outlets, 120 V, 15 A, computer grade on/off 20 A switch, resettable circuit breakers, internal thermal fusing, hybrid suppression circuit and comprehensive diagnostics. Strip to be listed UL 1449 Type 3.

EFI Electronics Corp. - Model 453 (15 A Overload Protection)  
Joslyn Electronic Systems - Model 1203-03 (15 A Overload Protection)  
Pass and Seymour - Model C6-L (15 A Overload Protection)  
Hubbell Model HBL6PS350A (15A Overload Protection)

- 2.5 Provide a device plate to suit each particular application. Cover all empty outlet boxes with a blank plate. Coverplates shall be manufactured by Pass and Seymour, Hubbell, Cooper, Bryant, Leviton or Mulberry; Taymac is an acceptable manufacturer for weatherproof non-metallic coverplates Multi-Mac Series, "While-In-Use" type, 3.5 inches depth, 'Extra Duty', opaque grey, locking tab. Provide jumbo size plates for outlets installed in masonry walls.
- 2.6 In finished spaces, wall plates shall be nominal .032 inch thick, made of 302 high nickel stainless steel with brushed satin finish and beveled edges. Screws shall be metal with countersunk heads and finished to match plates. Sectional plates will not be permitted.

### PART 3 - EXECUTION

- 3.1 Locate devices as shown on the drawings, coordinate exact location with other trades, to avoid interference. Check for potential interference from door swings, cabinets, heating equipment and other wall mounted devices.
- 3.2 Clean debris from outlet boxes.
- 3.3 Install receptacles with grounding pole on bottom.
- 3.4 Verify each receptacle device is energized and test each device for proper polarity.
- 3.5 Adjust devices and wall plates to be flush and level.

END OF SECTION

SECTION 26 28 13 FUSES

PART 1 - GENERAL

- 1.1 Safety switches and other fusible protective devices provided under this contract shall be complete with fuses properly sized to protect the feeders and equipment served.
- 1.2 Fuses shall not be shipped installed in switches in electrical equipment nor shall they be shipped to the job site until the equipment is ready to be energized. Fuses shall be of the same manufacturer to retain selectivity as designed.

PART 2 - PRODUCTS

- 2.1 Manufacturers shall be Bussmann, Mersen, Littelfuse or Edison or Engineer approved equal.
- 2.2 Fuses shall be current limiting with 200,000 amperes interrupting capacity, all shall be UL labeled.
- 2.3 Fuses, 601 ampere to 6,000 ampere (bolt type dimensions) shall be UL Class "L" fuses. The size and type is indicated on drawings; Bussmann HI CAP time delay fuse KRP C shall be used.
- 2.4 Fuses with ampere ratings 1 ampere to 600 ampere (standard dimensions) shall be UL Class RK 1. The size and type is indicated on drawings. Bussmann LOW PEAK Time Delay fuse LPN RK (250 volts) or LPS RK (600 volts).
- 2.5 Where Bussmann specific fuse types are indicated above or on the drawings, acceptable fuses by cross reference of manufacturers are:

Voltage UL Class	Ratings	Bussmann	Mersen	Littel Fuse	Edison
L	600 V	HI CAP KRP C	AMP TRAP A4BQ( )	POWR-PRO KLPC	LCL
RK 1	250V 600V	Low Peak LPN RK LPS RK	AMP TRAP II A2D ( ) R A6D ( ) R	POWR-PRO LLN-RK LLS-RK	LEN-RK LES-RK
J (Time Delay)	600V	LPJ ( )	AJT ( )	JTD ( )	JDL ( )

PART 3 - EXECUTION

- 3.1 Place a fuse identification label showing type and size inside door of each switch. Use fuse reducers where fuse gaps are larger than fuse dimension.
- 3.2 Verify fuse types before installation for proper application by voltage and ampere ratings; fuses protecting motors shall not exceed 150 percent of motor nameplate amps. (Applies to fuses in sizes 600 amps and below.)

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- 3.3 Furnish the Owner with a minimum of 25 percent of quantity of each size installed, but not less than one complete set of three spare fuses for each size of fuse furnished. Provide a typewritten bill of material and install in plastic cover to inside of cabinet door.

END OF SECTION



## SECTION 26 28 16 DISCONNECT SWITCHES

### PART 1 - GENERAL

- 1.1 Provide disconnect switches, fused and non-fused, where indicated on the drawings and in the specifications, and where required by the N.E.C.
- 1.2 Provide company switches by LEX, ETC or SSRC.

### PART 2 - PRODUCTS

- 2.1 Disconnect switches shall be listed by Underwriter's Laboratories and shall be manufactured by Square D, G.E. or Eaton. All starters and disconnect switches shall be of the same manufacturer unless otherwise approved.
- 2.2 Switches shall be Heavy-Duty Type, NEMA 1 enclosures, non-fused except where fuses are specified or required to protect wiring from overload; provide raintight NEMA 3R type enclosures for outdoor applications unless otherwise noted.
- 2.3 Disconnect switches shall be quick-make, quick-break, externally operated with door interlocked with operating handle. Provide solid neutral and ground bars where indicated or where required by the application.
- 2.4 Disconnect switches shall have multiple padlock provisions in the off position.
- 2.5 The fuse holders shall be designed for Class "R" rejection type fuses.
- 2.6 Refer to "Identification for Electrical Systems" Section for nameplate requirements.
- 2.7 Disconnect switches located outside shall be raintight NEMA 3R, unless noted otherwise.

### PART 3 - EXECUTION

- 3.1 Mount top of wall mounted disconnects and company switches 6 ft.-0 inches above floor where space permits.
- 3.2 Coordinate location of disconnect switches to avoid interference with other equipment and trades.

END OF SECTION

## SECTION 26 29 13 MOTOR CONTROLLERS

### PART 1 - GENERAL

- 1.1 Schedules on the drawings list motors, starter requirements and associated controls. Motor starters and disconnects shall be furnished under this Contract except where specifically shown or specified to be furnished by other trades. Motor starters and disconnects shall be manufactured and rated in accordance with NEMA, UL and IEEE standards. IEC RATED CONTACTORS AND OVERLOADS ARE NOT ACCEPTABLE.
- 1.2 Refer to "Disconnect Switches" Section for switch requirements.
- 1.3 All motor starters shall be rated for the available fault current at the point of application.

### PART 2 - PRODUCTS

- 2.1 Manufacturer Allen Bradley, whose catalog numbers are used herein as a standard, or equivalent by Square D Type S (Class 8536), G.E. Series CR306, Eaton Class AN16. All starters and disconnect switches shall be of the same manufacturer unless otherwise approved.
- 2.2 Where new motor starters and disconnect switches are to be installed in existing motor control centers they shall match existing units.
- 2.3 Magnetic starters shall be line voltage suitable for the service listed on the drawings. Each starter shall have one extra auxiliary contact for future control purposes, a 3 leg melting alloy thermal overload relay on a single block, a manual reset mechanism, a 120 volt control coil, Bulletin 509. Contractor shall have the option of installing Bulletin 512 combination starters in place of separately mounted switches and starters. Disconnects shall be non-fused type unless otherwise specifically indicated or required by NEC.
- 2.4 A HAND-OFF-AUTO selector switch shall be mounted in the face of each starter enclosure. The selector switch shall be so wired that when it is in the HAND or AUTO position, all SAFETY controls are wired in series with the selector switch; all CONTROL DEVICES shall be wired in the AUTO position only.
- 2.5 Each starter enclosure shall have a suitable 120 volt secondary control transformer fused separately on each phase of the primary and secondary, and grounded on the secondary.
- 2.6 Each starter shall have a red LED pilot light mounted in the face of the starter enclosure. The LED shall be wired so it will be on when the motor is energized.
- 2.7 Magnetic starters shall be furnished for motors, one horsepower and greater or any 3 phase motor, unless indicated otherwise on plan.
- 2.8 Provide adjustable 0 to 60 second "on" time delay relay on starters where indicated on drawings and wire into the "auto" position of the selector switch to delay motor starting.
- 2.9 Provide adjustable phase failure-reversal-undervoltage relay protection on all motor starters NEMA size 3 and larger; wire ahead of the H-O-A switch.

- 2.10 Manual starters with thermal overload protection shall be furnished for fractional horsepower, single phase motors unless otherwise noted and shall be Bulletin 600 with a pilot light, flush mounted in finished areas.
- 2.11 Unless otherwise noted or required by Code, safety switches shall be Heavy Duty Type, NEMA 1 enclosures, non-fused except where fuses are specified or required to protect wiring from overload. Switches shall be quick make, quick break, externally operated with door interlocked with operating handle and padlock provisions in OFF position. Provide solid neutral and ground bars where required. Switches located outside shall be raintight NEMA 3R, unless otherwise noted.

### PART 3 - EXECUTION

- 3.1 Check full load ampere and service factor rating of each motor after installed and furnish the proper size overload heater elements to protect the motor.
- 3.2 Mount floor mounted control centers on a 4 inches high concrete base, furnished by this Contractor.
- 3.3 Those portions of interlock and control wiring which are required but not prewired, shall be done in the field.
- 3.4 Motor starters and disconnect switches shall be conveniently accessible; all NEC minimum clearances from walls, pipes, ducts, equipment, etc., shall be maintained. Locate as inconspicuously as possible in finished spaces.
- 3.5 Refer to Section 26 05 53 "Identification for Electrical Systems" section for nameplate requirements.
- 3.6 Place label in each motor starter door identifying motor served, nameplate horsepower, full load amperes, code letter, service factor, voltage / phase, OL type and OL size.

END OF SECTION

## SECTION 26 51 13 INTERIOR LUMINAIRES, LAMPS AND BALLASTS

### PART 1 - GENERAL

- 1.1 Refer to schedule on the drawings for information on luminaires, lamps and manufacturers. Luminaires of manufacturers other than those listed, if offered, shall be on a substitute basis and so listed as a substitute with the bid. (Refer to Section 26 05 01, para. 2.4 B.)
- 1.2 The catalog numbers listed on the schedule do not necessarily have complete prefix and suffix designations for placing the luminaire order. The Contractor shall verify these numbers and include in his bid the necessary plaster frames, accessories, trim, mounting hardware, etc. to achieve a coordinated installation with ceiling types indicated on the architectural drawings and in specifications. The Contractor shall provide any hardware indicated by notes on the fixture schedule.
- 1.3 Luminaires, ballasts and individual components shall bear UL label. All ballasts including compact fluorescents shall be high efficiency and high power factor (HPF).

### PART 2 - PRODUCTS

#### 2.1 LED Luminaire Components

##### A. LED Luminaire Components

1. LED luminaire shall be rated for an installation/ambient temperature from -40 degrees C to +40 degrees C.
2. LED luminaire shall be modular in design (when applicable per the basis of design) with the ability to replace drivers, light engines, arrays, optics, reflectors, etc., without having to replace the entire luminaire.
3. The heat sink shall be easily accessible for maintenance or cleaning to maintain the overall thermal performance of the luminaire within specifications. The light engine and driver shall be easily accessible for maintenance.
4. LED luminaire (type V distribution) shall have an even distribution of luminous intensity within the 0 degree to 90 degree zone. Luminous intensity at any angle within this zone shall not differ from the mean luminous intensity for the entire 0 degree to 90 degree by more than 10 percent.
5. Exterior LED luminaire shall be full cutoff or fully shielded as defined by IESNA-RP-8.
6. LED luminaire shall come standard with the ability for full dimming.
7. LED Luminaire shall have a minimum of 5 year warranty.
8. Solid State Lighting (LED) – UL 1598.

B. LED/LED Module

1. LED/LED Module(s) shall be manufactured by:
  - a. Nichia.
  - b. Cree.
  - c. Achriche.
  - d. Phillips.
  - e. Osram/Sylvania.
  - f. Approved Equal (By Engineers approval).
2. LEDs shall be of the highest production quality.
3. LED/LED Module shall be rated for 50,000 hours of life at 70 percent output (L70) and shall have been tested in accordance with IESNA LM-79, LM-80, and TM-21.
4. LED/LED Module manufacturers shall adhere to LED package manufacturer guidelines, certification programs, and test procedures for thermal management.
5. LED/LED Module(s) shall be rated for a minimum luminous efficacy of 80 Lumens per Watt (lm/W).
6. Color consistency NEMA SSL-3.
7. LED/LED Module(s) shall have one of the following designated CCTs (Correlated Color Temperature) per ANSI C78.377-2008 and all within the 7-step chromaticity quadrangles as defined below:
  - a. 2700 K
  - b. 3000 K
  - c. 3500 K
  - d. 4100 K
  - e. 5000 K
8. LED/LED Modules shall originate from a common manufactured batch source. Contractor shall provide 5 percent of each module specified as spare in original sealed packaging and transport to the Building (and put in storage) as directed by the Owner.

C. LED Driver

1. The driver shall have 50,000 hrs. of anticipated/rated life. Minimum efficiency of 85 percent at full load conditions.
2. UL 8750 approved.
3. Driver shall meet UL Class 2, FCC 47CFR Part 15, Class A minimum compliant.
4. Driver shall have inherent short-circuit protection, self-limited, overload protected.
5. Driver shall have a Class A sound rating.
6. 100 to 277 volt input rating. Power factor .90 or higher.
7. All drivers shall provide full LED dimming range. The drivers in every LED fixture shall have the capability to be dimmable, whether indicated to be dimmed or not on the drawings.
8. Driver shall have a minimum of 5 year warranty.
9. EC shall provide 5 percent of each driver specified as spare in original sealed packaging and transport to the building (and put in storage) as directed by the Owner.

- D. The complete LED luminaire assembly shall be of the latest and highest efficacy design available.

- E. The LED luminaire assembly shall be Design Lights Consortium (DLC) approved.
- F. Equal fixtures/ luminaires provided other than the first name specified luminaire, shall at a minimum, provide the same if not more delivered lumens. Additionally the “equal” luminaire shall not exceed the first name specified luminaires total system input watts.

### PART 3 - EXECUTION

#### 3.1 Submittals

- A. Detailed cut sheets for all LED luminaire complete assembly shall be submitted for approval with shop drawings. Identifying pertinent information such as the manufacturer, frequency operation, THD, crest and ballast factor, reset thermal protection, etc. Shop drawings will be rejected if required information is not submitted.
- B. Submittals shall include dimensions, ratings, performance data and components of each luminaire. Where indicated on schedule, submit two (2) color chips illustrating luminaire finish color.

#### 3.2 Luminaire Hanging and Supporting

- A. Support each surface mounted or suspended luminaire in a minimum of two locations. In addition, where luminaires are in a continuous row, they shall be fastened together on each end in two places. For suspended luminaires provide pendant length required to suspend luminaire at indicated height.
- B. Recessed luminaires shall be supported at all four corners. Additionally, securely fasten each luminaire to the ceiling framing member by mechanical means such as bolts, screws, rivets or approved clips; install a minimum of one on each of the four sides of luminaire. This Contractor shall coordinate luminaire locations and luminaire weight with the trade installing the ceiling system to ensure adequate hangers are installed to support the weight of the ceiling plus twice the weight of each luminaire.
- C. Surface or flush luminaires in ceilings of the suspended lay in type shall be installed so that the long dimension of the luminaire is supported on the main support members of the ceiling system.
- D. In addition, all recessed luminaires for lay in ceilings shall be equipped with at least two galvanized steel safety support wires, or chains, attached from the luminaire housing to the structure independent of the ceiling system; hangers supporting ceiling system shall not be used.

#### 3.3 Alignment and Cleaning

- A. Luminaires shall be mounted straight, level and true to the building lines. Warped or damaged luminaires shall be replaced or repaired to the satisfaction of the Architect and Owner.

- B. Immediately preceding the final inspection, this Contractor shall thoroughly clean all luminaires of dust, dirt, grease, fingermarks, etc. All lamps shall be operating at the time of Owner's acceptance.
- C. Coordinate location of luminaires carefully with the Architectural reflected ceiling plan. Verify that no surface mounted luminaire interferes with door swings.
  - 1. Coordinate locations of luminaires with mechanical ducts, sprinkler pipes/heads, smoke alarms and fire alarm devices prior to rough-in to prevent conflicts.
  - 2. Where reflected ceiling plans indicate a larger quantity of luminaires than that shown on the electrical drawings for a particular space, the reflected ceiling plan shall be followed for that space.
- D. Adjust all adjustable fixtures to the satisfaction of the Architect and the Owner.

END OF SECTION

## SECTION 26 51 14 LIGHTING CONTROL PANELS

### PART 1 - GENERAL

#### 1.1 Summary

- A. This section covers the lighting controls for all the spaces. The intent of this specification is to provide a complete, programmable, intelligent, networked low voltage lighting control system for the control of lighting fixtures and/or circuits as described herein and as shown on the electrical drawings and schedules. This lighting control system applies to all the lighting fixtures (inside and outside) indicated on the lighting plans.
- B. Where applicable standards have been established, all equipment, individual components, and installation methods shall meet or exceed the requirements of these standards including the (UL) Underwriters Laboratories, (NEC) National Electric Code, (FCC) Federal Communications Commission, and any additional local codes that may be applicable.
- C. All system components shall arrive at the job site completely factory pre-wired and ready for field installation. All connections shall be clearly and permanently labeled to facilitate correct and easy termination of equipment. Coordinate the location and placement of each device, cable, and controller with the Architect, Engineer, Construction Manager, Project Managers, and other trades to minimize conflicts.
- D. Section includes a networked lighting control system comprised of the following components:
  1. System Software Interfaces
    - a. Management Interface
    - b. Historical Database and Analytics Interface
    - c. Visualization Interface
    - d. Personal Control Applications
    - e. Smartphone Programming Interface for wired devices
  2. System Backbone and Integration Equipment
    - a. System Controller
    - b. Open ADR Interface
  3. Wired Networked Devices
    - a. Wall Switches, Dimmers and Scene Controllers
    - b. Graphic Wall Stations
    - c. Auxiliary Input/Output Devices
    - d. Occupancy and Photocell Sensors
    - e. Wall Switch Sensors
    - f. Embedded Sensors
    - g. Power Packs and Secondary Packs
    - h. Networked Luminaires
    - i. Relay and Dimming Panel
    - j. Bluetooth® Low Energy Programming Device



- k. Communication Bridge
4. Wireless Mesh Networked Devices
  - a. Sensor Interface
  - b. Light Controllers
  - c. Digital Sensor Attachments
  - d. Sensor-Controllers
  - e. Networked Luminaires
  - f. Communication Bridge
5. Wireless Dual-Band Networked Devices
  - a. Wall Switches and Dimmers
  - b. Scene Controllers
  - c. Embedded Sensor-Controllers
  - d. Distributed Control Nodes
  - e. Power Packs and Secondary Packs
  - f. Networked Luminaires
  - g. Communication Adapter
6. The networked lighting control system shall meet all of the characteristics and performance requirements specified herein.
7. The contractor shall provide, install and verify proper operation of all equipment necessary for proper operation of the system as specified herein and as shown on applicable drawings. Manufacturer's representative shall provide time for system programming and support for contractor during installation. Additionally, the manufacturer's representative shall provide 8 hrs of training to the owner's staff.

## 1.2 Related Documents

- A. Section 26 27 26 Wiring Devices
- B. Section 26 09 23 Lighting Control Devices
- C. Section 26 51 13 Interior Lighting Fixtures

## 1.3 Shop Drawings – Submit shop drawings including product data sheets and wiring diagrams per requirements in the General Conditions including the following:

- A. The supplier shall submit for approval with shop drawings, schematic and 0.125 scale point to point wiring diagrams showing all devices, number and size of wires, etc. **SHOP DRAWINGS WILL BE REJECTED UNLESS THE SUBMITTAL INCLUDES ALL THIS REQUIRED INFORMATION.** At completion of the project, the wiring diagrams shall be revised "as-built" and included as part of the maintenance manuals.
- B. Supplier shall provide single line drawings indicating control panels, relays, local control switching etc. with shop drawing submittal. List and describe devices used in the system. Diagrams shall be specific to the project.
- C. Coordinate the layout of all equipment with the Owner and all other power or technology equipment.

- D. Job specific system block diagram indicating the actual hardware required for the project including part numbers and interconnecting wiring requirements.
- E. Complete and comprehensive Equipment Catalog Specification Sheets of each component provided, job specific.
- F. Bill of Materials necessary to install the networked lighting control system.
- G. Product Specification Sheets indicating general device descriptions, dimensions, electrical specifications, wiring details, and nomenclature.
- H. Riser Diagrams showing device wiring connections of system backbone and also typical per room/area type.
- I. Information Technology (IT) connection information pertaining to interconnection with facility IT networking equipment and third-party systems.
- J. Other Diagrams and Operational Descriptions – as needed to indicate system operation or interaction with other system(s).
- K. Contractor Startup/Commissioning Worksheet (must be completed prior to factory startup).
- L. Service Specification Sheets indicating general service descriptions, including startup, training, post-startup support, and service contract terms.
- M. Hardware and Software Operation Manuals.
- N. Submittals that do not contain all the above information will be rejected.

#### 1.4 Approvals

- A. Alternate products or systems require submission of catalog datasheets, system overview documents and installation manuals to engineer.

#### 1.5 Quality Assurance

##### A. Product Qualifications

1. System electrical components shall be listed or recognized by a nationally recognized testing laboratory (e.g., UL, ETL, or CSA) and shall be labeled with required markings as applicable.
2. System luminaires and controls are certified by manufacturer to have been designed, manufactured and tested for interoperability.

- B. All materials furnished under this contract shall be new, of highest quality and shall be of a regularly manufactured line, currently in production at the time of installation.

- C. All equipment described herein or otherwise required to perform the specified system functions shall be a regular product line, produced by the system manufacturer. Alternate Manufacturers shall have produced equipment of compatible features and performance.
- D. Installation and Startup Qualifications
  - 1. System startup shall be performed by qualified personnel approved or certified by the manufacturer.
  - 2. Installation shall be in compliance with the National Electric Code and all other applicable codes.
- E. Service and Support Requirements
  - 1. Phone Support: Toll free technical support shall be available.
  - 2. Remote Support: The manufacturer shall offer a remote support capability.
  - 3. Onsite Support: The manufacturer shall offer onsite support that is billable at whole day rates.
  - 4. Service Contract: The manufacturer shall offer a Service Contract that packages phone, remote, and onsite support calls for the project. Response times for each type of support call shall be indicated in the terms of the service contract included in the bid package.

#### 1.6 Project Conditions

- A. Only install equipment after the following site conditions are maintained:
  - 1. Ambient Temperature: 14 to 105°F.
  - 2. Relative Humidity: less than 90% non-condensing
- B. Equipment shall not be subjected to dust, debris, moisture, or temperature and humidity conditions exceeding the requirements indicated above, at any point prior to installation.
- C. Only properly rated equipment and enclosures, installed per the manufacturer's instructions, may be subjected to dust and moisture following installation.

#### 1.7 Warranty

- A. The lighting control system shall require no special maintenance and be manufactured for a period not less than 5 years. An extended service contract and/or electronic monitoring shall be available to the Owner at a rate specified per year upon request. The manufacturer, upon inspection of any failed component or device, shall determine whether to repair or replace the component or device.
- B. Provide warranty information with the O&M manuals.
- C. The manufacturer shall provide a minimum five-year warranty on all hardware devices supplied and installed. Warranty coverage shall begin on the date of shipment.

- D. The hardware warranty shall cover repair or replacement any defective products within the warranty period.

#### 1.8 Maintenance & Sustainability

- A. The equipment supplier shall provide factory trained technicians for programming, installation support and training of personnel. The manufacturer shall make available to the owner new parts, upgrades, and/or replacements available for a minimum of 5 years following installation.

### PART 2 - PRODUCTS

#### 2.1 Manufacturers

- A. Systems manufactured by the following manufacturers may be considered provided they meet the requirements of this specification and provide for the quality, functionality, and performance specified herein.
- B. Basis of Design System: Acuity Controls - nLight
- C. Acceptable equals to the Basis of Design: Payne-Sparkman, Watt Stopper, Hubbell Building Automation, Lutron, Leviton, Encellium, Square-D, GE, and Crestron.
- D. Listing of a manufacturer as acceptable does not in any way relieve the contractor from responsibility for meeting all specification requirements.

#### 2.2 System Compliance

- A. System components shall comply with UL 916 and UL 924 standards where applicable.
- B. System components shall comply with CFR Title 47, Part 15 standards where applicable.
- C. All equipment shall be installed and connected in compliance with NFPA 70.

#### 2.3 System Performance Requirements

- A. System Architecture
  - 1. System shall have an architecture that is based upon three main concepts: (1) networkable intelligent lighting control devices, (2) standalone lighting control zones using distributed intelligence, (3) optional system backbone for remote, time based and global operation between control zones.
  - 2. Intelligent lighting control devices shall have individually addressable network communication capability and consist of one or more basic lighting control components: occupancy sensor, photocell sensor, relay, dimming output, contact closure input, analog 10V input, and manual wall station capable of indicating switching, dimming, and/or scene control. Combining one or more of these

components into a single device enclosure shall be permissible so as to minimize overall device count of system.

3. System must be capable of interfacing directly with networked luminaires such that either low voltage network cabling or wireless RF communication is used to interconnect networked luminaires with control components such as sensors, switches and system backbone (see Control Zone Characteristics sections for each type of network connection, wired or wireless).
4. Lighting control zones consisting of one or more networked luminaires and intelligent lighting control devices and shall be capable of providing automatic control from sensors (occupancy and/or photocell) and manual control from local wallstations without requiring connection to a higher level system backbone; this capability is referred to as “distributed intelligence.”
  - a. Lighting control zones (wired and wireless) of at least 128 devices per zone shall be supported.
5. The system shall be capable of providing individually addressable switching and dimming control of the following: networked luminaires, control zones, and relay and dimming outputs from centralized panels to provide design flexibility appropriate with sequence of operations required in each project area or typical space type.
6. Networked luminaires and intelligent lighting control devices shall support individual (unique) configuration of device settings and properties.
7. Networked luminaires and intelligent lighting control devices shall have distributed intelligence programming stored in non-volatile memory such that following any loss of power the lighting control zones shall operate according to their defined default settings and sequence of operations.
8. Lighting control zones to be capable of being networked with a higher level system backbone to provide time based control, remote control from inputs and/or systems external to the control zone, and remote configuration and monitoring through a software interface.
9. The system will include one or more system controllers that provide time-based control and global system control across multiple control zones and backbone network segments. The system controller also provides a means of connecting the lighting control system to a system software interface and building management systems via BACnet/IP protocol.
10. The system may include “communication bridge” devices that route communication from lighting control zones (wired or wireless) to and from the system controller, for purposes of decreasing system wiring requirements.
11. All system devices will support remote firmware update, such that physical access to each device is not necessary, for purposes of upgrading functionality at a later date.
12. The system shall be capable of interfacing directly with building BAS systems, coordinate type and protocol with the owner and provide accordingly.

B. Wired Networked Control Zone Characteristics

1. Connections to devices within a wired networked lighting control zone and to backbone components shall be with a single type of low voltage network cable, which shall be compliant with low voltage specifications or higher. To prevent

wiring errors and provide cost savings, the use of mixed types of low voltage network cables shall not be permitted.

2. Devices in an area shall be connected via a “daisy-chain” topology; requiring all individual networked devices to be connected back to a central component in a “hub-and-spoke” topology shall not be permitted, so as to reduce the total amount of network cable required for each control zone.
3. System shall provide the option of having pre-terminated plenum rated low voltage network cabling supplied with hardware so as to reduce the opportunity for improper wiring and communication errors during system installation.
4. Following proper installation and provision of power, all networked devices connected together with low voltage network cable shall automatically form a functional lighting control zone without requiring any type of programming, regardless of the programming mechanism (e.g., software application, handheld remote, pushbutton). The “out of box” default sequence of operation is intended to provide typical sequence of operation so as to minimize the system startup and programming requirements and to also have functional lighting control operation prior to system startup and programming.
5. Once software is installed, system shall be able to automatically discover all connected devices without requiring any provisioning of system or zone addresses.
6. All networked devices shall have the ability to detect improper communication wiring and blink its LED in a specific cadence as to alert installation/startup personnel.
7. Networked control devices intended for control of egress and/or emergency light sources shall not require the use of additional, externally mounted UL924 shunting and/or 0-10V disconnect devices, so as to provide a compliant sequence of operation while reducing the overall installation and wiring costs of the system. The following types of wired networked control devices shall be provided for egress and/or emergency light fixtures:
  - a. Low-Voltage power sensing: These devices shall automatically provide 100% light level upon detection of loss of power sensed via the low voltage network cable connection.
  - b. UL924 Listed Line-Voltage power sensing: These devices shall be listed as emergency relays under the UL924 standard, and shall automatically close the load control relay(s) and provide 100% light output upon detection of loss of power sensed via line voltage connections.

C. Wireless Mesh Networked Control Zone Characteristics

1. No wired control connections between wireless networked devices shall be required.
2. Wireless networked devices shall communicate via radio frequency of 2.4 GHz using a standards-based wireless mesh networking protocol.
3. Wireless network shall be self-healing, such that optimum routing paths between devices are automatically established or restored if any nodes are respectively added to or removed from the wireless network.

4. Wireless network communication shall support uniform and instant response such that all luminaires in a lighting control zone respond immediately and synchronously in response to a sensor or wallstation signal.
5. To support the system architecture requirement for distributed intelligence, wireless network communication shall support communication of control signals from sensors and wallstations to networked luminaires and wireless load control devices, without requiring any communication, interpretation, or translation of information through a backbone device such as a wireless access point, communication bridge or gateway.
6. All wireless communication shall be encrypted using the 128-bit Advanced Encryption Standard (AES).
7. Wet listed wireless networked luminaires and wireless sensing devices shall be offered, so as to support a wide variety of lighting control applications.
8. Accounting for typical environmental conditions and building construction materials encountered within parking garage environments or within high-bay applications in industrial, warehouse, gymnasium environments, wireless mesh networked devices shall be capable of communicating to at least 30 ft spacing between luminaires with embedded wireless transceivers, and shall be capable of communicating to at least 60 ft spacing between wireless networked devices installed external to luminaire housings or other enclosures.
  - a. Wireless networked devices shall have a line-of-sight communication range of at least 1000 ft under ideal environmental conditions.
9. Networked control devices intended for control of egress and/or emergency light sources shall not require the use of additional, externally mounted UL924 shunting and/or 0-10V disconnect devices, so as to provide a compliant sequence of operation while reducing the overall installation and wiring costs of the system. The following types of wired networked control devices shall be provided for egress and/or emergency light fixtures:
  - a. UL924 Listed Line-Voltage power sensing: These devices shall be listed as emergency relays under the UL924 standard, and shall automatically close the load control relay(s) and provide 100% light output upon detection of loss or interruption of power sensed via line voltage connections.

D. Wireless Dual Band Networked Control Zone Characteristics

1. No wired connections between wireless networked devices shall be required.
2. Wireless networked devices shall communicate using two radio frequencies, 900 MHz and 2.4 GHz.
3. Multiple wireless networking protocols shall be supported:
  - a. A standards based, distributed star topology type of protocol for 900 MHz communication, so as to support indoor and outdoor lighting control applications.
  - b. A Bluetooth standard protocol for 2.4 GHz communication that supports direct connection to a smartphone and tablet device, so as to support device configuration and control applications without requiring the use of a system backbone.

4. Wireless network shall be self-healing, such that optimum communication between devices is automatically established or restored if any nodes are respectively added to or removed from the wireless network.
5. Wireless network communication shall support uniform and instant response such that all luminaires in a lighting control zone respond immediately and synchronously in response to a sensor or wallstation signal.
6. To support the system architecture requirement for distributed intelligence, wireless network communication shall support communication of control signals from sensors and wallstations to networked luminaires and wireless load control devices, without requiring any communication, interpretation, or translation of information through a backbone device such as a wireless access point, communication bridge or gateway.
7. All wireless communication shall support the following five tiers of security measures, so as to safely support Internet-connected applications.
  - a. Application Data Encryption
  - b. Mutual Entity Authentication
  - c. Message Authentication
  - d. Mutual Entity Authentication
  - e. Application Data Encryption
8. Accounting for typical environmental conditions and building construction materials encountered within commercial indoor lighting environments, wireless mesh networked devices shall be capable of communicating to at least 300' spacing between luminaires with embedded wireless transceivers.
9. Wireless networked devices shall have a line-of-sight communication range of at least 1000 ft. under ideal environmental conditions.

E. System Integration Capabilities

1. The system shall have the ability to interface with third party building management systems (BMS) to support two-way communication using the industry standard BACnet/IP or BACnet/MSTP protocols. The following system integration capabilities shall be available via BACnet/IP and BACnet/MSTP protocols:
  - a. The system shall support control of individual devices, including, but not limited to, control of relay and dimming output. All system devices shall be available for control.
  - b. The system shall support reading of individual device status information, including but not limited to, relay state, dimming output, power measurement, occupancy sensor status, and photocell sensor states or readings. All system devices shall be available for polling for devices status.
  - c. The system shall support activation of pre-defined system Global Profiles (see Supported Sequence of Operations for further definition of Global Profile capabilities).

F. Supported Sequence of Operations

1. The following characteristics and performance requirements shall apply to wired and wireless control zones provided by the system.



2. Control Zones
  - a. Networked luminaires and intelligent lighting control devices installed in an area (also referred to as a group of devices) shall be capable of transmitting and tracking occupancy sensor, photocell sensor, and manual switch information within at least 48 unique control zones to support different and reconfigurable sequences of operation within the area. These shall also be referred to as local control zones.
  - b. Networked luminaires and intelligent lighting control devices located in different areas shall be able to transmit and track occupancy, photocell, and switch information within at least 128 system-wide control zones to support required sequences of operation that may span across multiple areas. These shall also be referred to as global control zones.
3. Wallstation Capabilities
  - a. Wallstations shall be provided to support the following capabilities:
    - 1) On/Off of a local control zone and global control zone simultaneously, as required.
    - 2) Continuous dimming control of light level of a local control zone and global control zone simultaneously, as required.
    - 3) Preset Scenes that can activate a specific combination of light levels across multiple local and global channels, as required.
    - 4) Profile Scenes that can modify the sequence of operation for the devices in the area (group) in response to a button press. This capability is defined as supporting “Local Profiles” and is used to dynamically optimize the occupant experience and lighting energy usage. Parameters that shall be configurable and assigned to a Local Profile include light level, response to occupancy sensors (including enabling/disabling response), response to daylight sensors (including enabling/disabling response), and enabling/disabling of wallstations.
  - b. 3-way / multi-way control: multiple wallstations shall be capable of controlling the same local and global control zones, so as to support “multi-way” switching, dimming, preset scene, and profile scene control.
4. Occupancy Sensing Capabilities
  - a. Local and global control: Occupancy sensors shall be configurable to control a local and global zone simultaneously, as required.
  - b. Multi-sensor control: multiple occupancy sensors shall be capable of controlling the same local and global control zones. This capability combines occupancy sensing coverage from multiple sensors without consuming multiple control zone addresses.
  - c. System shall support the following types of occupancy sensing sequence of operations:
    - 1) On/Off Occupancy Sensing
    - 2) Partial-On Occupancy Sensing
    - 3) Partial-Off Occupancy Sensing
    - 4) Vacancy Sensing (Manual-On / Automatic-Off)
  - d. On/Off, Partial-On, and Partial-Off Occupancy Sensing modes shall function according to the following sequence of operation:
    - 1) Occupancy sensors automatically turn lights on to a designated level when occupancy is detected. To support fine tuning of Partial-On

- sequences the designated occupied light level shall support at least 100 dimming levels.
- 2) Occupancy sensors automatically turn lights off or to a dimmed state (Partial-Off) when vacancy occurs or if sufficient daylight is detected. To support fine tuning of Partial-Off sequences the designated unoccupied dim level shall support at least 100 dimming levels.
  - 3) To provide additional energy savings the system shall also be capable of combining Partial-Off and Full-Off operation by dimming the lights to a designated level when vacant and then turning the lights off completely after an additional amount of time.
  - 4) Photocell readings, if enabled in the Occupancy Sensing control zone, shall be capable of automatically adjusting the light level during occupied or unoccupied conditions as necessary to further reduce energy usage. Additional requirements and details for photocell sensing capabilities are indicated under Photocell Sensing Capabilities.
  - 5) The use of a wallstation shall change the dimming level or turn lights off as selected by the occupant. The lights shall remain in this manually-specified light level until the zone becomes vacant; upon vacancy the normal sequence of operation, as defined above, shall proceed.
- e. Vacancy Sensing mode (also referred to as Manual-On / Automatic-Off) shall function according to the following sequence of operation:
- 1) The use of a wallstation is required turn lights on. The system shall be capable of programming the zone to turn on to either to a designated light level or the previous light level. Initially occupying the space without using a wallstation shall not result in any change in light level.
  - 2) Occupancy sensors shall automatically turn lights off when vacancy occurs is detected. To provide an enhanced occupant experience the system shall also be capable of dimming the lights when vacant and then turning the lights off completely after an additional amount of time.
  - 3) To minimize occupant impact in case the area or zone is still physically occupied following dimming or shutoff of the lights due to detection of vacancy, the system shall support an “automatic grace period” immediately following detection of vacancy, during which time any detected occupancy shall result in the lights reverting to the previous level. After the grace period has expired, the use of a wallstation is required to turn lights on.
  - 4) Photocell readings, if enabled in the Occupancy Sensing control zone, shall be capable of automatically adjusting the light level as necessary to further reduce energy usage. Additional requirements and details for photocell sensing capabilities are indicated under Photocell Sensing Capabilities.
  - 5) At any time, the use of a wallstation shall change the dimming level or turn lights off as selected by the occupant. The lights shall remain in this manually-specified light level until the zone becomes vacant; upon vacancy the normal sequence of operation, as defined above, shall proceed.

- 6) To accommodate different types of environments, vacancy time delays before dimming or shutting off lights shall be specifiable for control zones between 15 seconds to 2 hours.
- f. Photocell Sensing Capabilities (Automatic Daylight Sensing)
  - 1) Photocell sensing devices shall be configurable to control a local and global zone simultaneously, as required.
  - 2) The system shall support the following types of photocell-based control:
    - a) On/Off: The control zone is automatically turned off if the photocell reading exceeds the defined setpoint and automatically turned on if the photocell reading is below the defined setpoint. A time delay or adaptive setpoint adjustable behavior may be used to prevent the system from exhibiting nuisance on/off switching.
    - b) Continuous Dimming: The control zone automatically adjusts its dimming output in response to photocell readings, such that a minimum light level consisting of both electric light and daylight sources is maintained at the task. The photocell response shall be configurable to adjust the photocell setpoint and dimming rates.
- g. Schedule and Global Profile Capabilities
  - 1) The system will be capable of automatically modifying the sequence of operation for selected devices in response to any of the following: a time-of-day schedule, contact closure input state, RS-232/RS-485 command, BACnet input command, and demand response signal. This capability is defined as supporting “Global Profiles” and is used to dynamically optimize the occupant experience and lighting energy usage.
  - 2) Scheduling. Global profiles may be scheduled with the following capabilities:
    - a) Global Profiles shall be stored within and executed from the system controller (via internal timeclock) such that a dedicated software host or server is not required to be online to support automatic scheduling and/or operation of Global Profiles.
    - b) Global Profile time of day schedules shall be capable of being given the following recurrence settings: daily, specific days of week, every “n” number of days, weekly, monthly, and yearly. Lighting control profile schedules shall support definition of start date, end date, end after “n” recurrences, or never ending. Daylight savings time adjustments shall be capable of being performed automatically, if desired.
    - c) Global Profiles shall be capable of being scheduled to run according to timed offsets relative to sunrise or sunset. Sunrise/sunset times shall be automatically derived from location information using an astronomical clock.
    - d) Blink warning and timed extension capabilities. At the end of a scheduled period, the system shall be capable of providing a visible “blink warning” 5 minutes prior to the end of the schedule. Wallstations may be programmed to provide timed overrides that turn the lights on for an additional period of time. Timed override duration shall be programmable for each individual device, zone of

- devices, or customized group of devices, ranging from 5 minutes to 12 hours.
- e) Software management interface shall be capable of displaying a graphic calendar view of profile schedules for each control zone.
- 3) System Global Profiles shall have the following additional capabilities:
- a) Global Profiles shall be capable of being manually activated directly from the system controller, specially programmed input devices, and software management interface.
  - b) Global Profiles shall be selectable to apply to a single device, zone of devices, or customized group of devices.
  - c) Parameters that shall be configurable and assigned to a Global Profile include light level, response to occupancy sensors (including enabling/disabling response), response to daylight sensors (including enabling/disabling response), and enabling/disabling of wallstations.
  - d) A backup of Local and Global Profiles shall be stored on the software's host server such that the Profile backup can be applied to a replacement system controller or wallstation.
- h. Automated demand response capabilities. Profiles created for automated demand response events shall support automatic reduction of light level to programmable values. At least four levels of demand response profiles shall be supported by the system.

## 2.4 System Software Interfaces

### A. Management Interface

1. System will provide a web-based management interface that provides remote system control, live status monitoring, and configuration capabilities of lighting control settings and schedules.
2. Management interface must be compatible with industry-standard web browser clients, including, but not limited to, Microsoft Internet Explorer®, Apple Safari®, Google Chrome®, Mozilla Firefox®.
3. Management interface shall require all users to login with a User Name and Password, and shall support creation of at least 100 unique user accounts.
4. Management interface shall support at least three permission levels for users: read-only, read & change settings, and full administrative system access.
5. Management interface shall be capable of restricting read-only and read & change access for user accounts to specific devices within the system.
6. All system devices shall be capable of being given user-defined names.
7. The following device identification information shall be displayed in the Management interface: model number, model description, serial number, manufacturing date code custom label(s), and parent network device.
8. Management interface shall be able to read the live status of a networked luminaire or intelligent control device and shall be capable of displaying luminaire on/off status, dim level, power measurement, device temperature, PIR occupancy sensor status, microphonic occupancy sensor status, remaining occupancy time delay, photocell reading, and active Scenes or Profiles.

9. Management interface shall be able to read the current active settings of a networked luminaire or intelligent control device and shall be capable of displaying dimming trim levels, occupancy sensor and photocell enable/disable, occupancy sensor time delay and light level settings, occupancy sensor response (normal or vacancy), and photocell setpoints and transition time delays.
10. Management interface shall be able to change the current active settings and also default settings for an individual networked luminaire or intelligent control device.
11. Management interface shall be capable of applying settings changes for a zone of devices or a group of selected devices using a single “save” action that does not require the user to save settings changes for each individual device.
12. A printable network inventory report shall be available via the management interface.
13. A printable report detailing all system profiles shall be available via the management interface.
14. All sensitive information stored by the software shall be encrypted.
15. All system software updates must be available for automatic download and installation via the Internet.

B. Historical Database and Analytics Interface

1. System shall provide a historical database that stores device operational history and calculates energy usage for all networked luminaires and intelligent control devices.
2. System shall be capable of reporting lighting system events and performance data back to the historical database for display and analysis.
3. Historical database shall be capable of recording historical data for up to 20,000 networked devices for a period of at least 1 calendar year.
4. An “Energy Scorecard” shall be displayed that shows calculated energy savings in dollars, kWh, or CO<sub>2</sub>.
5. Software shall calculate the allocation of energy savings to different control measures (occupancy sensors, photocells, manual switching, etc.).
6. Energy savings data shall be calculated for the system as a whole or for individual zones.
7. A time scaled graph showing all relay transitions shall be presented.
8. A time scaled graph showing a zones occupancy time delay shall be presented
9. A time scaled graph showing the total light level shall be presented.
10. User shall be able to customize the baseline run-time hours for a space.
11. User shall be able to customize up to four time-of-day billing rates and schedules.
12. Historical data shall be exportable from the Historical Database via a “CSV” type of file format.

C. Visualization Interfaces

1. System will provide a web-based visualization interface that displays graphical floorplan.
2. Graphical floorplan shall offer the following types of system visualization:

- a. Full Device Option - A master graphic of the entire building, by floor, showing each control device installed in the project with zones outlined to include but not be limited to the following:
    - 1) Controls embedded light fixtures
    - 2) Controls devices not embedded in light fixtures
    - 3) Daylight Sensors
    - 4) Occupancy Sensors
    - 5) Wall Switches and Dimmers
    - 6) Scene Controllers
    - 7) Networked Relays
    - 8) Bridges
    - 9) System Controllers
    - 10) Panels
    - 11) Zone outlines
  - b. Zone Only Option - A master graphic of the entire building, by floor, showing control zones:
    - 1) Zones outlined
  - c. Allow for pan and zoom commands so smaller areas can be displayed on a larger scale simply by panning and zooming each floor's master graphic.
  - d. A mouse click on any control device shall display the following information (as applicable):
    - 1) The device catalog number.
    - 2) The device name and custom label.
    - 3) Device diagnostic information.
    - 4) Information about the device status or current configuration is available with an additional mouse click.
3. Personal Control Applications
- a. Software interface shall support personal control software applications that provide user- specific control of individual luminaires, control zones, and scene presets.
  - b. Personal control applications shall support control of dimming output or definition of dimming presets for luminaires and devices that are dimmable.
  - c. The system administrator shall be capable of defining personal control permissions for each user account.
  - d. Software interface shall provide a Microsoft Windows® operating system taskbar application for personal lighting control.
  - e. Software interface shall provide an Apple iOS® operating system application (supported by mobile phones and mobile tablet devices) for personal lighting control.
4. Smartphone Programming Interface for Wired Devices
- a. Application interface shall be provided for both Apple iOS® and Android operating systems that allows configuration of lighting control settings.
  - b. The application shall support the configuration of wired networked control devices via a Bluetooth® Low Energy (BLE) Programming Device.
    - 1) Application shall support a security pin-code to access the zone of lighting control devices.

- 2) The application shall provide indication of signal strength where multiple Bluetooth Low Energy Programming Devices are available for configuration.
  - 3) The application shall indicate the number of wired networked control devices The application shall indicate the number of wired networked control devices.
5. Programming capabilities through the application shall include, but not be limited to, the following:
- a. Switch/occupancy/photosensor group configuration
  - b. Manual/automatic on modes
  - c. Turn-on dim level
  - d. Occupancy sensor time delays
  - e. Dual technology occupancy sensors sensitivity
  - f. Trim level settings

## 2.5 System Backbone and System Integration Equipment

### A. IP nLight ECLYPSE™ System Controller (IP-NE-CTRL)

1. System Controller shall be multi-tasking, real-time digital control processor consisting of modular hardware with plug-in enclosed processors, communication controllers, and power supplies.
2. System Controller shall have 32-bit microprocessor operating at a minimum of 1 GHz.
3. System Controller shall have minimum of 512MB memory, with a minimum of 4GB non-volatile flash, to support its own operating system and databases.
4. System Controller shall perform the following functions:
  - a. Facilitation of global network communication between different areas and control zones.
  - b. Time-based control of downstream wired and wireless network devices.
  - c. Linking into an Ethernet network.
  - d. Integration with Building Management Systems (BMS) and Heating, Ventilation and Air Conditioning (HVAC) equipment.
  - e. Connection to various software interfaces, including management interface, historical database and analytics interface, visualization interface, and personal control applications.
5. System Controller shall have an integral web server to support configuration, diagnostics and hosting of software interfaces.
6. Device shall have option for a graphical touch screen to support configuration and diagnostics.
7. Device shall have three RJ-45 networked lighting control ports for connection to any of the following:
  - a. The graphical touch screen
  - b. Wired communication bridges
  - c. Direct connection to networked wired luminaires and intelligent lighting control devices (up to 128 total devices per port)
8. Device shall be capable of communicating with wireless mesh network bridges and software interfaces via LAN connection.

9. Device shall automatically detect all networked devices connected to it, including those connected to wired and wireless communication bridges.
10. Device shall have a standard internal time clock.
11. Device shall have 2 switched RJ-45 10/100 BaseT Ethernet ports for local area network (LAN) connection
  - a. Ethernet connection shall support daisy chain wiring to other lighting control system LAN devices, such as other system controllers and wireless mesh networked communication bridges.
  - b. Ethernet connection shall support IPv4 and shall be capable of using a dedicated static or DHCP assigned IP address.
12. Device shall have 2 x USB 2.0 Expansion ports for
  - a. 802.11 Wi-Fi Adapter enabling wireless connectivity including:
    - 1) Hot Spot
    - 2) Access Point
    - 3) Client
    - 4) Spanning Tree Protocol
13. Each System Controller shall be capable of managing and operating at least 1500 networked devices (wired or wireless).
  - a. Multiple System Controllers may be networked together via LAN connection to scale the system up to 20,000 networked devices.
14. System Controller shall support BACnet/IP and BACnet/MSTP protocols to directly interface with BMS and HVAC equipment without the need for additional protocol translation gateways.
  - a. BACnet/MSTP shall support up to minimum of 50 additional BACnet MS/TP controllers in addition to the Expansion I/O modules.
  - b. BACnet/MSTP shall support 9600 to 115200 baud.
  - c. System Controller shall be BACnet Testing Laboratory (BTL listed) using Device Profile BACnet Building Controller (B-BC) with outlined enhanced features.
15. Shall contain a “FIPS 140-2 Level 1 Compliant” cryptographic module.

#### B. Open ADR Interface

1. System shall provide an interface to Open ADR protocol Demand Response Automation Servers (DRAS) typically provided by local electrical utility.
2. Open ADR interface shall meet all of the requirements of Open ADR 2.0a Virtual End Nodes (VEN), including:
  - a. Programmable with the account information of the end-user’s electrical utility DRAS account credentials.
3. Open ADR interface shall support the activation of system profiles configured for each of the automated demand response levels defined in the utility demand response program.

### 2.6 Wired Networked Devices

#### A. Wired Networked Wall Switches, Dimmers, Scene Controllers

1. Devices shall recess into single-gang switch box and fit a standard GFI opening.



2. Communication and low voltage power shall be delivered to each device via standard low voltage network cabling with RJ-45 connectors.
3. All switches shall have the ability to detect when it is not receiving valid communication and blink its LED in a pattern to visually indicate a potential wiring issue.
4. Devices with mechanical push-buttons shall provide tactile and LED user feedback.
5. Devices with mechanical push-buttons shall be made available with custom button labeling.
6. Wall switches & dimmers shall support the following device options:
  - a. Number of control zones: 1, 2 or 4
  - b. Control Types Supported: On/Off or On/Off/Dimming
  - c. Colors: Ivory, White, Light Almond, Gray, Black, Red
7. Scene controllers shall support the following device options:
  - a. Number of scenes: 1, 2 or 4
  - b. Control Types Supported:
    - 1) On/Off
    - 2) On/Off/Dimming
    - 3) Preset Level Scene Type
    - 4) Reprogramming of other devices within daisy-chained zone so as to implement user selected lighting scene
    - 5) Selecting a lighting profile to be run by the system's upstream controller so as to implement a selected lighting profile across multiple zones
    - 6) Colors: Ivory, White, Light Almond, Gray, Black, Red

B. Wired Networked Graphic Wall Stations

1. Device shall surface mount to single-gang switch box.
2. Device shall have a 3.5" full color touch screen.
3. Device shall be powered with Class 2 low voltage supplied locally via a directly wired power supply.
4. Device shall have a micro-USB style connector for local computer connectivity.
5. Communication shall be over standard low voltage network cabling with RJ-45 connectors.
6. Device shall enable user supplied screen saver image to be uploaded within one of the following formats: jpg, png, gif, bmp, tif.
7. Device shall enable configuration of all switches, dimmers, and lighting preset scenes via password protected setup screens.
8. Graphic wall stations shall support the following device options:
  - a. Number of control zones: Up to 16
  - b. Number of scenes: Up to 16
  - c. Colors: Ivory, White, Light Almond, Gray, Black
9. Provide two(2) manual control stations for lighting override of the networked lighting controls location as coordinated with Architect/University/Engineer.

C. Wired Networked Auxiliary Input / Output (I/O) Devices

1. Devices shall be plenum rated and be inline wired, screw mountable, or have an extended chase nipple for mounting to a ½ in knockout.
2. Communication and low voltage power shall be delivered to each device via standard low voltage network cabling with RJ-45 connectors.
3. Auxiliary Input/Output Devices shall be specified as an input or output device with the following options:
  - a. Contact closure input
    - 1) Input shall be programmable to support maintained or momentary inputs that can activate local or global scenes and profiles, ramp light level up or down, or toggle lights on/off.
  - b. 0-10V analog input
    - 1) Input shall be programmable to function as a daylight sensor.
  - c. RS-232/RS-485 digital input
    - 1) Input supports activation of local or global scenes and profiles, and on/off/dimming control of up to 16 local control zones.
  - d. 0-10V dimming control output, capable of sinking up to 20mA of current
    - 1) Output shall be programmable to support all standard sequence of operations supported by system.

D. Wired Networked Occupancy and Photosensors

1. Occupancy sensors shall sense the presence of human activity within the desired space and fully control the on/off function of the lights.
2. Sensors shall utilize passive infrared (PIR) technology, which detects occupant motion, to initially turn lights on from an off state, thus preventing false on conditions. Ultrasonic or Microwave based sensing technologies shall not be accepted.
3. For applications where a second method of sensing is necessary to adequately detect maintained occupancy (such as in rooms with obstructions), a sensor with an additional “dual” technology shall be used.
4. Dual technology sensors shall have one of its two technologies not require motion to detect occupancy. Acceptable dual technology includes PIR / Microphonics (also known as Passive Dual Technology or PDT) which both looks for occupant motion and listens for sounds indicating occupants. Sensors where both technologies detect motion (PIR / Ultrasonic) shall not be acceptable.
5. All sensing technologies shall be acoustically passive, meaning they do not transmit sound waves of any frequency (for example in the Ultrasonic range), as these technologies have the potential for interference with other electronic devices within the space (such as electronic white board readers). Acceptable detection technologies include Passive Infrared (PIR), and/or Microphonics technology. Ultrasonic or Microwave based sensing technologies shall not be accepted.
6. Communication and low voltage power shall be delivered to each device via standard low voltage network cabling with RJ-45 connectors.
7. All sensors shall have the ability to detect when it is not receiving valid communication and blink its LED in a pattern to visually indicate a potential wiring issue.

8. Sensor programming parameter shall be available and configurable remotely from the software and locally via the device push-button.
9. Network system shall have ceiling, fixture, recessed & corner mounted sensors available, with multiple lens options available customized for specific applications.
10. Sensors shall be available with zero or one integrated dry contact switching relays, capable of switching 1 amp at 24 VAC/VDC (resistive only).
11. Sensors shall be available with one or two occupancy “poles”, each of which provides a programmable time delay.
12. Sensors shall have optional features for photosensor/daylight override, dimming control, and low temperature/high humidity operation.
13. Photosensor shall provide for an on/off set-point, and a deadband to prevent the artificial light from cycling. Delay shall be incorporated into the photocell to prevent rapid response to passing clouds.
14. Photosensor and dimming sensor’s set-point and deadband shall be automatically calibrated through the sensor’s microprocessor by initiating an “Automatic Set-point Programming” procedure. Min and max dim settings as well as set-point may be manually entered.
15. Deadband setting shall be verified and modified by the sensor automatically every time the lights cycle to accommodate physical changes in the space (i.e., furniture layouts, lamp depreciation, or lamp outages).
16. A dual zone option shall be available for On/Off Photocell, Automatic Dimming Control Photocell, or Combination units. The secondary daylight zone shall be capable of being controlled as an “offset” from the primary zone.

E. Wired Networked Wall Switch Sensors

1. Devices shall recess into single-gang switch box and fit a standard GFI opening.
2. Communication and low voltage power shall be delivered to each device via standard low voltage network cabling with RJ-45 connectors.
3. All wall switch sensors shall have the ability to detect when it is not receiving valid communication and blink its LED in a pattern to visually indicate a potential wiring issue.
4. Devices with mechanical push-buttons shall provide tactile user feedback.
  - a. Wall switches sensors shall support the following device options:
  - b. User Input Control Types Supported: On/Off or On/Off/Dimming
  - c. Occupancy Sensing Technology: PIR only or Dual Tech acoustic
  - d. Daylight Sensing Option: Inhibit Photosensor
  - e. Colors: Ivory, White, Light Almond, Gray
5. Wired Networked Embedded Sensors
  - a. Network system shall have embedded sensors consisting of occupancy sensors and/or dimming photocells that can be embedded into luminaire such that only the lens shows on luminaire face.
  - b. Occupancy sensor detection pattern shall be suitable for 7.5 ft. to 20 ft. mounting heights.
  - c. Embedded sensors shall support the following device options:
    - 1) Occupancy Sensing technology: PIR only or Dual Tech acoustic

- 2) Daylight Sensing Option: Occupancy only, Daylight only, or combination Occupancy/Daylight sensor
6. Wired Networked Power Packs and Secondary Packs
    - a. Power Packs shall incorporate one optional Class 1 relay, optional 0-10 VDC dimming output, and contribute low voltage Class 2 power to the rest of the system.
    - b. Power Packs shall accept 120 or 277 VAC (or optionally 347 VAC) and carry a plenum rating.
    - c. Secondary Packs shall incorporate the relay and 0-10 VDC or line voltage dimming output, but shall not be required to contribute system power.
    - d. Power Supplies shall provide system power only, but are not required to switch line voltage circuit.
    - e. Auxiliary Relay Packs shall switch low voltage circuits only, capable of switching 1 amp at 40 VAC/VDC (resistive only).
    - f. Communication shall be delivered to each device via standard low voltage network cabling with RJ-45 connectors. Secondary packs shall receive low voltage power via standard low voltage network cable.
    - g. Power Pack programming parameter shall be available and configurable remotely from the software and locally via the device push-button.
    - h. Power Pack shall securely mount to junction location through a threaded ½ in chase nipple or be capable of being secured within a luminaire ballast/driver channel. Plastic clips into junction box shall not be accepted. All Class 1 wiring shall pass through chase nipple into adjacent junction box without any exposure of wire leads. Note: UL Listing under Energy Management or Industrial Control Equipment automatically meets this requirement, whereas Appliance Control Listing does not meet this safety requirement.
    - i. When required by local code, Power Pack must install inside standard electrical enclosure and provide UL recognized support to junction box. All Class 1 wiring is to pass through chase nipple into adjacent junction box without any exposure of wire leads.
    - j. Power/Secondary Packs shall be available with the following options:
      - 1) Power Pack capable of full 16-Amp switching of all normal power lighting load types, with optional 0-10V dimming output capable of up to 100mA of sink current.
      - 2) Secondary Pack with UL924 listing for switching of full 16-Amp Emergency Power circuits, with optional 0-10V dimming output capable of up to 100mA of sink current.
      - 3) Power and Secondary Packs capable of full 20-Amp switching of general purpose receptacle (plug-load) control.
      - 4) Secondary Pack capable of full 16-Amp switching of all normal power lighting load types.
      - 5) Secondary Pack capable of 5-Amps switching and dimming 120 VAC incandescent lighting loads or 120/277 VAC line voltage dimmable fluorescent ballasts (2-wire and 3-wire versions).
      - 6) Secondary Pack capable of 5-Amps switching and dimming of 120/277 VAC magnetic low voltage transformers.

- 7) Secondary Pack capable of 4-Amps switching and dimming of 120 VAC electronic low voltage transformers.
  - 8) Secondary Pack capable of louver/damper motor control for skylights.
  - 9) Secondary Pack capable of providing a pulse on/pulse off signal for purposes of controlling shade systems via relay inputs.
  - 10) Secondary Pack capable of switching 1 amp at 40 VAC/VDC (resistive only) with the intent to provide relay signal to auxiliary system (e.g. BMS).
  - 11) Power Supply capable of providing auxiliary bus power (no switched or dimmed load).
7. Wired Networked Luminaires
- a. Networked luminaire shall have a mechanically integrated control device.
  - b. Networked LED luminaire shall have two RJ-45 ports available (via control device directly or incorporated RJ-45 splitter).
  - c. Networked LED luminaire shall be able to digitally network directly to other network control devices (sensors, photocells, switches, dimmers).
  - d. Networked LED luminaire shall provide low voltage power to other networked control devices (excluding EMG and wireless versions).
  - e. System shall be able to turn on/off specific LED luminaires without using a relay, if LED driver supports “sleep mode”.
  - f. System shall be able to maintain constant lumen output over the specified life of the LED luminaire (also called lumen compensation) by automatically varying the dimming control signal to account for lumen depreciation.
    - 1) System shall indicate (via a blink warning) when the LED luminaire is no longer able to compensate for lumen depreciation.
8. Wired Networked Relay and Dimming Panel
- a. Relay and dimming panel shall be available with 4, 8, 12 or 16 individual Field Configurable Relays (FCR) per panel, with an equal number of individual 0-10V dimming outputs.
  - b. Standard relays used shall have the following required properties:
    - 1) Configurable in the field to operate with single-, double-, or triple-pole relay groupings.
    - 2) Configurable in the field to operate with normally closed or normally open behavior.
    - 3) Provides visual status of current state and manual override control of each relay.
    - 4) Listed for the following minimum ratings:
      - a) 40A@120-480VAC Ballast
      - b) 16A@120-277VAC Electronic
      - c) 20A@120-277VAC Tungsten
      - d) 20A@48VDC Resistive
      - e) 2HP @ 120VAC,
      - f) 3HP @ 240-277VAC
      - g) 65kA SCCR @ 480VAC
  - c. 0-10 dimming outputs shall support a minimum of 100mA sink current per output.
  - d. Relay and dimming outputs shall be individually programmable to support all standard sequence of operations as defined in this specification.

- e. Panel shall be UL924 listed for control of emergency lighting circuits.
  - f. Panel shall power itself from an integrated 120-277VAC or 347VAC supply.
  - g. Panel shall provide a configurable low-voltage sensor input with the following properties:
    - 1) Configurable to support any of the following input types:
      - a) Indoor Photocell
      - b) Outdoor Photocell
      - c) Occupancy Sensor
      - d) Contact Closure
    - 2) Low voltage sensor input shall provide +24VDC power for the sensor so that additional auxiliary power supplies are not required.
    - 3) Sensor input supports all standard sequence of operations as defined in this specification.
  - h. Panel shall provide a contact closure input that acts as a panel override to activate the normally configured state of all relays (i.e., normally open or normally closed) in the panel. This input is intended to provide an interface to alarm systems, fire panels, or BMS system to override the panel.
  - i. Panel shall supply current limited low voltage power to other networked devices connected via low voltage network cable.
  - j. Panel shall be available with NEMA 1 rated enclosure with the following properties:
    - 1) Surface-mounted or flush-mounted enclosure back box
    - 2) Screw-fastened cover or hinged cover with keyed lock
  - k. Panel shall be rated from 32-122 °F.
9. Wired Networked Bluetooth® Low Energy Programming Device
- a. Device shall be plenum rated and be inline wired, screw mountable.
  - b. Communication and low voltage power shall be delivered to device via standard low voltage network cabling with RJ-45 connectors.
  - c. Bluetooth Low Energy connection shall allow connection from smartphone application for programming device settings within the local daisy-chain zone (see list of available settings in section, 2.4-System Software Interfaces, Sub-section .5).
    - 1) Device shall provide visual indication of remote Bluetooth connection via LED integrated into device enclosure such that it is visible from all angles while the zone is being programmed.
10. Wired Networked Communication Bridge
- a. Device shall surface mount to a standard 4" x 4" square junction box.
  - b. Device shall have 8 RJ-45 ports for connection to lighting control zones (up to 128 devices per port), additional network bridges, and System Controller.
  - c. Device shall be capable of aggregating communication from multiple lighting control zones for purposes of minimizing backbone wiring requirements back to System Controller.
  - d. Device shall be powered with Class 2 low voltage supplied locally via a directly wired power supply, or powered via low voltage network connections from powered lighting control devices (e.g. power packs).
  - e. Wired Bridge shall be capable of redistributing power from its local supply and connected lighting control zones with excess power to lighting control zones with insufficient local power. This architecture also enables loss of

power to a particular area to be less impactful on network lighting control system.

## 2.7 Wireless Mesh Networked Devices

### A. Wireless Mesh Networked Sensor Interface

1. The wireless sensor interface shall integrate industry standard low voltage switching devices and contact closure outputs into the control network.
2. The device interface shall have a universal power supply that operates at 120, 208, 240 or 277 VAC.
3. The device shall be listed under the UL 916 standard to allow field installation.
4. The device interface shall be suitable for mounting onto an electrical junction box and have UL 2043 listing for mounting in a plenum.
5. The device interface shall provide 2 low voltage sensing input channels suitable for connecting to momentary contact wall switches and dry contact outputs from other systems.
6. The device shall provide at least 100 mA of output power at 24VDC for connection to external input devices.
7. The device shall be capable of broadcasting the following manual wall control commands: on, off, and adjust dim level.

### B. Wireless Mesh Networked Light Controllers

1. The wireless light controller shall have a line voltage relay and 0-10V dimming output suitable for control of commercial and industrial lighting including fluorescent, HID, induction and LEDs.
2. Device shall have a form factor similar to a slim European-style ballast, which is intended for installation directly inside the ballast channel of a fixture.
3. Device shall have an integrated internal antenna suitable for embedding inside of a commercial and industrial luminaire while maintaining reliable wireless communication for typical luminaire spacing in commercial and industrial applications (see Wireless Mesh Network Control Zone Characteristics). An external antenna attached to the luminaire shall not be allowed.
4. The wireless light controller shall have a universal power supply that operates at 120, 208, 240 or 277VAC.
5. The device shall be listed under the UL 916 standard to allow field installation.
6. Each wireless light controller shall provide measurement capability of the amperage, voltage, wattage, and watt-hours of its controlled lighting.
  - a. Amperage and current measurements shall be accurate to +/- 2%.
  - b. Wattage measurement shall account for power factor of the load, so that real active power is reported by the system instead of apparent power.
7. The wireless light controller shall have a connector for an optional digital occupancy sensor and photocell.
8. Wireless light controller shall have the following relay options:
  - a. Normal power, 5A relay
  - b. Emergency power, 5A relay (UL924 listed)

- c. Emergency power, no relay (UL924 listed); still provides 0-10V dimming control and power measurement of the load while providing unswitched and “fail-on” operation of the lighting load.

C. Wireless Mesh Networked Digital Sensor Attachments

1. Digital sensor attachments provide integrated digital occupancy sensing and digital photocell sensor.
2. Devices shall connect directly to the wireless light controller and shall be suitable for embedding into the enclosure of a luminaire.
3. IP-rated digital sensor attachments shall be provided that maintain wet-location capability of a luminaire.
4. Device shall have software-adjustable sensitivity of PIR occupancy sensor.
5. Photocell shall be suitable for closed and open loop applications.
6. Device shall have a user button that may be used to provide diagnostic and factory-default reset capabilities.
7. Digital sensor attachment shall have the following form factors and lens types:
  - a. IP rated, high-mounting height (15-45 ft.), 360° PIR with minimum 15 ft. detection radius, and photocell.
  - b. IP rated, low-mounting height (up to 15 ft.), extended range 360° PIR with up to 30 ft. detection radius and photocell.
  - c. Micro-sensor form factor, 360° PIR and photocell.

D. Wireless Mesh Networked Sensor-Controllers

1. Sensor-Controllers shall integrate the following functions in to a single enclosure:
  - a. Line voltage relay and 0-10V dimming control of a lighting load.
  - b. Power measurement of lighting load (voltage, amperage, watts, and watt-hours).
  - c. Digital PIR occupancy sensor with software-adjustable sensitivity.
  - d. Digital photocell sensor suitable for closed and open loop applications.
  - e. User button used to provide diagnostic and factory-default reset capabilities.
2. Sensor-Controllers shall mount to luminaires or junction boxes with a secured chase nipple suitable for ½ in KO mounting holes.
3. Sensor-Controllers shall have optional IP-rated enclosures for wet location applications.
4. Sensor-Controllers shall be the following enclosures, relay options, and lens types:
  - a. Enclosure
    - 1) Damp location, including optional offset bracket to locate the sensor lens to avoid detection cutoff from the luminaire.
    - 2) Wet location, IP65 rated enclosure or better, including optional back heights and nipple extension lengths to locate the sensor lens to avoid detection cutoff from the luminaire.
  - b. Relay Options
    - 1) Normal power, 5A relay.
    - 2) Emergency power, 5A relay (UL924 listed).



- 3) Emergency power, no relay (UL924 listed); still provides 0-10V dimming control and power measurement of the load while providing unswitched and “fail-on” operation of the lighting load.
- c. Lens Types
  - 1) “No lens,” which has no occupancy sensing or photocell sensing capability but allows the Sensor-Controller to be used purely as an externally mounted lighting control device.
  - 2) IP rated, high-mounting height (15-45 ft.), 360° PIR with minimum 15 ft. detection radius, and photocell.
  - 3) IP rated, high-mounting height (4.6-13.7 m), 360° PIR with minimum 4.6 m detection radius, and photocell.
  - 4) IP rated, low-mounting height (up to 15 ft.), extended range 360° PIR with up to 30 ft. detection radius and photocell.
  - 5) IP rated, low-mounting height (up to 4.6 m), extended range 360° PIR with up to 9.1 m detection radius and photocell.
5. Wireless Mesh Networked Luminaires
  - a. Networked luminaire shall have a mechanically integrated control device.
  - b. Networked LED luminaire shall be capable of communicating wirelessly to other networked luminaires or intelligent control devices (sensors, photocells, switches, dimmers).
6. Wireless Mesh Network Communication Bridge
  - a. A communication bridge device shall be provided that interfaces with the System Controller via LAN connection and interfaces with wireless mesh networked devices via an integrated 2.4 GHz transceiver.
  - b. Device shall provide an option to be powered from a Power-over-Ethernet connection conforming to the IEEE 802.3af standard.
  - c. Device shall provide an option to be powered from 120VAC electrical outlet.
  - d. Device shall consume no more than 6 W of power.
  - e. Device shall be capable of communicating with a group of at least 250 wireless mesh networked devices and luminaires, so as to reduce the amount of communication bridges required in the system.
  - f. Device shall be supplied with mounting hardware suitable for wall mounting in an office environment or utility closet.
  - g. Device shall have optional IP-rated enclosure suitable for wet location applications.
  - h. Device shall have optional heated enclosure suitable for below-freezing applications.
  - i. To provide security, the wireless bridge shall be unresponsive to wired and wireless communication that do not conform to the specific protocols used by the networked lighting control system.

## PART 3 - EXECUTION

### 3.1 Installation Requirements

- A. Install systems in accordance with UL, NEC and all other applicable codes. Install system to comply with drawings and final shop drawings in compliance with manufacturer instructions. Provide all required hardware and labor for rack mounting

of head-end system components. This contractor shall be responsible for furnishing and installing all required cabling between components to form a complete and operational system meeting all the requirements of this specifications.

- B. Refer to plans for locations and quantities of equipment. Equipment locations shown on plans will be required to be field coordinated to ensure proper system operation.
- C. Where pathways do not exist for Lighting Control Low Voltage wiring, this contractor shall be responsible for providing all required raceways for control/communications cabling to meet building codes and manufacturer's recommendations.
- D. No items of equipment shall be installed in such a manner as to void or reduce the proper operating characteristics of individual components or of the system.
- E. Cables shall not be laid upon ceilings or supported in a manner that would violate any codes or standards. All control cables shall be installed in conduit.
- F. All cabling and accessories installed in ceiling spaces that are used for air distribution plenums shall be UL plenum rated.
- G. Provide firestop material and seal all cable penetrations in the building per 26 05 05 Firestopping.
- H. Perform all work under the on-site supervision of a factory authorized trained technician. It shall be the responsibility of the technician to check, inspect and adjust this installation to the Engineer's and Owner's approval. A CSR of the installing contractor or manufacturer shall train the Owner's personnel on the proper operation and maintenance of the equipment. Perform all work in conjunction with this installation in accordance with good engineering practices as established by NEC.
- I. Delivery of all loose equipment which is to be turned over to Owner shall be carefully coordinated and scheduled with Owner prior to shipment
- J. Installation Procedures and Verification
  - 1. The successful bidder shall review all required installation and pre-startup procedures with the manufacturer's representative through pre-construction meetings.
  - 2. The successful bidder shall install and connect the networked lighting control system components according to the manufacturer's installation instructions, wiring diagrams, the project submittals and plans specifications.
  - 3. The successful bidder shall be responsible for testing of all low voltage network cable included in the bid. Bidder is responsible for verification of the following minimum parameters:
    - a. Wire Map (continuity, pin termination, shorts and open connections, etc.)
    - b. Length
    - c. Insertion Loss
- K. Coordination with Owner's IT Network Infrastructure

1. The contractor is required to coordinate with the owner's representative to secure all required network connections to the owner's IT network infrastructure.
  - a. The bidder shall provide to the owner's representative all network infrastructure requirements of the networked lighting control system.
  - b. The bidder shall provide to the manufacturer's representative all necessary contacts pertaining to the owner's IT infrastructure, to ensure that the system is properly connected and started up.

### 3.2 System Setup and Control Settings

- A. Contractor is responsible to program the system in this section according to the Owner's requirements. This includes the set up and assignment of zones, coordination of switches, etc. The Contractor shall meet with the Owner and/or Engineer and reach agreement on the programming. This programming agreement shall then be written out in detail and forwarded to the Engineer for approval. After approval is granted, proceed with final programming.
- B. All spaces indicated with manual switches or dimmers shall be controlled by those devices in their respective spaces along with occupancy sensors acting as vacancy sensors. Public spaces, restrooms, corridors, etc.... that do not have manual switches or dimmers indicated but do indicate occupancy sensors shall be controlled by a combination of time of day and occupancy sensors. Time of day settings and occupancy settings shall be coordinated with the University during the programming stages and shall be programmed per the owner's request.
- C. Manufacturer shall provide all scenes, and settings for all public spaces a requested by the owner to accommodate game days/nights, graduation, band competitions, performances, after hour use, job fairs, other sporting events, multipurpose venue events, etc..... Coordinate any and all instances and time settings for each with the owner and provide accordingly.
- D. Wireless software and controls shall be provided to the owner for control from a tablet or wireless device.
- E. Upon completion of installation by the installer, including completion of all required verification and documentation required by the manufacturer, the system shall be started up and programmed by an authorized representative of the manufacturer.
  1. Low voltage network cable testing shall be performed by the contractor prior to system startup.
  2. System start-up and programming shall include:
    - a. Verifying operational communication to all system devices.
    - b. Programming the network devices into functional control zones to meet the required sequence of operation.
    - c. Programming and verifying all sequence of operations, time of day and schedules as required by the owner.
    - d. Customization of owner's software interfaces and applications.

3. Initial start-up and programming is to occur on-site. Additional programming (if required) may occur on-site or remotely over the Internet as necessary until the installation and final programming is complete.

F. Provide 4 trips of programming for initial set up, this includes the set up and zoning, switches, etc for a complete and operational system. Provide 4 additional trips throughout the year for programming and trouble shooting for owner as requested by owner.

G. Concourse corridor/public spaces shall be controlled thru time of day schedule, zoned by Quadrants. After hours the concourse shall be controlled by occupancy sensors, zoned by Quadrants. Provide all the programming and labor and material for a complete and operational system.

### 3.3 Identification/Labeling

A. Contractor shall identify all major items of equipment and tag all cables with permanent type markers to denote equipment served. Cables shall be tagged at both ends and at each point where the cable is administered.

### 3.4 As-built Documentation/O&M Manuals

A. Copies of all approved shop drawings with the Engineer's stamp.

B. O&M manuals for every item of equipment when available from the manufacturer. These shall be the technical manuals provided by the manufacturer and shall not consist of generic sales brochures. Technical manuals shall provide complete specifications for the equipment as well as complete operating, maintenance, troubleshooting and product repair/replacement information.

C. Lighting Control System drawings shall be updated with final As-Built information.

D. System schematic and block diagrams for every system updated with final as-built information. These drawings shall define the exact arrangement of each system including wiring configuration, device locations and cable types.

E. The installing contractor shall be responsible for documenting installed location of all networked devices, including networked luminaires. This includes responsibility to provide as-built plan drawing showing device address barcodes corresponding to locations of installed equipment.

F. The installing contractor is also responsible for the following additional documentation to the manufacturer's representative if visualization / graphical floorplan software is provided as part of bid package:

1. As-Built floor plan drawings showing daisy-chain wired network control zones outlined, in addition to device address locations required above. All documentation shall remain legible when reproducing\scanning drawing files for electronic submission.

2. As-Built electrical lighting drawings (reflected ceiling plan) in PDF and CAD format. Architectural floor plans shall be based on as-built conditions.
  - a. CAD files shall have layers already turned on/off as desired to be shown in the graphical floorplan background images. The following CAD elements are recommended to be hidden to produce an ideal background graphical image:
    - a) Titleblock
    - b) Text- Inclusive of room names and numbers, fixture tags and drawings notes
    - c) Fixture wiring and homeruns
    - d) Control devices
    - e) Hatching or poché of light fixtures or architectural elements
  - b. CAD files shall be of AutoCAD 2013 or earlier. Autodesk Revit files overall floor plan views shall be exported to AutoCAD 2013.

### 3.5 Training Requirements

- A. Provide all training and utilize specified manuals and record documentation. Training shall be provided to all staff at the project site and coordinated with the Owner. Provide two (2) video copies of training.
- B. Training shall include multiple four-hour sessions encompassing all instructions required for system operation. Provide operators manuals and user guides with training. Provide follow up training after initial training. Provide a total of eight (8) hours of system training to the Owner.
- C. Training shall utilize the equipment provided at the project site. Coordinate use, time and availability of equipment with the Owner.
- D. Demonstrate adjustment, operation and maintenance of the system including each component and control.

### 3.6 Functional Testing

- A. Lighting control devices and control system shall be tested to ensure that control hardware, and software are calibrated, adjusted, programmed and in proper working condition in accordance with the manufacturer's installation instructions. A certificate of inspection shall be furnished by a qualified manufacturer's representative or equipment vendor; submit report to the Architect.

### 3.7 Project Turnover

- A. System Documentation
  1. Submit software database file with desired device labels and notes completed. Changes to this file will not be made by the factory.
  2. Owner Training

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- a. Provisions for onsite training for owner and designated attendees to be included in submittal package. A minimum of 8 hrs of training shall be provided to the owner or to the owner's satisfaction.

END OF SECTION

26 51 14 LIGHTING CONTROL SYSTEM

PART 1 - GENERAL

1.1 Lighting controller shall be provided by Lumenpulse or approve equal.

PART 2 - PRODUCTS

1.1 Lumentouch 2.0<sup>LM</sup> - DMX Lighting Controller

A. Physical

1. The Light Controller shall be provided with a 5 year manufacturer warranty
2. The Light Controller shall be flat and wall mounted
3. The Light Controller shall be 4-3/16" wide x 7/16" deep x 5-3/4" high (maximum)
4. The Light Controller shall operate in a temperature range of -10° C to 45° C
5. The Light Controller shall be EC, EMC, ROHS, ETL, UL compliant
6. The Light Controller face plate shall be made of clear glass with capacitive touch control
7. The Light Controller shall weigh 247g maximum
8. The Light Controller shall have mounting options for US Single Gang and Dual Gang Junction box, as well as a mounting option for EU Electrical box
9. The Light Controller shall have 10 touch sensitive buttons, 1 control wheel and Color LCD Screen
10. The Light Controller shall have a Mini-USB connection for programming
11. The Light Controller shall have a touch sensitive control interface
12. The Light Controller shall have up to 2 DMX universes on board with unlimited memory via Micro SDCARD
13. The Light Controller shall have RS-232 and I/O Ports for triggering
14. The Light Controller shall have a universal infrared receiver
15. The Light Controller shall have an Ethernet Card for networking and triggering via remote iPhone/iPad Apps or Android control
16. The Light Controller shall have an integrated Real Time Clock and Calendar
17. The Light Controller Windows (XP, VISTA, 7, 8, 32-Bit and 64-Bit) programming software download shall be compatible with:
  - a. Electrical
    - 1) The Light Controller shall accept 100 to 240V input through the provided, remote UL listed 6V DC power supply
    - 2) The Light Controller shall have an extension socket for additional features and connections (Power, Relays, DMX Universe 1 & 2, Contact Closures and RS-232 connections)

PART 3 - EXECUTION

1.1 Programming

- A. All programming, technician's time, manufacturer's site visits, labor, material, etc.... shall be included for the lighting controls for this project. Programming and training shall be provided to the satisfaction of the owner before the project shall be considered complete.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- B. Owner will provide the type and quantity of programs to be provided; E.C. (or manufacturer) is responsible to provide programs as requested by the owner.
- C. Eight hours of training time for the owner on how to use and program this system shall be included in this project.

END OF SECTION



The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

## SECTION 26 52 00 EXIT AND EMERGENCY LIGHTING

### PART 1 - GENERAL

- 1.1 Exit lighting and emergency lighting system wiring shall be run in conduit system which is completely independent of normal wiring systems.
- 1.2 Equipment to transfer power from a normal source to an emergency source are to be listed and labeled for load transfer.

### PART 2 - PRODUCTS - NOT USED

### PART 3 - EXECUTION

- 3.1 All circuits to have dedicated neutral conductor.
- 3.2 Test system operation for full 90 minutes witnessed by the AHJ.

END OF SECTION

## SECTION 265600 EXTERIOR LIGHTING

### PART 1 - GENERAL

- 1.1 Work includes a complete system of exterior lighting including luminaires, lamps, poles, bases, conduit, conductors, fusing, control devices, etc. as shown on drawings. Include all excavation, backfill, concrete bases and concrete encasement of underground conduits.
- 1.2 The catalog numbers listed on the schedule do not necessarily have complete prefix and suffix designations for placing the luminaire order. The Contractor shall verify these numbers and include in his bid the necessary plaster frames, accessories, trim, mounting hardware, etc. to achieve a coordinated installation with ceiling types indicated on the architectural drawings and in specifications. The Contractor shall provide any hardware indicated by notes on the fixture schedule.
- 1.3 Luminaires, drivers, ballasts and individual components shall bear UL label. All ballasts including compact fluorescents shall be high efficiency and high power factor (HPF).

### PART 2 - PRODUCTS

- 2.1 Refer to data on the drawings for fixture details.
- 2.2 The pole manufacturer shall provide a factory installed internal impact type vibration damper in each pole where indicated on the drawings or when the pole is 25 ft. or greater in length.

### PART 3 - EXECUTION

- 3.1 Concrete bases for standards shall be round formed above finish grade, chamfered corners and rubbed finish. Furnish anchor bolts as recommended by the manufacturer. Concrete bases shall be poured-in-place at the job site; steel reinforced concrete, minimum 3500 lb. test.
- 3.2 Provide a surge arrester behind the handhole in pole base of each lighting standard exceeding 15 ft. in height and connect to each phase conductor and 0.625 inches diameter by 10 ft. long copper clad driven ground rod providing a good grounding path. Connect the equipment grounding conductor to this grounding terminal. A separate ground rod is required for each lighting standard exceeding 15 ft. in height. Surge arresters shall be Square D Series SDSA, Joslyn Model Series 1250 or G.E. 9L15E and F Series. Install per NEC Article 280.
- 3.3 Provide Buss "KTK" fuses in HEB waterproof in-line holder ahead of the ballast in each "hot" leg; locate behind handhole in pole base.
- 3.4 Note these special installation procedures – never install a pole without the intended luminaire in place. Poles are designed to carry a load, and a pole cannot be installed before the luminaire is mounted because of the potential for damaging the pole from unwanted vibrations.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- 3.5 Mount standards truly vertical. Shim and grout under fixture base to level standards; visible shims will not be permitted. Provide anchor bolt covers.
- 3.6 Splicing shall be made with listed and approved, waterproof splicing kits and shall be located in base of poles behind handhole.
- 3.7 Install a green wire ground throughout the underground wiring system, and bond to all standards.

END OF SECTION

SECTION 28 31 00 FIRE DETECTION AND ALARM

PART 1 - GENERAL

- 1.1 Existing system is a microprocessor based double supervised, closed circuit fire alarm system of modular design utilizing addressable technology for remote devices. Wiring is Class "B" (for signaling and notification circuits. Smoke detectors shall be analog, addressable units with control panel adjustable sensitivity. All new units of equipment shall be labeled by Underwriters' Laboratories for fire alarm signaling use and shall comply with UL 864 Ninth Edition.
  - A. An existing Simplex 4100U fire alarm panel is located in the fire command center of the existing Central Riverfront Garage. The lot 23 Garage area was provided with a simplex fire alarm system under a previous project, this is to be extended and power strobes and monitor inputs and required zones in the Lot 28 garage. The main panel in the Central Riverfront Garage fire command center contains all software and dial out capability of the fire alarm system.
  - B. All fire alarm wiring extending down from the Upper Level (500) to below flood level devices shall be run through terminal strips in stainless steel boxes located on columns below Upper Level (500) signaling devices.
- 1.2 Operation of any addressable manual or automatic fire alarm initiating device shall initiate the following:
  - A. Sound a Code-3 temporal pattern (continuous) audible fire alarm signal and illuminate fire signal lights in a synchronous mode until alarms have been silenced at the main fire alarm system control panel or at a remote operator's control panel by means of the "alarm silence" switch or the device returned to normal and a "reset" switch is manually actuated.
  - B. Display alarm condition on integral alphanumeric LCD displays in the control panel(s), indicating the alarming device and its location. Each manual and automatic alarm initiating device shall be individually addressed.
  - C. Release all electro-magnetic door holders.
  - D. Release of smoke dampers when the associated duct mounted smoke detector alarms shall be through the HVAC control system. Provide a 120 volt emergency power supply to a junction box near each group of smoke dampers as indicated on the drawings. Provide a separate remote auxiliary contact (control ZAM), associated with each smoke damper duct detector, adjacent to ATC control panels as indicated on the drawings. The HVAC Contractor shall extend all wiring and conduit from the 120 volt circuit and the fire alarm system remote auxiliary contact as required for operation of the smoke dampers.
  - E. Print the assigned English language message and activate control-by-event functions, with time and date, for the monitored point in alarm at the printer at the control panel. Located in the existing Fire Command Center.

- F. Initiate a separate trouble and alarm signal for connection to the municipal fire department or remote monitoring service via equipment in the existing Fire Command Center of the Central Riverfront Garage.
  - G. Provide communication from the existing garage fire alarming system with the new Music Venue overbuilds fire alarm system. The garage Simplex fire alarm system shall communicate sprinkler activation in the garage areas by designated sprinkler zones for the Lots 23,24 and 27 garages. The overbuild fire alarm system shall communicate the buildings alarms initiated by any sprinkler activation, any pull station activation, two or more smoke detection devices in alarm with the Central Riverfront Garage (CRG) Simplex fire alarm system.
  - H. The following shall be accomplished by Pseudo points generated at the overbuild fire alarm system and the Central Riverfront Garage Simplex fire alarm system.
    - Functionality for first responders to respond to a fire within the Central Riverfront Garage (CRG) – both signaling the CRG patrons with both audible and visual alarms and reporting the incident the overbuild development fire alarm system.
    - Functionality for first responders to respond to a fire within the overbuild development – signaling the Music Overbuild Venue with both audible and visual alarms and reporting the incident to the CRG fire alarm system located at parking offices.
    - Allow tie-in communications between the Music Venue fire alarm system and the existing CRG Fire Control Center Simplex system for alarm notification via the designated Pseudo points in alarm.
- 1.3 Emergency Control Functions and Interfaces
- A. Operation of any addressable manual or automatic fire alarm initiating device shall interface with the components described herein.
- 1.4 Supervised Monitoring
- A. This is existing equipment
- 1.5 In the event of operating power failure or an open or a grounded circuit in the system, a trouble signal and trouble LED shall be activated until the system is restored to normal. The trouble event shall be recorded within the control panel historical trouble log, and printed on the system printer (when applicable). The trouble signal may be silenced by means of a button located on the control panel operator's interface. Upon restoration of the system to normal condition, the trouble indicators shall automatically extinguish.
- 1.6 The fire alarm supplier shall submit for approval with shop drawings, floor plans, schematic and point to point wiring diagrams showing all manual and automatic devices, control panels, sounding devices, conduit sizes, number and size of wires, etc. Shop drawings shall include calculations for sizing of signal power supplies, voltage drop calculations for audible and visual signal circuits, speaker amplifiers and standby batteries. Voltage drop calculations will be based on each strobe drawing 110% of operating current and each audible device drawing 120% of operating current to allow for

future devices. Submittal shall include copies of personnel certification as required in 3.1. SHOP DRAWINGS WILL BE REJECTED UNLESS THE SUBMITTAL INCLUDES ALL THIS REQUIRED INFORMATION.

- 1.7 At completion of the project, the wiring diagrams shall be revised "as-built" and included as part of the maintenance manuals. The fire alarm supplier shall also furnish a hard copy printout of each detector's address, operating routines, etc. as part of the as-built drawings. Additionally, the supplier shall include an electronic copy (floppy disks or CD's) of the system's operating program with the as-builts for the Owner's records.
- 1.8 The Contractor or his fire alarm supplier/installer shall submit shop drawings, after the Architect's and Engineer's review, to the State Fire Marshal's Office and Ohio Department of Commerce, Division of Industrial Compliance where applicable for their review and approval; where buildings are not under the jurisdiction of the State Fire Marshal, the shop drawings shall be submitted to the local fire official for review and approval. The fire alarm supplier / installer shall provide sealed documents for submittal to the inspection authority.
- 1.9 Base bid includes three (3) additional combination audible/visual alarm signals 135 cd and 1 pull station, complete with installation, programming, power supplies and fifty (50) feet of conduit with circuitry per device. The audible/visual signals shall be added where designated by the Architect at the time of final acceptance.

## PART 2 - PRODUCTS

- 2.1 Equipment shall be equal in quality and performance to equipment as manufactured by Simplex, whose catalog numbers are used herein for establishing equipment criteria. Equipment supplier shall have a service organization within 50 miles of the project site and be a U.L. certified company. All material and/or equipment necessary for proper operation of the system not specified or described herein shall be deemed part of these specifications.
  - A. Remote system components as manufactured by Wheelock, Gentex or System Sensor are acceptable if UL listed and warranted as part of the total fire alarm system, provided by the fire alarm equipment supplier.
- 2.2 Control Unit
  - A. The control unit is existing, the contractor shall provide any hardware required for to operate and monitor the new fire alarm devices in lot 28.
- 2.3 Remote System Components
  - A. The existing Miniplex transponders located in the Lot 24 garage currently communicate with the Main Fire Alarm Control Unit to provide for centralized control of alarm and trouble signaling as well as output signaling.
  - B. Manual stations shall be addressable communicating devices, shall have a red finish and shall be non-coded, single action with breakrod operation (glass rod not required to reset station), semi-flush/surface mounted with keyed reset switch. Simplex #4099-9001.

- C. Fire signal lights (strobe lights) for synchronized operation shall provide visual indication of all alarms and shall illuminate in a flashing mode whenever system is in alarm state. Fire signal lights shall be labeled in accordance with UL 1971 Standards and shall be 15 candela in corridors and 110 candela in all other areas unless specifically designated as 75 candela or 110 candela on the drawings. Semi-flush / surface mount signal lights on walls where shown on the drawings. Lens shall be installed in a horizontal alignment on a red back plate labeled "FIRE" and shall produce 1 flash per second. Strobes shall be Simplex non-addressable #4904 Truealert Series with appropriate mounting hardware. Exterior units shall be gasketed and labeled for exterior use. Wheelock #WM3T.
- D. Speakers shall be surface mounted, with red grille and field selectable output levels of 85 or 91 dB at 10 ft. (based on UL 464 reverberant test requirements). Speakers operating power levels shall be set initially at 85 dB and adjusted upward as required for proper sound coverage during the final check-out. Power calculations shall be made using the current draw for these units operating at 91 dBA. Outside assemblies shall be weatherproof. Combination (audible/visible) horn and fire signal lights shall utilize a compact, combination mounting base assemblies. Horns shall be labeled "Fire" (utilize the continuous horn signal setting) with mounting accessories. Exterior units shall be gasketed for weatherproof rating. Combination strobe/horn signal units shall be factory assembled.
- E. Combo speaker with fire signal lights (strobe lights) for synchronized operation shall provide both audible and visual indication of all alarms and shall illuminate in a synchronized flashing mode whenever system is in alarm state. Fire signal lights shall be labeled in accordance with UL 1971 Standards and shall be 15 candela in corridors and 75 candela in all other areas unless specifically designated as 110 candela on the drawings. Surface mount signals on walls where shown on the drawings. Lens shall be installed in a horizontal alignment and shall produce 1 flash per second. Horns shall be supplied with a red grille / cover and labeled "FIRE" and shall have field selectable output levels of 90 or 95 dBA at 10 feet (based on UL 464 reverberant test requirements). Horn operating power levels shall be set initially at 90 dB and adjusted up or down as required for proper sound coverage during the final checkout. Power calculations shall be made using the current draw for these units operating at 95 dB. All strobes shall be synchronized throughout the entire building utilizing control circuitry within the main fire alarm panel (and extender panels if used). Exterior units shall be gasketed and labeled for exterior use. Simplex non-addressable #4903 True Alert series.
- F. Surface mounted fire alarm devices mounted on walls - such as manual stations, bells, horns, chimes, fire signal lights, etc. shall utilize finished backboxes. These backboxes shall be red metal and shall be field punched for conduit entrance and shall not employ stamped K-O construction.
- G. Individual addressable monitor module shall be an addressable module used for monitoring N.O. contact devices such as water flow, tamper switches, the kitchen hood fire extinguishing system, etc. Simplex IAM #4090-9001
- H. Programmable relay control module shall be an individual addressable module used for control of auxiliary functions such as elevator control, door release, smoke damper shutdown, air handling unit shutdown, etc. Simplex IAM #4090-9002.

- I. Waterflow switches shall indicate the continuous flow of water in sprinkler pipes. Switches shall be furnished and installed by the Fire Suppression Contractor. Wiring and connection shall be by this Electrical Contractor. Unit shall be equipped with retard mechanism, adjustable up to two minutes, to minimize false alarms due to pressure changes. Coordinate pipe size with Fire Suppression Contractor. Units are to be turned over to Fire Suppression Contractor for installation. Each waterflow switch shall be connected to the fire alarm system through a dedicated address via a monitor module. Simplex #2097-9047 thru 9054 depending on pipe size.
- J. Gate valve switches (OS&Y) shall monitor the status of sprinkler valves where indicated on drawings and shall signal a trouble alarm when respective valve is closed. Switches shall be furnished and installed by the Fire Suppression Contractor. Wiring and connection shall be by this Electrical Contractor. Each gate valve switch shall be connected to the fire alarm system through a dedicated address via a monitor module. Simplex #2097-9032. Units are to be turned over to the Fire Suppression Contractor for installation.
- K. Magnetic door holders shall be voltage selectable for 24 VDC or 24/120 VAC operation. Flush (Simplex #2088-9607), semiflush (Simplex #2088-9608) or surface wall mounted (Simplex #2088-9609) as required. Floor mount models for single door (Simplex #2088-9610 / Notifier #FM-980) or double door (Simplex #2088-9611) applications where required.
- L. Notification appliance power extender control panels shall be provided where shown on the drawings. These panels shall communicate with and be completely supervised from the main fire alarm panel and shall be capable of powering additional synchronized visual alarm signals and/or audible alarm signal circuits. Each panel shall include supervisory modules, power supplies, batteries and chargers. At the Contractor's option, additional extender panels may be utilized. Coordinate exact locations of these additional remote panels with the Architect/Engineer during the submittal phase. Operating power (120V) shall be supplied from the emergency system where available on the premise. Simplex #4009-9201 Series panel with accessories.

### PART 3 - EXECUTION

- 3.1 Follow NFPA 72 and manufacturer's instructions regarding mounting, wiring and testing system. Installer(s) shall meet project's respective State and local Municipality requirements for certification and as a minimum, have one installer certified as a NICET Level 2. In addition, the fire alarm system supplier shall have on staff, one NICET Level 3 certified individual and be an U.L. certified company.
- 3.2 Wiring, #14 AWG minimum, shall be installed in accordance with manufacturer's wiring diagrams, recommendations and in compliance with practices set forth by local, state and national fire codes. Color code and tag all wires at all junction points. #18 AWG conductors may be utilized when installed as a multi-conductor cable with an overall protective jacket when approved by manufacturer. All fire alarm system wiring shall comply with NEC Article 760.
- 3.3 Coordinate door holder equipment connections with hardware supplier and supply necessary power supply from main control panel. Door holders shall not be maintained by integral control unit back up battery.



The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- 3.4 All wiring shall be installed in conduit; conduit system shall be independent of all other systems.
- 3.5 Provide protection, such as wire guards, which are listed for the specific use on all fire alarm devices within areas subject to mechanical damage.
- 3.6 Base bid includes three (3) additional combination audible/visual alarm signals 135 cd, one (1) pull station complete with installation supplies and fifty (50) feet of conduit with circuitry per device. These additional base bid devices shall also include any related submissions to the AHJ, revised “as-builts”, related system programming and revised Owner electronic copy. The audible/visual signals and smoke detection shall be added where designated by the Engineer at the time of final acceptance.

END OF SECTION

DIVISION 31 – EARTHWORK

SECTION 310000

EARTHWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Protection for structures, pavements, utilities, excavations, and other improvements that are to remain.
- B. Excavating and backfilling of holes and trenches left from removal of miscellaneous foundations, sewers, catch basins, manholes, other underground utilities, other demolished items, and underground constructions.
- C. Excavating and backfilling for new structures.
- D. Subgrade preparation.
- E. Fill and sub-base materials and operations.
- F. Undercutting and replacement of unacceptable existing in-place materials.
- G. Dewatering of excavated and backfilled areas.
- H. Removal and disposal of excess material.
- I. Erosion control measures.

1.2 RELATED SECTIONS

- A. Section 003200 – Geotechnical Data.
- B. Section 024100 –Demolition.

1.3 REFERENCES

- A. ASTM (American Society for Testing and Materials) D698, Standard Proctor Method for density and moisture control.
- B. ASTM D2487, Unified Soil Classification System.
- C. Other specified ASTM standards.

- D. Where specified, comply with the indicated items of the current issue of the State of Ohio Department of Transportation (ODOT) Construction and Material Specifications, ODOT Supplemental Specifications (CMS), and the current issue of the City of Cincinnati Supplement to the ODOT Construction and Material Specifications. The “Method of Measurement” and “Basis of Payment” of these specifications shall not apply. All references in the ODOT CMS to the ODOT general provisions shall be superceded by the Project Manual.
- E. Occupational Safety and Health Administration, OSHA.
- F. Cincinnati - Ohio Building Code.

#### 1.4 QUALITY ASSURANCE

- A. Regulatory Requirements:
  - 1. Comply with applicable laws, ordinances, and the Cincinnati - Ohio Building Code.
- B. Soil Testing and Inspection: Owner will provide services of a Geotechnical Testing Laboratory to perform lab and field testing and inspection in accordance with General Conditions including the following:
  - 1. Inspection and approval of all borrow materials and excavated material to be used as fill and backfill.
  - 2. Inspection, testing, and approval of subgrades for backfills and fills.
  - 3. Testing and approval of compaction for all fills and backfills at a frequency of every 30 cubic yards placed or more frequently if directed by Architect, Geotechnical Engineer, or Construction Manager.
  - 4. Submit reports of all inspections, tests, and approvals in accordance with General Conditions and Section 014000.
  - 5. Identify and measure quantities of existing unsuitable material to be undercut.
  - 6. At completion of earthwork, submit Certification, signed jointly by Contractor and earthwork subcontractor, that all earthwork requiring inspection and testing complies with requirements of these Specifications.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Schedule and coordinate delivery and removal of material. No stockpiling will be permitted on site, except as indicated on Drawings or as directed by Construction Manager.

#### 1.6 PROJECT CONDITIONS

A. Soils Investigation Data:

1. Soils and subsurface investigations were conducted in the area by Terracon Consultants Inc., Cincinnati, Ohio. Refer to Section 003200.
2. Bidders shall examine this report and are urged to make their own investigation of the Project Site before bidding. Subsequent claims for additional compensation attributable to the Bidder not examining this report and/or the Project Site will not be considered.
3. Soils investigation data is provided for information and convenience of the Bidders. Owner, Architect, and Construction Manager disclaim any responsibility for the accuracy, true location and extent of the Soils Investigation that has been prepared by others. Owner, Architect, and Construction Manager further disclaim responsibility for interpretation of that data by bidders, as in projecting soil-bearing values, rock profiles, soil stability and the presence, level, and extent of underground water.
4. Soils investigation data is not part of the Contract Documents.

- B. Undertake earthwork operations only when weather conditions permit compliance with the referenced standards and Contract Documents.

1.7 SEQUENCING AND SCHEDULING

- A. Coordinate earthwork with work of related Sections.

PART 2 PRODUCTS

2.1 BACKFILL AND FILL

- A. Use only materials in accordance with the geotechnical report in Section 003200 and approved by the Geotechnical Testing Laboratory. Use only materials that have been conditioned to within plus 3% or minus 2% of optimum moisture content range.
- B. Excavated material may be reused if stockpiled, conditioned, and backfilled in accordance with these Specifications, the geotechnical report in Section 003200, and with the approval of the Geotechnical Testing Laboratory.
- C. Granular subbase material: ODOT 304.02 and ODOT 703.17.
- D. Cohesive subgrade soils where noted and specified on the drawings. Material to be approved by the Geotechnical Engineer.
- E. Backfill material placed against below-grade foundation walls and retaining walls to be free-draining, clean, granular material with a maximum of 5% by weight passing the No. 200 sieve, and approved by the Geotechnical Engineer.

F. Utility Trench Backfill:

1. Under non-pavement areas: Free-draining, clean, granular material, capped with 18 inches of cohesive fill.
2. Under pavement and slab-on-grade areas: Comply with paragraph 2.1.A above.

G. Material shall be readily suitable for compaction with the moisture content within optimum range. Conform to ODOT 203.07 and geotechnical data in Section 003200.

H. Unsuitable Material: Do not use the following material for fill or backfill.

1. Frozen, excessively wet, organic, or deleterious material.
2. Material containing rocks or stones larger than 4 inches in any dimension.
3. Material containing debris or waste.
4. Material classified as ML, OL, CL/CH, CH, MH, OH or PT.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine areas and conditions under which earthwork is to be performed. Notify Construction Manager of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Starting of work constitutes acceptance of substrates.

3.2 PROTECTION

- A. Protect reference points, existing structures, sidewalks, paving, curbs, and other improvements to remain against damage during earthwork operations.
- B. Provide shoring, bracing, sheet piling, underpinning and other methods as needed to prevent cave-ins and other unplanned displacement of earth, for safe execution of the work, and for protection of persons and property.
- C. Design and install retention systems for all excavations with slopes greater than 1:1, unless otherwise approved by the Geotechnical Engineer.
- D. Protect bottoms of excavations and soil around and beneath foundations from frost.
- E. Water Removal:

1. Grade around excavations to prevent accumulation of surface runoff.
  2. Provide and operate equipment to keep construction areas free of subsurface, surface, and storm water.
  3. Dispose of water as directed so construction and storage areas, streets, drives, and other surfaces are not flooded.
  4. Contractor shall be responsible for rodding, routing, and flushing clean existing sewers, catch basins, and manholes at no cost to the Owner if erosion from stockpiled excavated materials or unprotected disturbed areas obstructs drainage, at any time during the Work.
- F. Provide barricades and protection required by law for all open excavations occurring as part of this work.
- G. Existing Utilities: REFER TO ADDITIONAL NOTES ON DRAWINGS.
1. Locate and verify existing underground utilities in areas of work before excavating. If utilities are to remain in place, provide adequate protection during earthwork operations.
  2. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult the Owner and Construction Manager immediately for direction. Cooperate with the Owner and utility companies in keeping services and facilities in operation. Repair utilities damaged by neglect of Contractor, to the satisfaction of utility owner.
  3. Do not interrupt existing utilities except when permitted in writing and then only after acceptable temporary utility services have been arranged.
  4. Do not remove utilities that must be removed with excavations until they have been properly disconnected and capped.
- H. Erosion Control:
1. Provide silt fences, seeding, and sodding as required to keep all driveways, roads, and sidewalks clean and clear of runoff debris. Refer to additional notes on Drawings.
  2. Periodically replace damaged or disturbed erosion control materials and clean off driveways, roads, and sidewalks with water, as directed by the Construction Manager or Owner.

### 3.3 EXCAVATION

A. General Excavation:

1. Excavation is unclassified and includes excavation to the elevations shown or

described, regardless of character of materials or obstructions encountered.

2. Conform to elevations, grades, and dimensions shown with a tolerance of plus or minus 0.10 foot.
  3. Do not allow water to accumulate in excavations. Remove water before it causes soil changes detrimental to stability of sub-grades. Provide and maintain pumps, sumps, suction and discharge lines, and other dewatering system components necessary to convey water from excavation. Comply with ODOT 203.04(A).
  4. Unauthorized excavation consists of removal of materials beyond indicated elevations or dimensions without specific direction of Architect or Geotechnical Engineer.
  5. Excavate unsatisfactory soil materials encountered that extend below required elevations to additional depth directed by Geotechnical Engineer. Removal of material softened by moisture and water will not be considered as a change in the Work.
  6. Stockpile satisfactory excavated materials only as directed and approved by Construction Manager and Geotechnical Engineer. Place, grade, and shape stockpiles for proper drainage. Locate and retain material away from edge of excavations. Provide erosion control measures to retain stockpiles. Legally dispose of excess and unsatisfactory excavated materials.
  7. Use of explosives is prohibited.
- B. Stability: Slope sides of excavation to comply with requirements of governing authorities and the following requirements, whichever are more restrictive. Shore and brace where sloping is not performed.
1. Temporary excavation slopes for excavations less than 8 feet in depth in stiff cohesive soils: No greater (steeper) than 1.0 horizontal to 1.0 vertical.
  2. Temporary excavation slopes in granular soils: No greater (steeper) than 1.5 horizontal to 1.0 vertical.
  3. Flatten slopes where top of excavation is surcharged and/or during wet conditions.
  4. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
  5. Provide trench shoring and bracing as required and in accordance with local codes and authorities having jurisdiction.
  6. Excavations to be constantly observed by Contractor for signs of yielding and potential failures or "cave-ins".

### 3.4 SUBGRADE PREPARATION

- A. Following excavation, prepare subgrade with equipment capable of obtaining compaction densities of 98% maximum dry density, as determined by Standard Proctor Method ASTM D-698.
- B. Prepare subgrade in accordance with geotechnical report in Section 003200.
- C. Undercut any soft or yielding areas as directed by Geotechnical Engineer.

### 3.5 BACKFILL AND FILL

- A. General: Use only approved on-site soils (per paragraph 2.1 above) or approved borrow material. Do not use frozen soils or soils not approved by Geotechnical Engineer.
- B. Backfill: Backfill excavations as promptly as work permits, but not until completion of the following:
  - 1. Survey of existing utilities or piles to remain; refer to Sections 024100.
  - 2. Removal of shoring and bracing, and filling of voids with satisfactory materials.
  - 3. Removal of trash and debris.
  - 4. Ground Surface Preparation:
    - a. Remove debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Bottom of excavations shall be cleaned of loose, soft, or wetted materials.
- C. Placement and Compaction:
  - 1. Place backfill and fill materials in layers not more than 8" in loose depth. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content. Compact each layer of fill to required percentage of maximum density. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
  - 2. Place backfill and fill materials evenly adjacent to structures, to required elevations. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around structure to approximately same elevation in each lift.
  - 3. Compact all backfill and fill lifts to not less than 98% of Standard Proctor Method maximum dry density (ASTM D-698).



4. Moisture Control:

- a. Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, in a manner that prevents free water appearing on surface during, or subsequent to, compaction operations.
  - b. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by disking, harrowing, or pulverizing until moisture content is reduced to satisfactory value, as determined by moisture-density relation tests.
- D. Dewatering: Maintain surfaces of backfills and fills properly compacted and drained at all times to prevent surface water penetration and deterioration and to prevent flooding of excavations and adjacent property.
- E. Protect structures, piping, conduit, utilities, and other existing appurtenances against cracking, crushing, displacement or other damage. Repair damage at no cost to the Owner caused by backfilling or compaction operations.

3.6 GRADING

- A. General: Uniformly grade areas, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.

3.7 TOLERANCES

- A. Establish all finish grades within 0.10 ft. of planned elevations.

3.8 FIELD QUALITY CONTROL

- A. Geotechnical Testing Laboratory must inspect and approve subgrade and backfill/fill layers before further construction work is performed thereon.
- B. If based on reports of testing service and inspection, fills or backfills, which have been placed, are below specified density or do not meet moisture control criteria, provide additional compaction and testing at no additional expense. Retesting of such remedial work shall be performed by the Geotechnical Testing Laboratory and paid for by Contractor.

3.9 CLEANING

- A. Legally dispose of all waste materials, trash, and debris off Project Site.

3.10 PROTECTION

A. Protection of Graded Areas:

1. Protect completed areas from traffic and erosion; keep free of trash and debris.
2. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

END OF SECTION

## **SECTION 312000 - EARTH MOVING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Preparing subgrades for slabs-on-grade, walks, pavements, lawns and grasses, and exterior plants.
  - 2. Excavating and backfilling for buildings and structures.
  - 3. Drainage course for slabs-on-grade.
  - 4. Subbase course for concrete walks and pavements.
- B. Related Sections include the following:
  - 1. Division 31 Section "Site Clearing" for temporary erosion and sedimentation control measures, site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
  - 2. Division 32 Section "Turf and Grasses" for finish grading, including preparing and placing topsoil and planting soil for lawns.
  - 3. Division 32 Section "Plants" for planting bed establishment and tree and shrub pit excavation and planting.

#### **1.3 DEFINITIONS**

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
  - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
  - 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Base Course: Course placed between the subbase course and hot-mix asphalt paving.
- C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

- G. Fill: Soil materials used to raise existing grades.
- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- I. Subbase Course: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- J. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- K. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

#### 1.4 SUBMITTALS

- A. Product Data: For the following:
  - 1. Geotextile.
  - 2. Controlled low-strength material, including design mixture.

#### 1.5 QUALITY ASSURANCE

- A. Codes and Standards: Perform earthwork complying with requirements of authorities having jurisdiction.
- B. Geotechnical Testing Agency Qualifications: Owner will employ and pay a qualified, independent geotechnical testing laboratory to perform soil testing and inspection services during earthwork operations. Contractor shall be responsible for scheduling and coordination of these services.
- C. Preexcavation Conference: Before commencing earthwork, meet with representatives of governing authorities, Owner, Architect, Structural Engineer, consultants, Geotechnical Testing Agency and other concerned entities. Review earthwork procedures and responsibilities including testing and inspection procedures and requirements. Notify participants at least three working days prior to convening conference. Record discussions and agreements and furnish a copy to each attendee.

#### 1.6 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Construction Manager and then only after arranging to provide temporary utility services according to requirements indicated.
  - 1. Notify Construction Manager not less than two days in advance of proposed utility interruptions.
  - 2. Do not proceed with utility interruptions without Construction Manager's written permission.

3. Contact utility-locator service for area where Project is located before excavating.
- B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

## **PART 2 - PRODUCTS**

### **2.1 SOIL MATERIALS**

- A. General: Provide off-site borrow soil materials when sufficient satisfactory soil materials are not available from on-site excavations.
- B. Satisfactory Soils: On site soils satisfactory to testing agency, containing less than 25% pulverized shale fragments, free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, organics, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: Silt, highly organic soils, wood, roots, trash, debris, and other soils and materials not acceptable to the testing agency.
  1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.
- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- H. Drainage Course: Narrowly graded mixture of washed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.
- I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.
- J. Sand: ASTM C 33; fine aggregate, natural, or manufactured sand.
- K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

## 2.2 GEOTEXTILES

- A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; as noted on drawings.
- B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; as noted on the drawings.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Protect and maintain erosion and sedimentation controls during earthwork operations.
- C. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

### 3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
  - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated utility trenches as temporary drainage ditches.
  - 2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

### 3.3 EXPLOSIVES

- A. Explosives: Do not use explosives.

### 3.4 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

### 3.5 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

### 3.6 EXCAVATION FOR UTILITY TRENCHES

- A. For sanitary sewer, storm sewer, and water lines, please see the corresponding spec sections. For other site utilities follow below.
- B. Excavate trenches to indicated gradients, lines, depths, and elevations.
  1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- C. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
  1. Clearance: 12 inches each side of pipe or conduit.
- D. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe.
  1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

### 3.7 SUBGRADE INSPECTION

- A. Notify testing agency when excavations have reached required subgrade.
- B. If testing agency determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Construction Manager, without additional compensation.

### 3.8 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Geotechnical Engineer.
  - 1. Fill unauthorized excavations under other construction or utility pipe as directed by Construction Manager.

### 3.9 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

### 3.10 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
  - 1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
  - 2. Surveying locations of underground utilities for Record Documents.
  - 3. Testing and inspecting underground utilities.
  - 4. Removing concrete formwork.
  - 5. Removing trash and debris.
  - 6. Removing temporary shoring and bracing, and sheeting.
  - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.

### 3.11 UTILITY TRENCH BACKFILL

- A. For sanitary sewer, storm sewer, and water lines, please see the corresponding spec sections. For other site utility backfill, follow below.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.
- C. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- D. Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings.
- E. Provide 4-inch- thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase.



- F. Place and compact initial backfill material, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the utility pipe or conduit in non-paved areas.
  - 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- G. Controlled Low-Strength Material: Place initial backfill of controlled low-strength material to a height of 12 inches over the utility pipe or conduit in paved areas.
- H. Backfill voids with satisfactory soil while installing and removing shoring and bracing.
- I. Place and compact final backfill of satisfactory soil to final subgrade elevation in non-paved areas.
- J. Controlled Low-Strength Material: Place final backfill of controlled low-strength material to final subgrade elevation in paved areas.

### 3.12 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations in accordance with sections 3.13 and 3.14 and as follows:
  - 1. Under grass and planted areas, use satisfactory soil material or engineered fill.
  - 2. Under walks and pavements, use satisfactory soil material (excluding topsoil) or engineered fill.
  - 3. Under steps and ramps, use satisfactory soil material (excluding topsoil) or engineered fill.
  - 4. Under building slabs, use satisfactory soil material (excluding topsoil) or engineered fill.
  - 5. Under footings and foundations, use satisfactory (excluding topsoil) soil material or engineered fill.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

### 3.13 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
  - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
  - 2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

### 3.14 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
  - 1. Under structures, building slabs, steps, and pavements, including 10 feet beyond all such areas, compact each layer of backfill or fill soil material at 100 percent maximum dry density.
  - 2. Under walkways, compact each layer of backfill or fill soil material at 100 percent maximum dry density.
  - 3. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent maximum dry density.
  - 4. For utility trenches, compact each layer of initial and final backfill soil material at 100 percent maximum dry density.

### 3.15 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
  - 1. Provide a smooth transition between adjacent existing grades and new grades.
  - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
  - 1. Lawn or Unpaved Areas: Plus or minus 1 inch.
  - 2. Walks: Plus or minus 1/2 inch.
  - 3. Pavements: Plus or minus 1/2 inch.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

### 3.16 SUBSURFACE DRAINAGE

- A. Subdrainage Pipe: Specified in Division 33 Section "Subdrainage."
- B. Subsurface Drain: Place subsurface drainage geotextile around perimeter of subdrainage trench. Place a 6-inch course of filter material on subsurface drainage geotextile to support subdrainage pipe. Encase subdrainage pipe in a minimum of 12 inches of filter material, placed in compacted layers 6 inches thick, and wrap in subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

1. Compact each filter material layer to 85 percent of maximum dry unit weight according to ASTM D 698.

C. Drainage Backfill: Place and compact filter material over subsurface drain, in width indicated, to within 12 inches of final subgrade, in compacted layers 6 inches thick. Overlay drainage backfill with 1 layer of subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

1. Compact each filter material layer to 85 percent of maximum dry unit weight according to ASTM D 698.

### 3.17 SUBBASE AND BASE COURSES

A. Place subbase and base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase and base course under pavements and walks as follows:

1. Where specified install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Shape subbase and base course to required crown elevations and cross-slope grades.
3. Place subbase and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
4. Compact subbase and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 98 percent of maximum dry density.

C. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 100 percent of maximum dry density.

### 3.18 DRAINAGE COURSE

A. Place drainage course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:

1. Install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Place drainage course 6 inches or less in compacted thickness in a single layer.
3. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
4. Compact each layer of drainage course to required cross sections and thicknesses to not less than 98 percent of maximum dry unit weight according to ASTM D 698.

### 3.19 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

### 3.20 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
  - 1. Scarify or remove and replace soil material to depth as directed by Construction Manager; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
  - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

### 3.21 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Transport surplus soil material offsite to a legal disposal site off Owner's property.
  - 1. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.
- B. Excavated pavements shall be considered waste material and shall not be incorporated into fills.

**END OF SECTION 312000**

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

SECTION 321440  
GRANITE UNIT PAVING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Granite pavers on sand/cement setting bed.

1.2 RELATED SECTIONS

- A. Section 033000 - Cast-in-Place Concrete.
- B. Section 044213 - Dimensional Stone Cladding.
- C. Section 044302 – Solid Granite.
- D. Section 057000 - Ornamental Metals.
- E. Section 071400 - Fluid Applied Waterproofing.
- F. Section 079000 – Expansion Joints.
- G. Section 079200 – Sealants.
- H. Division 22 – Plumbing (Drains).

1.3 REFERENCES

- A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirement shall govern.
  - 1. American Society for Testing and Materials (ASTM):
    - C 97 Absorption and Bulk Specific Gravity of Natural Building Stone
    - C 150 Portland Cement
    - C 170 Compressive Strength of Dimension Stone
    - C 615 Structural Granite
    - C 615 Granite Dimension Stone
    - C 880 Flexural Strength of Natural Building Stone

1.4 SUBMITTALS

- A. Product Data:
  - 1. Granite.
  - 2. Sand-Cement setting bed materials, including additives.
  - 3. Polymeric sand joint filler.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- B. Shop Drawings:
1. Indicate sizes, dimensions, layout, finishes, edging, and relationship to adjacent items (curbs, drains, etc).
  2. Show locations and details of joints.
  3. **Note: Stone shop drawing preparation (excluding engineering) for this Bid Package has already been bought by the Owner. Refer to Contractor Scope-of-Work (in Section 011100) for additional information.**
- C. Samples: Samples of granite pavers shall be “range samples” provided from the quarry granite pavers will be supplied from. Submit the following samples:
- | <u>Item</u>    | <u>Quantity and Size</u>   |
|----------------|--|
| Granite Pavers | For each specified color and finish, provide (2) pavers of each size (full size and full thickness). |
- D. Qualification Data: For firms and persons specified in “Quality Assurance” Article to demonstrate their capabilities and experience. Include lists of completed projects (including project name and address) with names and addresses of architects and owners, and other information.
- E. Contractor’s Review: Before commencing work, submit written statement signed by the Contractor stating that the Contract Documents have been reviewed with a qualified representative of granite supplier, and that the selected materials and construction are proper, compatible, and adequate for the application shown.

#### 1.5 TESTS, INSPECTIONS AND VERIFICATIONS

- A. Test Report: Submit reports from tests conforming to ASTM C 67 methods indicating:
1. Compressive strength, psi. (ASTM C 170)
  2. Density, lbs./c.f. (ASTM C 97)
  3. Absorption by weight, % (ASTM C 97)
  4. Abrasion resistance (ASTM C 241)
  5. Flexural strength psi. (MPa) (ASTM C 880)
- B. Resistance to freezing and thawing shall be determined in accordance with Section 8 of ASTM C 67 for five pavers. The pavers shall have no breakage and no more than 1.0 percent loss of any individual unit in dry weight when subjected to 50 cycles of freezing and thawing.
- C. Dimensional Tolerance:
1. The length and width of each paver in the sample shall not vary from any other paver in this or any other lot sample by more than 1/8 inch.
  2. Thickness of any paver in the sample shall not vary by more than 1/8 inch from the specified paver thickness.

- E. Retest: The Contractor shall notify the Architect if any pavers fail to meet the specified requirements. In case the shipment fails to conform to the specified requirements, the Contractor may sort it, and new specimens shall be selected by the Contractor from the retained lot for retesting, as directed by the Architect. All granite paver retests shall be performed at the expense of the Contractor. In case the second set of specimens fail to conform to the test requirements, the entire lot shall be rejected.

#### 1.6 SAMPLE PANEL

- A. Construct a sample panel of granite paving on specified setting bed and base before start of any granite paving. Sample panel shall exhibit granite pavers, grain and grain direction, and required jointing and relationship to adjacent paving. Minimum size of panel shall be 10 ft. x 10 ft. Sample panel shall be reviewed by the Architect and Owner. If the original sample is not acceptable, construct additional panels at no cost to the Owner until an acceptable panel is constructed. The acceptable panel shall become the standard for the entire job, and shall remain undisturbed until completion of all granite paving.
  - 1. Build sample panel in location as directed by Architect.
  - 2. Notify Architect seven days in advance of dates and times when sample panel will be constructed.
  - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
  - 4. Obtain Architect's and Owner's approval of sample panel before starting unit paver installation.
  - 5. Maintain sample panel during construction in an undisturbed condition as a standard for judging the completed Work.
  - 6. Demolish and remove sample panel when directed.

#### 1.7 QUALITY ASSURANCE

- A. Granite shall conform to the requirements of ASTM C 615, Architectural Grade and NBGQA Specifications, except as modified herein.
- B. Installer Qualifications: An experienced installer who has completed unit paver installations similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Source Limitations: Obtain each type of unit paver, joint material, and setting material from one source with resources to provide materials and products of consistent quality in appearance and physical properties.
  - 1. Granites shall be quarried by members of the National Building Granite Quarries Association, Inc. and shall meet the specified test criteria.

#### 1.8 DELIVERY, HANDLING, AND STORAGE

- A. Granite shall be packed and banded by the supplier for shipment. Store on wood skids or pallets, covered with non-staining, waterproof membrane and protected from weather. Place skids to evenly distribute the weight of the granite materials, and to prevent damage to granite.

Store granite to allow air to circulate around the granite material. Do not place granite in direct contact with the ground.

#### 1.9 PROTECTION OF FINISHED SURFACES

- A. Finished surfaces adjacent to the paving work shall be adequately protected from soiling, staining, and other damage.

#### 1.10 JOB CONDITIONS

##### A. Cold Weather Protection:

1. Remove any ice or snow formed on granite or concrete bed by carefully applying heat until top surface is dry to touch.
2. Remove granite work determined to be damaged by freezing conditions.

##### B. Cold Weather Protection for Completed Granite Work:

Mean Daily

Air Temperature

Procedures

40° – 32°F.

Protect granite work from rain or snow for at least 24 hours by covering with weather-resistive membrane.

32° – 25°F.

Completely cover granite work with weather-resistive membrane for at least 24 hours.

25° – 20°F.

Completely cover granite work with insulating blankets or similar protection for at least 24 hours.

20° – below

Maintain granite work at temperature above 32°F. for 24 hours using enclosures and supplemental heat.

1. Do not use frozen materials or materials mixed or coated with ice or frost.
2. Do not build on frozen work.
3. During all seasons, protect partially completed granite work against weather when work is not in progress.

## PART 2 PRODUCTS

### 2.1 PAVERS - GENERAL

- A. General Standards: Refer to Section 044302 2.1
- B. Granite shall be standard grade, free of cracks, seam, starts, or other defects which may impair its strength, durability or appearance. Exposed surfaces shall be free from spots, spalls, chips, stains, discoloration, or other defects which would affect its appearance. Color, texture and finish shall be within the range of samples approved by the Architect.



- C. Granite shall conform to ASTM C 615 and be of the sizes and dimensions indicated on the Drawings.
- D. Granite pavers shall conform to the following requirements:
  - 1. Absorption by weight shall not exceed 4%.
  - 2. Compressive strength of not less than 19,000 psi.
  - 3. Minimum density of 160 pcf.

## 2.2 GRANITE PAVERS

- A. “Mesabi Black” granite by Coldspring Granite, or approved equal.
  - 1. Size shall be 1'-6" x 3'-0" x 2 in. thick (typical), and as indicated on the Drawings.
  - 2. Finish: Diamond 5.
- B. “Prairie Brown” granite by Coldspring Granite, or approved equal.
  - 1. Size: 1'-0" x 2'-0" x 2 in. thick (typical), and as indicated on the Drawings.
  - 2. Finish: Diamond 10.
- C. “Deer Isle” granite by Coldspring Granite, or approved equal.
  - 1. Note: Some existing Deer Isle Thermal is being salvaged and reused as part of the project. It is anticipated that the salvaged pavers will cover the extent of the new area of Deer Isle. However, some new Deer Isle may be required depending on salvage rate, detailing, etc. Refer to Drawings for additional information.
  - 2. Size: 1'-0" x 2'-0" x 2 in. thick (typical), and as indicated on the Drawings.
  - 3. Finish: Thermal.

## 2.3 SAND-CEMENT SETTING BED

- A. Setting bed shall be a Portland cement and sand mixture.
- B. Mixture shall be one part Portland cement and three parts sand.
  - 1. Portland cement shall conform to ASTM C 150, Type I or II.
  - 2. Sand shall be clean, sharp, natural sand conforming to ASTM C 33, except that the fineness modulus shall be  $2.25 \pm 0.10$ .
    - a. Gradation for setting bed sand shall be as follows:

<u>Sieve Size</u>	<u>% Passing by Weight</u>
3/8 in.	100
No. 4	95-100

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

No. 8	80-100
No. 16	50-85
No. 50	10-30
No. 100	5-15
No. 200	0-10

#### 2.4 POLYMERIC SAND FOR JOINT FILLER

- A. Joint filler shall be Alliance Gator Maxx G2 polymeric sand, manufactured by Alliance Designer Products Inc., or approved equal.

#### 2.5 EDGE RESTRAINT

- A. Edge restraint system shall be heavy duty PVC or aluminum edge restraint with 4" +/- vertical wall height (color: black).

### PART 3 EXECUTION

#### 3.1 ACCEPTABILITY OF EXISTING CONDITIONS

- A. Contractor shall examine the concrete subbase, waterproofing, drainage board, protective board, and other work that may impact the installation of the granite paver work. Evidence of inadequate conditions shall be brought to the immediate attention of the Construction Manager.
- B. Start of work of this Section shall constitute acceptance of existing conditions.

#### 3.2 INSTALLATION, GENERAL

- A. Do not use granite pavers with chips, cracks, voids, discolorations, and other defects that might be visible or cause staining in the finished work.
- B. Mixed pavers from several pallets or cubes, as they are placed, to produce blend of colors and textures.
- C. Cut granite pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible.
- D. Joint Pattern: As indicated on the Drawings.
- E. Unfilled Gaps: Any gaps between granite pavers and any structures, or other members that cannot be filled with a whole paver shall be filled with a granite paver cut to fit the gap, except that slivers will not be allowed and the minimum size of cut block shall be 1/3 full dimension. Cutting shall be done with a hydraulic splitter, a masonry saw, or other device that leaves a clean, vertical face without spalling. Gaps between the paver and adjoining structure greater than 1/4 inch will not be accepted.
- F. Tolerances: Do not exceed 1/32-inch (0.8-mm) unit-to-unit offset from flush (lippage) nor 1/8 inch in 10 feet (3mm in 3 m) from level, or indicated slope, for finished surface of paving.

- G. Expansion and Control Joints: Provide for sealant-filled joints at locations and of widths indicated. Provide joint filler as backing for sealant-filled joints where indicated. Install joint filler before setting pavers. Refer to spec Section 079200 – Sealants.

### 3.3 CUTTING AND FITTING

- A. Full units of the proper size shall be used wherever possible. Cutting and fitting, including that required to accommodate the work of others, shall be done by using power masonry saws. Stone units may be wet or dry cut. Wet cut lines, before being placed in the work, shall be dried to the same surface-dry appearance as uncut units being laid in the wall. Cut edges shall be clean, true and sharp.

### 3.4 EDGE RESTRAINT

- A. Edge restraint system shall be installed in strict accordance with manufacturer's printed instructions.

### 3.5 SETTING ON SAND-CEMENT BED

- A. Sand-cement shall be mixed dry until the mass is of uniform color. Once thoroughly mixed, the mass shall be lightly moistened with water.
- B. Sand-cement mixture shall be spread over concrete base as a setting bed for pavers. Mixture shall be spread, and leveled to required slope and grade. Minimum thickness of setting bed shall be 1 in. after leveling. The bedding shall be left uncompacted and shall not be disturbed by any pedestrian or vehicle construction traffic.
- C. Surface tolerance shall be with 1/4 in. of required grade as measured with a 10 ft. straightedge in both transverse and longitudinal directions.
- D. The area of bedding placed in any one work day shall be scheduled so that no bedding course remains at the end of the day with a paver course.
- E. Place granite pavers in the indicated pattern. Placement of paver shall start from a corner or straight edge and proceed forward over the undisturbed bedding layer. The joints shall be 1/8 in. width.
- F. Spread dry polymeric sand and fill joints immediately after setting pavers. Minimum depth: 1.25".
  1. Make sure that the pavers' side and top surfaces are dry before applying the polymeric sand. Spread joint filler sand over the pavers then use a hard-bristle brush to sweep the sand into the joints, filling them completely. Run a vibrating plate over the pavers in several directions to compact the sand inside the joints (this action is not appropriate for slabs). Repeat this step (spreading the sand, then compacting) at least two more times. If a vibrating plate compactor cannot be used, tamp the stones with a rubber mallet and make sure the sand is densely packed in the joints.
  2. Using a fine-bristle broom, remove any excess from paver surfaces. Make sure the finished sand level is 1/8 in. lower than the surface of the paver. Using a leaf blower, remove any sand residue from paved surfaces. Depending on the physical layout, it may be more appropriate to remove residue by using a vacuum unit.

3. At a height of 4 feet (1.2m), use a water gun connected to a hose to direct a fine mist (water gun setting: “mist” or equivalent) of water on a specific paver area for 10 to 15 seconds. Wait 3 to 4 minutes (not longer).
4. From a height of 2 feet (.60m), aim the water mist again directly at the paved surface. Mist and rinse simultaneously so as to eliminate any sand residue left on the pavers. Any sand residue should go directly into the paver joints. Wait 3 to 4 minutes (not longer).
5. From a height of 2 feet (.60m) aim the water mist again directly at the paved surface. Again, mist and rinse simultaneously so as to eliminate any joint filler sand residue left on the pavers. The sand residue should go directly into the paver joints. However, stop misting when you see a minimal amount of water retention on the paver joints. **NOTE:** Repeat the directions of steps 3 to 5 for all other areas that have not been misted with water.
6. Use a leaf blower to remove any excess water lying on paver pores and crevices. This blowing action is necessary to help remove any remaining joint filler sand residue that was left on the paver surface from the previous steps.

### 3.6 ADJUSTMENT AND CLEANING

- A. Remove and replace granite pieces which are broken, chipped, stained, or otherwise damaged. Remove and replace units which are misaligned or not to grade or do not match adjoining granite work. Provide new matching units, install as specified and point-up joints, or refill with sand to eliminate evidence of replacement. Repair defective and unsatisfactory joints as required to provide a neat, uniform appearance.
- B. Clean granite work within six days after completion of work, using a clean water and stiff-bristle brushes. Do not use wire brushes, acid type cleaning agents, or other cleaning compounds with caustic or harsh fillers.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 328400

UNDERGROUND IRRIGATION SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1. Section 329300 "Plants" for trees, shrubs, ground covers, and other plants.

1.2 DESCRIPTION OF WORK

- A. The system shall provide 100% coverage and uniformly irrigate all zones and perform as required:

1. The contractor shall provide an underground irrigation system drawing and adhere to these specifications.

- a. Automatic irrigation system including piping, fittings, sprinkler heads, control wire, quick coupler valves, controllers, and accessories.
- b. Excavating and backfilling irrigation system work.
- c. Testing and adjusting of system.
- d. "As – Built" drawings
- e. Winterization – shutdown – spring start-up

2. All work required by the contractor's plans and these specifications shall be accomplished by the Irrigation Contractor even though minor items required may not be specifically mentioned in the above listing.

- B. Drawings: The irrigation layout is diagrammatic. Exact locations of piping, sprinkler heads, valves, and other components shall be by the Contractor. Modifications in the field at time of installation to allow for actual on-site conditions are acceptable. Proper spacing of sprinkler heads will be required to obtain satisfactory coverage. Minor adjustments in the system layout will be permitted to clear fixed obstructions. Any major revisions to the irrigation system shall be submitted in writing to the owner for approval. The final system layout must be acceptable to the owner.

- C. Verification of Plans and Specifications: It shall be the responsibility of the Irrigation Contractor to carefully examine the irrigation zones and specifications relating to this work for completeness, accuracy, and clarity. Any conflict errors or clarifications request shall be immediately brought to the attention of the owner's representative for written interpretation or instructions. No claim for increased compensation for additions, changes, or alterations will be considered unless written authorization is granted by

Owner's representative. Otherwise any additional materials and/or labor due to existing conditions shall be furnished under this contract.

- D. Irrigation Contractor is responsible for obtaining all permits required for installation of this work.
- E. Irrigation contractor to ensure that the general contractor provides required power to irrigation system.

### 1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provide underground irrigation system as a complete unit produced by a single acceptable manufacturer, including heads, valves, controls, and accessories.
- B. Work and materials shall be in accordance with the latest rules, and other applicable state or local laws. Nothing in the Contract Documents is to be construed to permit work not conforming to these codes.
- C. Contractors Qualifications: Bidding contractors shall have a minimum of three years experience in the construction of a job of similar size and complexity.
  - 1. Provide the General Contractor a list of five equivalent, irrigation system installations, performed in the last five years, incorporating the following information:
    - a. Name and address of product.
    - b. Name and address of Owner.
      - 1) Contact person
    - c. Name and address with whom contact was with.
      - 1) Contact person
- D. Requirements of regulatory agencies and utilities:
  - 1. System shall comply with the latest requirements of all state and local codes and ordinances.
  - 2. System shall comply with the latest rules and requirements by all utility companies involved.
  - 3. Nothing in the contract documents is to be constructed to permit work not conforming to these rules, codes and ordinances.
- E. Electrical devices shall carry Underwriter's Laboratory labels.

### 1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for underground irrigation system.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- B. Record Drawings: After completion of the work and before final acceptance, a set of scaled, reproducible record drawings, and two sets of prints showing the location of the complete work shall be submitted to the Owner. Final payment and any retainage will not be released until these drawings are submitted and accepted by the Owner.
- C. Submit a weekly irrigation schedule based on an annual evapotranspiration rate, average rainfall amounts etc.

## 1.5 WARRANTY

- A. The contractor shall furnish a manufacturer's written warranty to the effect that all heads, valves, and controllers will be warranted for a period of no less than one year to be free from defects and faulty workmanship, and that any defective heads, valves, or controllers shall be promptly repaired or replaced without additional cost to the Owner in accordance with that warranty.
- B. All materials other than those referred to in Paragraph A above shall be warranted for a period of one full year from the date of final acceptance by the Owner.
- C. All installation labor used on this project will be warranted for one full year from date of final acceptance by the Owner.

## PART 2 - PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide products of one of the following:
  - 1. Hunter Industries
  - 2. Rain Bird Sprinkler Mfg. Corp.
  - 3. The TORO Co., Irrigation Div.

### 2.2 MATERIALS

- A. Pressure Pipe: Comply with following:
  - 1. Unplasticized PVC pipe, Class 200 SDR21, ASTM D 2241.
    - a. 3" and larger, may be installed with slip joint ring tite seals.
    - b. 2-1/2" and smaller shall be installed using solvent weld joints.
  - 2. Dripper Tubing with Pressure Compensating Emitters
- B. Circuit Pipe (downstream from circuit valves): Comply with following:
  - 1. Unplasticized PVC pipe, Class 200 SDR-21, ASTM D 2241.
  - 2. Virgin Polyethylene tubing, 80-pound minimum N.S.F. approved, ASTM D2239.
- C. Pipe Fittings: Comply with following:

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

1. For PVC plastic pipe, Approved socket fittings to be used with ASTM D2241 pipe and ASTM D2564 solvent cement.
2. For polyethylene (PE) plastic pipe, plastic insert fittings, ASTM D2609.

D. Valves: Manufacturer's standard, of type and size indicated, and as follows:

1. Provide PVC or cast bronze bodies, as called for on plans.
2. Proved pressure regulating valves, if called for on plans.
3. Manual Circuit Valves: Globe valves.
4. Key Operated Valves: Manual valves, fitted for key operation.
  - a. Furnish 2 valve keys, 3 feet long with tee handles and key end to fit valves.
5. Automatic circuit valves: Globe valves operated by low-power solenoid, normally closed, manual flow adjustment.
6. Automatic Drain Valves: Designed to open for drainage when line pressure drops below 3 psi.

E. Backflow Preventer: As required by governing code.

F. Sprinkler Heads: Manufacturer's standard unit designed to provide uniform coverage over entire area of spray shown on drawings at available water pressure, as follows:

1. Bubbler: Fixed pattern, pressure compensating type.
2. Shrubbery: Fixed pattern, pressure compensating type
3. Pop-Up Spray: Fixed pattern, with screw-type flow adjustment or pressure regulating nozzle and stainless steel retraction spring.
4. Pop-Up Rotary Spray: Gear drive, full circle and adjustable part circle type.
5. Pop-Up Rotary Impact: Impact drive, full circle and part circle as indicated.
6. Above Ground Rotary Impact: Impact drive, full circle and part circle as indicated.

G. Valve Box: Industrial Grade Plastic.

H. Valve Cover and Frame: Industrial Grade Plastic.

I. Wiring: UF type single strand wire #14 with white common ground and others color coded.

1. Connections: Suitable moisture proof device; 3M pack or Rain Bird snap type connector.

J. Drainage Backfill: Cleaned gravel or crushed stone, graded from 3" maximum to 3/4" minimum.

## 2.3 AUTOMATIC CONTROL SYSTEM

A. General: Furnish low voltage system manufactured expressly for control of automatic circuit valves of underground irrigation systems. Provide unit of capacity to suit number of circuits as indicated.



The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- B. Exterior Control Enclosure: Manufacturer's standard weatherproof enclosure with locking cover, complying with NFPA 70 (National Electric Code).
- C. Interior Control Enclosure: Manufacturer's standard with locking cover, complying with NFPA 70.
- D. Transformer: To convert building service voltage to control voltage of 24 volts.
- E. Circuit Control: Each circuit variable from approximately 5 to 60 minutes. Include switch for manual or automatic operation of each circuit.
- F. Timing Device: Adjustable, 24-hour and 7 or 14-day clocks to operate any time of day and skip any day in a 7 or 14-day period.
  - 1. Allow for manual or semi-automatic operation without disturbing preset automatic operation.

### PART 3 - EXECUTION

#### 3.1 SYSTEM DESIGN

- A. Design Pressures: As indicated on contractor's drawings, at connection to building system and at last head in circuit.
- B. Location of Heads: As indicated on drawings. Make minor adjustments as necessary to avoid plantings and other obstructions.
- C. Minimum Water Coverage:
  - 1. Turf areas, 100%
  - 2. Planting areas, 100%.
  - 3. Layout may be modified, if necessary to obtain coverage, to suit manufacturer's standard heads. Do not decrease number of heads indicated on contractor's drawings unless otherwise acceptable to Architect/Owners Representative.

#### 3.2 TRENCHING AND BACKFILLING

- A. General: Excavate straight and true with bottom uniformly sloped to low points.
- B. Trench Depth: Excavate trenches to a depth of 3" below invert of pipe, unless otherwise indicated.
- C. Minimum Cover: Provide following minimum cover over top of installed piping:
  - 1. A minimum of 18" cover shall be held over all main lines and lateral lines 1" thru 2" in diameter, and a minimum of 24" of cover for pipe sizes 2-1/2" thru 3" diameter.
  - 2. Pipe sizes between 4" and 6" in diameter should have a minimum of 30" of cover.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- D. Backfill: Backfill with clean material from excavation. Remove organic material as well as rocks and debris larger than 1" diameter. Place acceptable backfill material in 6" lifts, compacting each lift.
- E. Backfill trench to within 6" of finished grade. Continue fill with acceptable topsoil and compact to bring soil level with finished grade.
- F. Replant or replace sod within 7 days after removal, roll and water generously.
- G. Pavements: Where existing pavements must be cut to install irrigation system, cut smoothly to straight lines 6" wider than trench.
  - 1. Excavate trench to required depth and width.
  - 2. Remove cut-out pavement and excavated material from site.
  - 3. At walkways, jack piping under paving material, if possible.
  - 4. Backfill with dry sand fill material, placing in 6-inch lifts.
  - 5. Repair or replace pavement cuts with equivalent materials and finishes.

### 3.3 PULLING PIPE AND WIRE

- A. Contractor may elect to install the irrigation pipe and electrical wire by means of vibratory plow. Starting and finishing holes for his method of installation shall not exceed a 1'-0" by 3'-0" opening. These excavations and other necessary excavations for installation of valves, sprinkler heads, connections, etc., shall be backfilled immediately after work is completed with sand or pea rock to preclude future settlement.

### 3.4 INSTALLATION

- A. General: Unless otherwise indicated, comply with requirements of Uniform Plumbing Code.
- B. Connection to Main: Connect to existing building piping in location indicated.
  - 1. Install new tee, valve, and union.
  - 2. Connect to existing stub. Install new valve and union.
  - 3. Connect to existing stub with union.
- C. Maintain uninterrupted water service to building during normal working hours. Arrange for temporary water shut-off with Architect/Engineer.
- D. Backflow Preventer: Provide union on downstream side. Install approved back flow prevention device as directed by manufacturer and in a manner approved by state and local codes.
- E. Water Hammer Arrester: Install between connection to building main and circuit valves, inside building or in valve box as indicated.
- F. Circuit Valves: Install in valve box, arranged for easy adjustment and removal.
  - 1. Provide union on downstream side.

2. Adjust automatic control valves to provide flow rate or rated operating pressure required for each sprinkler circuit. If an over pressure condition exists, contractor shall install, at his expense, such pressure compensation devices as are necessary to bring the circuit or heads into proper operating range.
- G. Piping: Lay pipe on solid subbase, uniformly sloped without humps or depressions.
1. For circuit piping, slope to drain valve at least 1/2" in 10' or run.
  2. At wall penetrations, pack the opening around pipe with non-shrink grout. At exterior face, leave a perimeter slot approximately 1/2" wide by 3/4" deep. Fill this slot with backer rod and an acceptable elastomeric sealant. Repair below grade waterproofing disturbed by this work and make penetration watertight.
  3. Install PVC pipe in dry weather when temperature is above 40 degrees F in strict accordance with manufacturer's instructions. Allow joints to cure at least 24 hours at temperature above 40 degrees F before testing, unless otherwise recommended by manufacturer.
    - a. Allow joints to cure at least 24 hours at temperature above 40 degrees F before testing, unless otherwise recommended by manufacturer.
- H. Drain Pockets: Excavate to sizes indicated. Backfill with acceptable drain material to 12" below grade. Cover drain material with a sheet of 30-pound Asphalt saturated felt and backfill remainder with excavated material.
- I. Sprinkler Heads: Flush circuit lines with full head of water and install heads after hydrostatic test is completed.
1. Install shrubby heads at heights indicated.
  2. Locate part-circle heads to maintain a minimum distance of 4" from walls and 2" from other boundaries, unless otherwise indicated.
- J. Wiring: Make all wire splices in valve boxes.
- K. Dielectric Protection: Use dielectric fittings at connection where pipes of dissimilar metal are joined.
- L. Closing of Pipe and Flushing Lines: Cap or plug all openings as soon as lines have been installed to prevent the entrance of materials that would obstruct the pipe. Leave in place until removal is necessary for completion of the installation. Thoroughly flush out all main water lines before installing valves. Thoroughly flush out all lateral lines after installation and before attaching heads.
- 3.5 TESTING AND TRAINING
- A. General: Notify Architect/Engineer in writing when testing will be conducted. Conduct tests in presence of Architect/Engineer.
  - B. Hydrostatic Test: Test water piping and valves, before backfilling trenches, to a hydrostatic pressure of not less than 100 psi. Piping may be tested in sections to

expedite work. Remove and repair piping, connections, valves which do not pass hydrostatic testing.

- C. Operational Testing: Perform operational testing after hydrostatic testing is completed, backfill is in place, and sprinkler heads adjusted to final position.
  - 1. Demonstrate to Architect/Engineer that system meets coverage requirements and that automatic controls function properly.
  - 2. Coverage requirements are based on operation of one circuit at a time.
- D. After completion of grading carefully adjust sprinkler heads so they will be flush with or not more than 1/2" above finish grade.
- E. Personnel training
  - 1. Contractor shall be responsible for the training of as many personnel as the Owner shall deem necessary.
  - 2. Contractor shall be responsible for one starting and one winterizing of the system during the appropriate times of the year after final acceptance by the Owner as part of the training of the Owner's personnel.
  - 3. Contractor shall include general troubleshooting and operation of the system with reference to head, valve, and controller operation.
  - 4. Contractor shall furnish a complete operation and maintenance manual to the Owner's personnel. This manual shall include repair parts lists, assembly instructions, troubleshooting guides, programming instructions, and recommended precipitation rates.

### 3.6 ADJUSTMENTS

- A. After completion of grading, seeding or sodding, if applicable, Contractor shall return to the job site to perform any final adjustments to the system, which might be deemed necessary.
- B. The contractor will be responsible for any pressure testing and start up of the system when construction is complete. The contractor will also be responsible for the winterization of the system after the first season of operation.

END SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 329113

PLANTING SOILS

PART 1 - GENERAL

1.1 GENERAL PROVISION

- A. Contract Documents 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 specifies administrative and procedural requirements for manufactured planting soils (planting soils) including, but not limited, to the following:

1. Evaluation of rough subgrade water infiltration.
2. Planting soil material acquisition.
3. Testing and analysis for specification conformance.
4. Inspection and testing of subgrade for preparation of subgrade.
5. Preparation of mixes and testing for conformance.
6. Installation and placement of soils.
7. De-compaction and re-compaction of soils.
8. Final in-place testing of soils.
9. Coordination with other contractors.
10. Clean-up.

1.3 RELATED SECTIONS

- A. The following items of related work are specified and included in other Sections of the Specifications:
  1. Section 328400 "Underground Irrigation System" for irrigation components and installation.
  2. Section 329113.23 "Structural Soil" for structural soil mix and installation.
  3. Section 329300 "Plants" for trees, shrubs, ground covers, and other plants.

1.4 DEFINITIONS

- A. ASA: American Society of Agronomy.

1.5 QUALITY ASSURANCE/DEFINITIONS

- A. Testing/Testing Agency
  1. Refer to Section 014000, Quality Requirements.
  2. Refer to Section 329300 Trees, Plants and Ground Covers

3. Refer to this section, 1.6.B.

#### 1.6 TESTING, SUBMITTALS, MOCK-UPS AND INSPECTIONS

- A. Certificates: Contractor shall submit certification that all soil blend components and all soil blends meet all environmental standards of the State of Ohio for use in residential zones.
- B. Testing for Planting Soil, and: Testing provided by the contractor is required at the following intervals:
  1. Testing of individual base components for all soil mixes. Tests are as described in Section 329113, 1.6.C.
  2. After test results for components have been accepted, create sample mixes of each planting soil mix and perform tests described in Section 329113, 1.6, C.
  3. After the test results for planting soil mixes have been accepted, and during the placement of planting soils, test every 100 cubic yards of soil mix delivered to the job site. Testing applies to all soil layers of the planting profile.
- C. Test Reports: Submit certified reports for tests as described in this Section.
  1. Mechanical gradation (sieve analysis) shall be performed and compared to the USDA Soil Classification System. Percent clay (0.002 mm) shall be reported separately in addition to silt (ASTM D-422-63, hydrometer method).
  2. The silt and clay content shall be determined by a Hydrometer Test of soil passing the #270 sieve.
  3. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium Magnesium, Aluminum, Iron, Manganese, Lead, Cation Exchange Capacity, Soluble Salts, acidity (pH) and buffer pH.
  4. Tests shall be conducted in accordance with Recommended Soil Testing Procedures for the Northeastern United States, 2nd Edition, Northeastern Regional Publication No. 493; Agricultural Experiment Stations of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont and West Virginia; Revised - December 15, 1995. Tests include the following:
    - a. Test for soil Organic Matter by loss of weight on ignition, as described in Northeastern Regional Publication No. 493, p. 59.
    - b. Test for soil CEC by exchangeable acidity method as described in Northeastern Regional Publication No. 493, p. 64.
    - c. Test for soil Soluble Salts shall be by the 1:2 (v:v) soil:water Extract Method as described in Northeastern Regional Publication No. 493, p. 74.
    - d. Test for Buffer pH by the SMP method as described in Northeastern Regional Publication No. 493, p.
  5. Certified reports on analyses from producers of composted organic materials are required, particularly when sources are changed. Analyses will include all tests for criteria specified in 2.01F.
  6. Density Tests: ASTM D1556 Density of Soil and Rock in Place Using Sand Cone

Method. ASTM D698 Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort.

- a. In-place density tests shall be carried out at a rate of one test per 500 square feet for Planting.
7. Testing Agencies: Testing laboratories must be accredited by a laboratory accreditation authority and will be required to submit a copy of the Certificate of Accreditation and Scope of Accreditation. The laboratory's scope of accreditation must include the appropriate ASTM standards (E 329, C 1077, D 3666, D 3740, A 880, E 543) listed in the technical sections of the specifications.
- D. Samples: Prior to ordering the below listed materials, submit representative samples to the Construction Manager and Architect for selection and approval. Do not order materials until Construction Manager's and Architect's approval has been obtained. Delivered materials shall closely match the approved samples.
1. Organic amendment (Compost): duplicate samples of 1 gallon.
  2. Base Loam: duplicate samples of 1 gallon.
  3. Coarse Sand: duplicate samples of 1 gallon.
- E. Sources for Soil Components and Soil Mixes: Submit information identifying sources for all soil components and the firm responsible for mixing of soil mixes.
1. Construction Manager and Architect shall have the right to reject any soil supplier.
  2. Soil mix supplier shall have a minimum of five years experience at supplying custom planting soil mixes.
  3. Submit supplier name, address, telephone and fax numbers and contact name.
  4. Submit certification that accepted supplier is able to provide sufficient quantities of materials and mixes for the entire project.
- F. Inspection:
1. The Contractor shall not place Planting Soil onto subgrade prior to inspection and approval of Architect for compliance. The Contractor shall request inspection before proceeding.
  2. The Contractor shall not plant any plant material prior to inspection and approval of Architect for compliance with soil depth and compaction specifications. The Contractor shall request inspection before proceeding.
- 1.7 DELIVERY, STORAGE AND HANDLING
- A. In addition, the following provision is established: Material shall not be handled or hauled, placed or compacted when it is wet as after a heavy rainfall, early spring or is frozen. Soil shall be handled only when the moisture content is compliant with Section 329113, 1.7.G. The Construction Manager and Architect shall be consulted to determine if the soil is too wet to handle.
  - B. Store and handle packaged materials in strict compliance with manufacturer's

instructions and recommendations. Protect all materials from weather, damage, injury and theft.

- C. Sequence deliveries to avoid delay. On-site storage space is permissible only with written notice from Construction Manager. Deliver materials only after preparations for placement of planting soil have been completed.
- D. Prohibit vehicular and pedestrian traffic on or around stockpiled planting soil.
- E. Soil that is to be stockpiled longer than two weeks, whether on or off site, shall not be placed in mounds greater than six feet high. If soil stockpiles greater than six feet high are present longer than two weeks, then the contractor shall break down and disperse soil so that mounds do not exceed the six-foot height restriction for longer than two weeks.
- F. Vehicular access to the site is restricted. Before construction, the Contractor shall submit for approval a plan showing proposed routing for deliveries and site access.
- G. Soil Moisture Content:
  - 1. Contractor shall not move, blend or grade soil when moisture content is so great that free moisture is apparent, nor when it is so dry that dust will form in the air or that clods will not break readily, nor when it is frozen. Apply water, if necessary, or allow to dry to bring soil moisture between 60% of optimum moisture content and optimum moisture content as determined by ASTM D698 for compaction, grading and plantings.
  - 2. Field Soil Moisture Test:
    - a. Form soil in palm of hand, if soil retains shape and crumbles upon touching, the soil may be worked.
    - b. If the soil will not retain shape it is too dry and should not be worked.
    - c. If the soil retains shape and will not crumble, it is too wet and should not be worked.
    - d. If the soil glistens or free water is observed when the sample is patted in the palm of hand the soil is too wet and should not be worked.

## PART 2 - PRODUCTS

### 2.1 SOIL MATERIALS

- A. General:
  - 1. All plant mix material shall fulfill the requirements as specified and be tested to confirm the specified characteristics.
  - 2. Samples of individual components of soil mixes in addition to blended soil mixes including mulch materials shall be submitted by the Contractor for testing and analysis to the approved testing laboratory. Comply with specific materials requirements specified.
    - a. No base component material or soil components for soil mixes shall be



used until certified test reports by an approved agricultural chemist have been received and approved by the Construction Manager and Architect.

- b. As necessary, make any and all soil mix amendments and resubmit test reports indicating amendments until approved.
3. Construction Manager and Architect may request additional testing by Contractor for confirmation of mix quality and/or soil mix amendments at any time until completion. Changes in mix ratios may be required.

B Soil Testing and Soils Testing Report Submittal:

1. All testing of the soil mix components shall be carried out by the Soils Testing Laboratory. Recommendations for amending and/or correcting the soil mix will be provided to the Contractor by the Soils Testing Laboratory after approval by the Architect.
2. Failure of any material by testing and/or amendment procedure to meet Specification requirements shall require the Contractor to seek another source for the failed material and the initiation of all testing procedures for the new replacement material shall immediately take place.
3. The Contractor shall be responsible for recognizing that these critical project materials warrant timely and serious attention, that the testing process to achieve Approved materials should be considered a lead time item, and that under no circumstance shall failure to comply with all specification requirements be an excuse for “staying on project construction schedule.”

C Soil Samples: Submit 1-gallon planting soil samples in two phases. Submit samples concurrent with horticultural soil test reports in both phases. Submit as phase one, planting soil base components for approval. Only after approval of phase one components, submit as phase two, soil blend mixes / mediums for approval. All reports must be from recent analyses, less than 90 days old, and represent materials that are available for delivery to the site.

1. Phase One Submittals of Planting Soil Base Components:
  - a. Base Loam.
  - b. Organic Amendment Materials (Compost).
  - c. Coarse Sand.
2. Phase Two Submittals of Planting Mediums: mixing and batching of soil mediums to be submitted in the same manner as bulk soils and will be prepared prior to delivery to site.
  - a. Planting Soil.
3. Submit reports for each of the above samples: Submit sample from each proposed source for testing and approval. Deliver samples to the testing laboratory and pay costs. Send report directly to Construction Manager and Architect.
4. Soil Sample Submittals: Sampling shall be done by the Contractor. The size of

the samples and method of sampling shall be as follows: Samples shall be representative of the material to be brought to the site. Each sample shall be a Composite Sample, which consists of 5 separate sub samples taken from a minimum of (5) different locations at each source and mixed together to make the test sample.

5. The Contractor shall schedule this testing in order to permit reasonable time for testing, evaluation, and approvals prior to scheduled installation.

D. Base Loam:

1. Base Loam as required for blending with sand and compost planting shall be a naturally occurring soil formed from geologic soil forming processes without admixtures of sand or organic matter sources (composts). Base Loam, which has been contaminated by incorporation of subsoil shall not be acceptable for use. Base Loam as required for the work shall be free of subsoil, large stones, earth clods, sticks, stumps, clay lumps, roots or other objectionable, extraneous matter or debris. Base Loam shall also be free of quack-grass rhizomes, *Agropyron Repens*, and the nut-like tubers of nutgrass, *Cyperus Esculentus*, and all other primary noxious weeds. Base Loam shall not be delivered or used for planting while in a frozen or muddy condition. Base Loam for mixing shall conform to the following grain size distribution for material passing the #10 sieve:

U.S. Sieve Size Number	Percent Passing	
	Minimum	Maximum
10	---	100
18	85	100
35	70	95
60	50	85
140	36	53
270	32	42
0.002mm	3	6

2. The ratio of the particle size for 80% passing (D80) to the particle size for 30% passing (D30) shall be 8 or less ( $D80/D30 < 8$ ). Maximum size shall be one-inch largest dimension. The maximum retained on the #10 sieve shall be 20% by weight of the total sample. Tests shall be by combined hydrometer and wet sieving in compliance with ASTM D422 after destruction of organic matter by ignition. The organic content shall be between 4.0 and 8.0 percent by weight.
3. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium Magnesium, Aluminum, Iron, Manganese, Lead, Cation Exchange Capacity, Soluble Salts, acidity (pH) and buffer pH.

E. Coarse Sand:

1. Sand for Planting Soil shall be uniformly graded medium to coarse sand consisting of clean, inert, rounded to sub-angular grains of quartz or other durable rock free from loam or clay, mica, surface coatings and deleterious materials with the following grain size distribution for material passing the #10 sieve:

U.S. Sieve Size Number	Percent Passing	
	Minimum	Maximum
10	100	--
18	60	80
35	25	45
60	8	20
140	0	8
270	0	3
0.002mm	0	0.5

2. Maximum size shall be one-inch largest dimension. The maximum retained on the #10 sieve shall be 20% by weight of the total sample.
3. The ratio of the particle size for 70% passing (D70) to the particle size for 20% passing (D20) shall be 3.0 or less ( $D70/D20 < 3.0$ ). Tests shall be by combined hydrometer and wet sieving in compliance with ASTM D422.
4. pH shall be less than 7.5.

F. Leaf Yard Waste Compost (Organic Amendment):

1. Organic Matter for amending planting soils shall be a stable, humus-like material produced from the aerobic decomposition and curing of Leaf Yard Waste Compost, composted for a minimum of one year (12 months). The leaf yard waste compost shall be free of debris such as plastics, metal, concrete or other debris. The leaf yard waste compost shall be free of stones larger than 3/8", larger branches and roots. Wood chips over 1" in length or diameter shall be removed by screening. The compost shall be a dark brown to black color and be capable of supporting plant growth with appropriate management practices in conjunction with addition of fertilizer and other amendments as applicable, with no visible free water or dust, with no unpleasant odor, and meeting the following criteria as reported by laboratory tests.
  - a. The ratio of carbon to nitrogen shall be in the range of 12:1 to 25:1.
  - b. Stability shall be assessed by the Solvita procedure. Protocols are specified by the Solvita manual (version 4.0). The compost must achieve a maturity index of 6 or more as measured by the Solvita scale. Stability tests

- shall be conducted by Woods End Research Laboratory, Mt. Vernon, Maine.
- c. Pathogens/Metals/Vector Attraction reduction shall meet 40 CFR Part 503 rule, Table 3, page 9392, Vol. 58 No. 32, and Commonwealth of Massachusetts 310 CMR 32.00 (for applications to soils with human activity).
  - d. Organic Content shall be at least 20 percent (dry weight). One hundred percent of the material shall pass a 3/8-inch (or smaller) screen. Debris such as metal, glass, plastic, wood (other than residual chips), asphalt or masonry shall not be visible and shall not exceed one percent dry weight. Organic content shall be determined by weight loss on ignition for particles passing a number 10 sieve according to procedures performed by the West Experiment Station at the University of Massachusetts, Amherst or equal as follows. A 50-cc sub-sample of the screened and mixed compost is ground to pass the number 60 sieve. Two to three grams (+ 0.001g) of ground sample, dried to a constant weight at 105 degrees C is placed into a muffle furnace. The temperature is slowly raised (5C/minute) to 450C and maintained for three hours. The sample is removed to an oven to equilibrate at 105C and the weight is taken. Organic matter is calculated as loss on ignition.
  - e. pH: The pH shall be between 6.5 to 7.4 as determined from a 1:1 soil-distilled water suspension using a glass electrode pH meter American Society of Agronomy *Methods of Soil Analysis*, Part 2, 1986.
  - f. Salinity: Electrical conductivity of a one to five soil to water ratio extract shall not exceed 2.5 mmhos/cm (dS/m).
  - g. The compost shall be screened to 3/8-inch maximum particle size and shall contain no more that 3 percent material finer than 0.002mm as determined by hydrometer test on ashed material.
  - h. Nutrient content shall be determined by the University of Massachusetts Soil Testing Laboratory or equivalent laboratory and utilized to evaluate soil-required amendments for the mixed soils. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Aluminum, Magnesium, Iron, Manganese, Lead, Soluble Salts, Cation Exchange Capacity, soil reaction (pH), and buffer pH.

## 2.2 PLANTING SOIL MIXES

- A. Uniformly mix ingredients by windrowing/tilling on an approved hard surface area or by alternately processing materials through a screening plant. All soil components and Organic Amendment shall be maintained moist, not wet, during mixing. Amendments shall not be added unless approved to extent and quantity by the owner and additional tests have been conducted to verify type and quantity of amendment is acceptable. Percentages of components, unless otherwise noted, will be established upon completion of individual test results for components of the various mixes.
- B. After component percentages are determined by the Testing Laboratory, each planting soil mix shall be tested for physical and chemical analysis. Component percentages may be modified at any time by the Architect dependent upon the results of testing of the various components or final blends.

C. Planting Soil:

1. Planting Soil shall consist of a combination of approximately equal parts by volume: Coarse Sand(S), Base Loam (L) and Organic Amendment (C) (1S:1L:1C). The following gradation for material passing a Number 10 Sieve shall be achieved in the final mix.

U.S. Sieve Size No.	Percent Passing	
	Minimum	Maximum
10	100	
18	85	95
35	60	85
60	42	65
140	21	44
270	18	24
0.002 mm	2	4

2. Maximum size shall be one half-inch largest dimension. The maximum retained on the #10 sieve shall be 10% by weight of the total sample. The ratio of the particle size for 80% passing (D80) to the particle size for 30% passing (D30) shall be 6 or less ( $D_{80}/D_{30} < 6$ ). The final mix shall have an organic content between 5 and 7 percent by weight. The final mix shall have a hydraulic conductivity of no less than 1.5 inches per according to test procedure ASTM D5856-95 (2000) hour when compacted to a minimum of 86 percent Standard Proctor ASTM D 698. Tests shall be by combined hydrometer and wet sieving in compliance with ASTM D422 after destruction of organic matter by ignition.
3. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium Magnesium, Aluminum, Iron, Manganese, Lead, Cation Exchange Capacity, Soluble Salts, acidity (pH) and buffer pH.

PART 3 - EXECUTION

3.1 PRE-INSTALLATION EXAMINATION AND PREPARATION

- A. Reference Other Sections as necessary.
- B. Coordinate activities with other project contractors so that there is no soil disturbance from traffic or other construction activities subsequent to placement.
- C. Pre-Installation Examination Required: The Contractor shall examine previous work, related work, and conditions under which this work is to be performed and shall notify Architect in writing of all deficiencies and conditions detrimental to the proper completion of this work. Beginning work means Contractor accepts substrates,

previous work, and conditions. The Contractor shall not place any planting soil until all work in adjacent areas is complete and approved by the Architect.

- D. Examination of Subgrade: The subgrade shall be examined by the Contractor prior to the start of soil placement and planting. Any deficiencies shall be noted and related to the Architect in writing prior to acceptance of the subgrade by the Landscape Contractor. Deficiencies include, but shall not be limited to the following:
1. Construction debris present within the planting areas.
  2. The subgrade is at incorrect depths for installing the designed soil profile and drainage layer.
  3. Incomplete irrigation and/or subsurface drainage installation.
  4. Subgrade de-compacted and re-compacted according to Section 329113, 3.3.B.
  5. Subgrade must infiltrate water at the rate of at least one inch per hour.
- E. Planting Soil Preparation: Refer to Section 329113, 2.2 for planting soil and mixtures. Examine soil and remove foreign materials, stones and organic debris over 1/2" in size. Mix-in fertilizers and amendments as required by tests and as approved by the Architect. All preparation and mixing shall be accomplished when the soil moisture content is compliant with Section 329113, 1.7.G and at a moisture content approved by the Architect. If lime is to be added, it shall be mixed with dry soil before fertilizer is added and mixed.

### 3.2 MIXING OF PLANTING SOIL MIXES

- A. Soil blends shall be produced with equipment that blends together each component in a thorough and uniform manner.

### 3.3 BACKFILLING OF PLANTING SOIL

- A. Soil Placement Preparation:

1. Verify that the plumbing for the irrigation system has been installed and accepted.
2. Verify that the underdrainage system has been installed and accepted.
3. Notify the Architect of soil placement operations at least seven (7) calendar days prior to the beginning of work.
4. The plant stock shall be placed simultaneously with the planting soil as described in Section 3.3 C. The Architect will stake trees and shrubs during placement of the planting soil.
5. Verify that the subgrade passes the minimum water infiltration requirement.

- B. Subgrade De-compaction and Re-compaction

1. In areas on-grade, the subgrade shall be de-compacted with excavator or backhoe to depth of 12 inches. The Contractor shall re-compact subgrade to between 90 and 92% Standard Proctor.
2. De-compaction and re-compaction shall occur just prior to placement of drainage layer and after all wheeled vehicles have been excluded from area.
3. Moisture content must be compliant with Section 329113, 1.7.G.

C. Placement of Planting Soil:

1. Placement of Planting Soil and plant stock shall be carried out simultaneously to prevent excessive traffic over soil lifts and the final grade so as to prevent the creation of undesirable soil compaction. The contractor shall install plants simultaneously with the installation of the lower soil layers. The upper soil layers shall not be installed before all plants are installed and before the acceptance by the Architect.
2. Planting Soil shall be placed in lifts not to exceed 8 inches in thickness and compacted to meet minimum and maximum requirements as specified below:
  - a. Planting Soil shall be compacted to between 84 and 86 percent Standard Proctor.
  - b. In all cases, the soil being placed shall be in a dry to damp condition. No wet soils shall be placed. All testing of in-place density for planting materials shall be made according to ASTM D1556.
3. Prevention of compacted soils can be accomplished by beginning the work in corner, against walls, or the center of isolated beds, and progressing outwards towards the borders.
4. Planting Soils shall never be moved or worked when wet or frozen.
5. The Contractor shall place barricades as required to prevent any unnecessary compaction of planting soil from vehicles, equipment, or pedestrian traffic.

3.4 PROTECTION

- A. Protect newly graded areas from traffic, freezing and erosion. Keep free of trash, debris or construction materials from other work.
- B. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or compaction due to subsequent construction operations or weather conditions. Scarify or remove and replace material to a depth as directed by the Architect; reshape and re-compact at optimum moisture content to the required density.
- C. Where settling occurs, before final acceptance or during the warranty period, remove finish surfacing, backfill with additional approved material, compact to specified rates, and restore any disturbed areas to a condition acceptable to the Owner.

3.5 COORDINATION AND EXCESS MATERIALS

- A. Coordinate activities with other project contractors so that there is no soil disturbance from traffic or other construction activities subsequent to placement.
- B. Excess Planting Soil Mixtures and Materials: Remove the excess planting soil mixture and materials from the site at no additional cost to the Owner unless otherwise requested.

3.6 POST-INSTALLATION TESTING

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- A. In-place density testing is required in all areas. Planting Soils may be tested by the test methods below.
- B. Acceptable Density Test Methods: ASTM D1556 Density of soil and rock in place using Sand Cone Method", ASTM D6398-10 Nuclear Methods or ASTM D2167-08 Rubber Balloon method. ASTM D698 Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort.

END OF SECTION



DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 329113.23

STRUCTURAL SOIL

PART 1 - GENERAL

1.1 SUMMARY

- A. The work of this Section consists of all Structural Soil work and related items as indicated on the Drawings or as specified herein and includes, but is not limited to the following:

CU-Soil™ is a proprietary material patented by Cornell University (US Patent #5,849,069) and marketed under the registered trademark, CU-Structural Soil®. Only licensed companies are authorized to produce this material, meeting the specifications described in this text. For a list of licensed CU Soil™ producers, call AMEREQ, INC. at 800-832-8788.

- B. Related Sections:

1. Section 329113 “Planting Soils” for plant soil mix and installation.
2. Section 329300 “Plants” for installation of plant material.

1.2 REFERENCES AND STANDARDS

- A. The following references are used herein and shall mean:

1. AOAC: Association of Official Agricultural Chemists.
2. ASTM: American Society of Testing Materials.
3. ASHTO: American Association of State Highway and Transportation Officials.
4. Standard Specifications: Regional or Municipal Standard Specifications Documentation for the location of proposed usage.
5. USDA: United States Department of Agriculture.

1.3 SAMPLES AND SUBMITTALS

- A. At least 30 days prior to ordering materials, the Contractor shall submit to the Architect, representative samples, certificates, manufacturer’s literature and certified tests for materials specified below. No materials shall be ordered until the required samples, certificates, manufacturer’s literature and test results have been reviewed and approved by the Architect. Delivered materials shall closely match the approved samples. Approval shall not constitute final acceptance. The Architect reserves the right to reject, on or after delivery, any material that does not meet these specifications.

- B. Submit 2 - one half cubic foot representative samples of Clay Loam and 2 - two cubic foot representative samples Structural Soil mixes in this section for testing, analysis and approval. Submit one set of samples for every 500 CY of material to be delivered. In the event of multiple source fields for Clay Loam, submit a minimum of one set of

samples per source field or stockpile. Samples shall be taken randomly throughout the field or stockpile at locations as directed by the Architect and packaged in the presence of the Architect. Contractor shall deliver all samples to testing laboratories and shall have the test results sent directly to the Architect. Samples shall be labeled to include the location of the source of the material, the date of the sample and the Contractors name. One of the two samples is to be used by the testing laboratory for testing purposes. The second sample of all Clay Loam and Structural Soil shall be submitted to the Architect at the same time as test analysis as a record of the soil color and texture.

1. Submit the locations of all source fields for Clay Loam.
  2. Submit a list of all chemicals and herbicides applied to the Clay Loam for the last five years and a list of all crops grown in the Clay Loam source fields for the last three years.
- C. Submit soil test analysis reports for each sample of Clay Loam and Structural Soil from an approved soil-testing laboratory. The test results shall report the following:
1. The soil testing laboratory shall be approved by the Architect. The testing laboratory for particle size and chemical analysis may be a public agricultural extension service agency or agricultural experiment station.
  2. Submit a mechanical analysis of the sample and particle size analysis including the following gradient of mineral content:

USDA Designation	Size in mm
Gravel	+2mm.
Sand	0.05 -2 mm.
Silt	0.002-0.05 mm.
Clay minus	0.002 mm.

Sieve analysis shall be performed and compared to USDA Soil Classification System.

Sieve analysis shall be done by a combined hydrometer and wet sieving using sodium hexametaphosphate as a dispersant in compliance with ASTM D422 after destruction of organic matter by hydrogen peroxide.

3. Submit a chemical analysis, performed in accordance with current AOAC Standards, including the following:
  - a. pH and Buffer pH.
  - b. Percent organic matter as determined by the loss of ignition of oven dried samples. Test samples shall be oven dried to a constant weight at a temperature of 230 degrees F, plus or minus 9 degrees.
  - c. Analysis for nutrient levels by parts per million including nitrate nitrogen, ammonium nitrogen, phosphorus, potassium, magnesium, manganese, iron, zinc, calcium and extractable aluminum. Nutrient test shall include the testing laboratory recommendations for supplemental additions to the soil

- as calculated by the amount of material to be added per volume of soil for the type of plants to be grown in the soil.
- d. Analysis for levels of toxic elements and compounds including arsenic, boron, cadmium, chromium, copper, lead mercury, molybdenum, nickel, zinc and PCB. Test results shall be cited in milligrams per kilogram.
  - e. Soluble salt by electrical conductivity of a 1:2 soil water sample measured in Millimho per cm.
  - f. Cation Exchange Capacity (CEC).
  - g. Carbon/Nitrogen Ratio.
4. Submit 5-point minimum moisture density curve AASHTO T 99 test results for each Structural Soil sample without removing oversized aggregate.
  5. Submit California Bearing Ratio test results for each Structural Soil sample compacted to peak standard density. The soaked CBR shall equal or exceed a value of 50.
  6. Submit measured dry-weight percentage of stone in the mixture.
  7. The approved Structural Soil samples shall be the standard for each lot of 500 cubic yards of material.
  8. All testing and analysis shall be at the expense of the Contractor.
- D. Maintenance Instructions: Prior to the time of Final Acceptance of the Work, submit maintenance instructions for the use, removal and replacement of Structural Soil for the licensor's (Amereq Corp.) use. The instructions shall be reviewed by the Architect as a pre-condition for Final Acceptance of the Work.
- E. Submit to the Architect for review a proposed plan and vertical section layout of all Structural Soil.
- F. Submit one cubic foot sample per each 500 cubic yards of required material, and for each sample, the following analysis for all Crushed Stone. The soil testing laboratory shall be approved by the Architect.
1. Provide a particle size analysis including the following gradient of mineral content:

USDA Designation	Size in mm
3	+76mm.
2-1/2	63-76mm
2	50-63mm
1-1/2	37-50mm
1	25-37mm
3/4	19-25mm
Fine gravel	2-19mm.
Sand	0.05 -2 mm
Silt	0.002-0.05 mm
Clay	minus 0.002 mm.

2. Provide the manufacturers analysis of the following: a. Loose and rodded unit weight.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- a. Bulk specific gravity and absorbency.
  - b. Stone dimension and surface texture description.
  - c. Documentation of acceptance for use as DOT approved aggregate by the appropriate regional DOT.
3. Losses from LA Abrasion tests not to exceed 40%.
  4. Minimum 90% with 2 or more fractured faces.
  5. Provide a percent pore space analysis defined as follows:
    - a.  $(I\text{-Rodded Unit Weight divided by the Bulk Specific (gravity)} \times 10)$ .
- G. Submit one-pound sample of each type of fertilizer and 3 certificates showing composition and analysis. Submit the purchasing receipt for each fertilizer showing the total quantity purchased for the project prior to installation.
- H. Submit the Landscape or Pavement Material Contractor's qualifications outlining projects of similar quality, schedule requirements and construction detailing over the last 5 years. Qualifications shall include: The names of all similar projects, year completed, location, description of the scope of work including the types and quantities of planting mix / pavement material installed and the name, address and telephone number of the owner or the owner's representative.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver or place soils in frozen, wet, or muddy conditions. Material shall be delivered at or near optimum compaction moisture content as determined by AASHTO T 99 (ASTM D 698). Do not deliver or place materials in an excessively moist condition (beyond 2 percent above optimum compaction moisture content as determined by AASHTO T 99 (ASTM D 698).
- B. Protect soils and mixes from absorbing excess water and from erosion at all times. Do not store materials unprotected from large rainfall events. Do not allow excess water to enter site prior to compaction. If water is introduced into the material after grading, allow material to drain or aerate to optimum compaction moisture content.

#### 1.5 EXAMINATION OF CONDITIONS

- A. All areas to receive Structural Soil shall be inspected by the Contractor before starting work and all defects such as incorrect grading, compaction and inadequate drainage etc. shall be reported to the Architect prior to beginning this work.
- B. The Contractor shall be responsible for judging the full extent of work requirements involved, including but not limited to the potential need for temporary storage and staging of soils, including moving soil stock piles at the site to accommodate scheduling of other work and the need to protect installed soils from compaction, erosion and contamination.

#### 1.6 QUALITY ASSURANCE

- A. Qualifications of Landscape or Pavement Material Contractor: The work of this section shall be performed by a Landscape Contracting firm which has a minimum of 5 years

experience successfully installing planting mix of a similar quality, schedule requirement and construction detailing to this project. Proof of this experience shall be submitted as per paragraph, SAMPLES AND SUBMITTALS, of this Section.

## PART 2 - PRODUCTS

### 2.1 CLAY LOAM

- A. Clay Loam shall be a "loam" based on the "USDA classification system" as determined by mechanical analysis (ASTM 0-422) and it shall be of uniform composition, without admixture of subsoil. It shall be free of stones greater than one-half inch, lumps, plants and their roots, debris and other extraneous matter over one inch in diameter or excess of smaller pieces of the same materials as determined by the Architect. It shall not contain toxic substances harmful to plant growth. It shall be obtained from naturally well-drained areas, which have never been stripped of top soil before and have a history of satisfactory vegetative growth. Clay Loam shall contain not less than 2% or more than 5% organic matter as determined by the loss on ignition of oven-dried samples. Test samples shall be oven-dried to a constant weight at a temperature of 230 degrees F., plus or minus 9 degrees.

- B. Mechanical analysis for a Loam / Clay Loam shall be as follows:

Textural Class	% of total weight.
Gravel	less than 5%
Sand	20 – 45%
Silt	20 – 50%
Clay	20- 40%

- C. Chemical analysis: Meet or be amended to meet the following criteria.

1. pH between 5.5 to 6.5.
2. Percent organic matter 2 -5% by dry weight.
3. Nutrient levels as required by the testing laboratory recommendations for the type of plants to be grown in the soil.
4. Toxic elements and compounds below the United States Environmental Protection Agency Standards for Exceptional Quality sludge or local standard; whichever is more stringent.
5. Soluble salt less than 1.0 Millimho per cm.
6. Cation Exchange Capacity (CEC) greater than 10
7. Carbon/Nitrogen Ratio less than 33:1.

- D. Loam or Clay Loam shall be the product of a commercial processing facility specializing in production of stripped natural topsoil. No topsoil shall come from USDA - classified prime farmland.

### 2.2 FERTILIZER

- A. Commercial fertilizer complying with State and United States fertilizer laws. Deliver fertilizer in original unopened containers, which shall bear the manufacturer's certificate of compliance covering analysis, which shall be furnished to the Architect. Fertilizer

shall be formulated for mixing into the soil and be certified by the manufacturer to provide controlled release of nitrogen continuously for a period of no less than 9 months and no more than 12 months.

- B. Fertilizer percentages of weight of ingredients and application rates shall be as recommended by the soil testing results.

### 2.3 SULFUR

- A. Sulfur, if required, shall be commercial granular, 96% pure sulfur, delivered in containers with the name of the manufacturer, material and analysis appearing in the container.
- B. Sulfur used to lower soil pH above 6.5 shall be ferrous sulfate formulation.
- C. Application rates shall be dependent on soil test results.

### 2.4 LIME

- A. Agricultural limestone, if required, containing a minimum of 85% carbonates. Minimum gradation: 100% passing 10 mesh sieve; 98% passing 20 mesh sieve; 55% passing 60 mesh sieve and 40% passing 100 mesh sieve.

### 2.5 CRUSHED STONE

- A. Crushed Stone shall be a DOT certified crushed stone. Granite and limestone have been successfully used in this application. 90-100 percent of the stone should pass the 1.5-inch sieve; 20-55 percent should pass the 1.0-inch sieve; and 10 percent should pass the 0.75-inch sieve. A ratio of nominal maximum to nominal minimum particle size of 2 is required.
- B. Acceptable aggregate dimensions will not exceed 2.5:1.0 for any two dimensions chosen.
- C. Minimum 90 percent with one fractured face, minimum 75 percent with two or more fractured faces.
- D. Results of Aggregate Soundness Loss test shall not exceed 18 percent.
- E. Losses from LA Abrasion tests shall not exceed 40%.

### 2.6 HYDROGEL

- A. Hydrogel shall be a potassium propenoate-propenamamide copolymer (Gelscape® Hydrogel Tackifier) as manufactured by Amereq, Inc. 800-832-8788, or approved equal.

### 2.7 WATER

- A. The Contractor shall be responsible to furnish his own supply of water to the site at no extra cost. All work injured or damaged due to the lack of water, or the use of too much

water, shall be the Contractor's responsibility to correct. Water shall be free from impurities injurious to vegetation.

2.8 STRUCTURAL SOIL

- A. A uniformly blended mixture of Crushed Stone, Clay Loam and Hydrogel, mixed to the following proportion:

Material	Unit of Weight
Crushed Stone	100 units dry weight
Loam	as determined by the test of the mix (Approx. 20 units)
Hydrogel	0.035 units dry weight
Total moisture	AASHTO T-99/ASTM D698 optimum moisture

- B. The initial mix design for testing shall be determined by adjusting the ratio between the Crushed Stone and the Clay loam. Adjust final mix dry weight mixing proportion to decrease soil in mixture if CBR test results fail to meet acceptance (CBR # 50).

PART 3 - EXECUTION

3.1 MIX DESIGN

- A. Prepare sample Structural Soil mixes to determine the ratio of mix components. Submit for approval.
1. Submit samples and the test results of each mix component for approval. Based on samples and the analysis of the mix components, the Architect and the Contractor will jointly determine a mix ratio to be tested for conformance with the requirements of the specifications. For Structural Soil quantities greater than 500 cubic yards, test the mix ratio for each Clay Loam or Crushed Stone where the testing indicates a significant difference in physical analysis of the Clay Loam or Crushed Stone as determined by the Architect.
  2. The Contractor shall prepare the samples of the proposed mix ratio options and obtain soil test as described in above. Submit the samples of each of the mixes with the test results.
  3. The Architect may request additional Structural Soil mix ratio samples to be tested in the event that further refinement of the mix is necessary.
  4. Submit to the Architect proposed fertility amendment recommendations including amounts and types of fertilizers and pH adjustments for each mix ratio. Fertility adjustments shall be included as part of the mixing process.

3.2 SOIL MIXING AND QUALITY CONTROL TESTING

- A. All Structural Soil mixing shall be performed at the Contractor's yard using appropriate soil measuring, mixing and shredding equipment of sufficient capacity and capability to assure proper quality control and consistent mix ratios. No mixing of Structural Soil at the project site shall be permitted. Portable pugging may be used.

1. Maintain adequate moisture content during the mixing process. Soils and mix components shall easily shred and break down without clumping. Soil clods shall easily break down into a fine crumbly texture. Soils shall not be overly wet or dry. The contractor shall measure and monitor the amount of soil moisture at the mixing site periodically during the mixing process.
  2. A Mixing procedure for front-end loader shall be as follows:
    - a. On a flat asphalt or concrete paved surface, spread an 8 inch to 12-inch layer of crushed stone.
    - b. Spread evenly over the stone the specified amount of dry Hydrogel.
    - c. Spread over the dry Hydrogel and crushed stone a proportional amount of clay loam according to the mix design.
    - d. Blend the entire amount by turning, using a front-end loader or other suitable equipment until a consistent blend is produced.
    - e. Add moisture gradually and evenly during the blending and turning operation as required to achieve the required moisture content. Delay applications of moisture for 10 minutes prior to successive applications. Once established, mixing should produce a material within 1 % of the optimum moisture level for compaction.
  3. A pugging operation mixing procedure may be as follows:
    - a. Feed a known weight of crushed stone into the mixing trough.
    - b. Add Hydrogel as a slurry into trough and mix slurry and stone into a uniform blend.
    - c. Meter in soil in proper proportion of Clay loam Soil while stone-slurry mixture is in motion.
    - d. Add water to bring mixture to target moisture content after factoring in water from the slurry and the Clay-loam moisture.
    - e. Auger out to stock pile or transport vehicle (or into pit if using a portable pugging operation).
  4. Add soil amendments to alter soil fertility including fertilizers and pH adjustment at the time of mixing at the rates recommended by the soil test.
    - a. Soil pH shall be adjusted to fall within a value of 5.5 and 6.5 two months after mixing if the material is stored, unless mixing with a high pH stone. Once pavement is laid, no adjustment should be imposed.
    - b. Soil component Carbon / nitrogen ratio shall be adjusted to be less than 33: 1 within two months after mixing.
- B. The Contractor shall mix sufficient material in advance of the time needed at the job site to allow adequate time for final quality control testing as required by the progress of the work. Structural Soil shall be stored in piles of approximately 500 cubic yards and each pile shall be numbered for identification and quality control purposes. Storage piles shall be protected from rain and erosion by covering with plastic sheeting.
- C. During the mixing process, the Contractor shall take two - one cubic foot quality control samples per 500 cubic yards of production from the final Structural Soil. The samples shall be taken from random locations in the numbered stockpiles as required herein.



Each sample shall be tested for particle size analysis and chemical analysis as described above. Submit the results directly to the Architect for review and approval.

- D. The quality control sample Clay Loam-Crushed Stone ratio shall be no greater or less than 2% of the approved test sample as determined by splitting a known weight of oven dried material on a #4 sieve. In the event that the quality control samples vary significantly from the approved Structural Soil sample, as determined by the Architect, remix and retest any lot of soil that fails to meet the correct analysis making adjustments to the mixing ratios and procedures to achieve the approved consistency.

### 3.3 UNDERGROUND UTILITIES AND SUBSURFACE CONDITIONS

- A. Notify the Architect of any subsurface conditions which will affect the Contractor's ability to complete the work.
- B. Locate and confirm the location of all underground utility lines and structures prior to the start of any excavation.
- C. Repair any underground utilities or foundations damaged by the Contractor during the progress of this work. The cost of all repairs shall be at the Contractor's expense.

### 3.4 SITE PREPARATION

- A. Do not proceed with the installation of the Structural Soil material until all walls, curb footings and utility work in the area have been installed. For site elements dependent on Structural Soil for foundation support, postpone installation until immediately after the installation of Structural Soil.
- B. Install subsurface drain lines as shown on the Drawings prior to installation of Structural Soil materials.
- C. Excavate and compact the proposed sub-grade to depths, slopes and widths as shown on the Drawings. Maintain all required angles of repose of the adjacent materials as shown on the drawings. Do not over excavate compacted sub-grades of adjacent pavement or structures.
- D. Confirm that the sub-grade is at the proper elevation and compacted as required. Sub-grade elevations shall slope parallel to the finished grade and or toward the subsurface drain lines as shown on the drawings.
- E. Clear the excavation of all construction debris, trash, rubble and any foreign material. In the event that fuels, oils, concrete washout silts or other material harmful to plants have been spilled into the sub-grade material, excavate the soil sufficiently to remove the harmful material. Fill any over excavation with approved fill and compact to the required sub-grade compaction.
- F. Do not proceed with the installation of Structural Soil until all utility work in the area has been installed. All subsurface drainage systems shall be operational prior to installation of Structural Soils.

- G. Protect adjacent walls, walks and utilities from damage or staining by the soil. Use 1/2" plywood and or plastic sheeting as directed to cover existing concrete, metal and masonry work and other items as directed during the progress of the work.
  - 1. Clean up all trash and any soil or dirt spilled on any paved surface at the end of each working day.
  - 2. Any damage to the paving or architectural work caused by the soils installation Contractor shall be repaired by the general Contractor at the soils installation Contractor's expense.
- H. Maintain all silt and sediment control devices required by applicable regulations. Provide adequate methods to assure that trucks and other equipment do not track soil from the site onto adjacent property and the public right of way.

### 3.5 INSTALLATION OF STRUCTURAL SOIL MATERIAL

- A. Install Structural Soil in 6-inch lifts and compact each lift.
- B. Compact all materials to peak dry density from a standard AASHTO compaction curve (AASHTO T 99). No compaction shall occur when moisture content exceeds maximum as listed herein. Delay compaction 24 hours if moisture content exceeds maximum allowable and protect Structural Soil during delays in compaction with plastic or plywood as directed by the Architect.
- C. Bring Structural Soils to finished grades as shown on the Drawings. Immediately protect the Structural Soil material from contamination by toxic materials, trash, debris, water containing cement, clay, silt or materials that will alter the particle size distribution of the mix with plastic or plywood as directed by the Architect.
- D. The Architect may periodically check the material being delivered and installed at the site for color and texture consistency with the approved sample provided by the Contractor as part of the submittal for Structural Soil. In the event that the installed material varies significantly from the approved sample, the Architect may request that the Contractor test the installed Structural Soil. Any soil which varies significantly from the approved testing results, as determined by the Architect, shall be removed and new Structural Soil installed that meets these specifications.
- E. Structural Soil shall not be stockpiled long-term. Any Structural Soil not installed immediately shall be protected by a tarp or other waterproof covering.

### 3.6 FINE GRADING

- A. After the initial placement and rough grading of the Structural Soil, but prior to the start of fine grading, the Contractor shall request review of the rough grading by the Architect. The Contractor shall set sufficient grade stakes for checking the finished grades.
- B. Adjust the finish grades to meet field conditions as directed.
  - 1. Provide smooth transitions between slopes of different gradients and direction.
  - 2. Fill all dips and remove any bumps in the overall plane of the slope.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- a. The tolerance for dips and bumps in Structural Soil areas shall be a 3" deviation from the plane in 10'.
- 3. All fine grading shall be inspected and approved by the Architect prior to the installation of other items to be placed on the Structural Soil.
- C. The Architect will inspect the work upon the request of the Contractor. Request for inspection shall be received by the Architect at least 10 days before the anticipated date of inspection.

### 3.7 ACCEPTANCE STANDARDS

- A. The Architect will inspect the work upon the request of the Contractor. Request for inspection shall be received by the Architect at least 10 days before the anticipated date of inspection.

### 3.8 CLEANUP

- A. Upon completion of the Structural Soil installation operations, clean areas within the contract limits. Remove all excess fills, soils and mix stockpiles and legally dispose of all waste materials, trash and debris. Remove all tools and equipment and provide a clean, clear site. Sweep, do not wash, all paving and other exposed surfaces of dirt and mud until the paving has been installed over the Structural Soil material. Do no washing until finished materials covering Structural Soil material are in place.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 329300

PLANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Plants.
- 2. Tree stabilization.
- 3. Aeration.

- B. Related Requirements:

- 1. Section 328400 “Underground Irrigation System” for irrigation components and installation.
- 2. Section 329113 “Planting Soils” for plant soil mix and installation.
- 3. Section 329113.23 “Structural Soils” for structural soil mix and installation.

1.3 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with a ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.
- C. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.
- D. Finish Grade: Elevation of finished surface of planting soil.
- E. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides,

rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.

- F. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- G. Planting Area: Areas to be planted.
- H. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 329113 "Planting Soils."
- I. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
- J. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.
- K. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.
- L. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

#### 1.4 COORDINATION

- A. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.
  - 1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

#### 1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

#### 1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 20 plants are required, include a minimum of three

photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

- B. Samples for Verification: For each of the following:
1. Organic Mulch: 1-quart volume of each organic mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.
  2. Weed Control Barrier: 12 by 12 inches.
  3. Tree stabilization: One sample of tree anchors.

#### 1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.
- B. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:
1. Manufacturer's certified analysis of standard products.
  2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
- C. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.
- D. Sample Warranty: For special warranty.

#### 1.8 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before expiration of required maintenance periods.

#### 1.9 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful establishment of plants.
1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
  2. Experience: Five years' experience in landscape installation in addition to requirements in Section 014000 "Quality Requirements."

3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
  4. Personnel Certifications: Installer's field supervisor shall have certification in all of the following categories from the Professional Landcare Network:
    - a. Landscape Industry Certified Technician - Exterior.
    - b. Landscape Industry Certified Horticultural Technician.
  5. Pesticide Applicator: State licensed, commercial.
- B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.
- C. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.
1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container-grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.
  2. Other Plants: Measure with stems, petioles, and foliage in their normal position.
- D. Plant Material Observation: Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Architect may also observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and may reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.
1. Notify Architect of sources of planting materials seven days in advance of delivery to site.
- 1.10 DELIVERY, STORAGE, AND HANDLING
- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws if applicable.
- B. Bulk Materials:
1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
  2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
  3. Accompany each delivery of bulk materials with appropriate certificates.

- C. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.
- D. Handle planting stock by root ball.
- E. Store bulbs, corms, and tubers in a dry place at 60 to 65 degrees F until planting.
- F. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.
- G. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.
  - 1. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
  - 2. Do not remove container-grown stock from containers before time of planting.
  - 3. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly wet condition.

#### 1.11 FIELD CONDITIONS

- A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.
- B. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
  - 1. Spring Planting: March 15 to June 1.
  - 2. Fall Planting: September 1 to November 1.
- C. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

#### 1.12 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.



1. Failures include, but are not limited to, the following:
  - a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner.
  - b. Structural failures including plantings falling or blowing over.
  - c. Faulty performance of tree stabilization.
  - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
2. Warranty Periods: From date of Substantial Completion.
  - a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.
  - b. Ground Covers, Biennials, Perennials, and Other Plants: 12 months.
  - c. Annuals: Three months.
3. Include the following remedial actions as a minimum:
  - a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
  - b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
  - c. A limit of one replacement of each plant is required except for losses or replacements due to failure to comply with requirements.
  - d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

## PART 2 - PRODUCTS

### 2.1 PLANT MATERIAL

- A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant List, Plant Schedule, or Plant Legend indicated on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
  1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots are unacceptable.
  2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.
- B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which begins at root flare according to ANSI Z60.1. Root flare shall be visible before planting.
- D. Labeling: Label each plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant.
- E. If formal arrangements or consecutive order of plants is indicated on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.
- F. Annuals and: Provide healthy, disease-free plants of species and variety shown or listed, with well-established root systems reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container. Provide only plants that are acclimated to outdoor conditions before delivery and that are in bud but not yet in bloom.

## 2.2 FERTILIZERS

- A. Fertilizer: Refer to Section 329113 “Planting Soils.”

## 2.3 MULCHES

- A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:
  - 1. Type: Double-shredded hardwood.
  - 2. Size Range: 3 inches maximum, 1/2 inch minimum.
  - 3. Color: Natural.

## 2.4 WEED-CONTROL BARRIERS

- A. Nonwoven Geotextile Filter Fabric: Polypropylene or polyester fabric, 3 oz./sq. yd. minimum, composed of fibers formed into a stable network so that fibers retain their relative position. Fabric shall be inert to biological degradation and resist naturally encountered chemicals, alkalis, and acids.

## 2.5 PESTICIDES

- A. General: Pesticide registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.
- B. Pre-Emergent Herbicide (Selective and Nonselective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- C. Post-Emergent Herbicide (Selective and Nonselective): Effective for controlling weed growth that has already germinated.

## 2.6 TREE-STABILIZATION MATERIALS

- A. Basis-of-Design: ArborGuy Tree Anchoring System manufactured by GreenBlue Urban; Phone (866) 282-2743. Or approved equal.

1. Model: SASAP08A.
  - a. Verify depth from finished grade to structure prior to installation.

## 2.7 AERATION

- A. Basis-of-Design: RootRain Aeration Pipe manufactured by GreenBlue Urban; Phone (866) 282-2743. Or approved equal.

1. Cap each aeration stand pipe at the surface with RootRain Civic Aeration Inlet manufactured by GreenBlue Urban; Phone (866) 282-2743. Or approved equal.
  - a. Fixed grid inlet with a vandal resistant powder-coated aluminum cap on a retainer chain.

## 2.8 MISCELLANEOUS PRODUCTS

- A. Burlap: Non-synthetic, biodegradable.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas to receive plants, with Installer present, for compliance with requirements and conditions affecting installation and performance of the Work.
  1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
  2. Verify that plants and vehicles loaded with plants can travel to planting locations with adequate overhead clearance.
  3. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
  4. Uniformly moisten excessively dry soil that is not workable or which is dusty.
- B. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Protect waterproofing, structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

### 3.3 PLANTING AREA ESTABLISHMENT

- A. General: Prepare planting area for soil placement and mix planting soil according to Section 329113 "Planting Soils."
- B. Placing Planting Soil: Place and mix planting soil according to Section 329113 "Planting Soils."
- C. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

### 3.4 EXCAVATION FOR TREES AND SHRUBS

- A. Planting Pits and Trenches: Excavate circular planting pits.
  - 1. Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
  - 2. Excavate approximately three times as wide as ball diameter for balled and burlapped and container-grown stock.
  - 3. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
  - 4. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
  - 5. Maintain angles of repose of adjacent materials to ensure stability. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
  - 6. Maintain supervision of excavations during working hours.
  - 7. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
- B. Backfill Soil: Subsoil and topsoil removed from excavations [may] [may not] be used as backfill soil unless otherwise indicated.
- C. Obstructions: Notify Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

1. Hardpan Layer: Drill 6-inch-diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.
- D. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

### 3.5 TREE, SHRUB, AND VINE PLANTING

- A. Inspection: At time of planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.
- B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.
- C. Balled and Burlapped Stock: Set each plant plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.
  1. Backfill: Planting soil per Section 329113 "Planting Soils."
  2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
  3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
  4. Continue backfilling process. Water again after placing and tamping final layer of soil.
- D. Container-Grown Stock: Set each plant plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.
  1. Backfill: Planting soil per Section 329113 "Planting Soils."
  2. Carefully remove root ball from container without damaging root ball or plant.
  3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
  4. Continue backfilling process. Water again after placing and tamping final layer of soil.
- E. Slopes: When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

### 3.6 MECHANIZED TREE-SPADE PLANTING

- A. Trees may be planted with an approved mechanized tree spade at the designated locations. Do not use tree spade to move trees larger than the maximum size allowed for a similar field-grown, balled-and-burlapped root-ball diameter according to ANSI Z60.1, or larger than manufacturer's maximum size recommendation for the tree spade being used, whichever is smaller.
- B. Use the same tree spade to excavate the planting hole as will be used to extract and transport the tree.
- C. When extracting the tree, center the trunk within the tree spade and move tree with a solid ball of earth.
- D. Cut exposed roots cleanly during transplanting operations.
- E. Plant trees following procedures in "Tree, Shrub, and Vine Planting" Article.
- F. Where possible, orient the tree in the same direction as in its original location.

### 3.7 TREE, SHRUB, AND VINE PRUNING

- A. Remove only dead, dying, or broken branches. Do not prune for shape.
- B. Do not apply pruning paint to wounds.

### 3.8 TREE STABILIZATION

- A. Trunk Stabilization by ArborGuy
  1. Install per manufacturer's recommendations.
  2. Use two kits per tree, six anchor wires positioned equally around the rootball with the two straps installed in a 'Star of David' pattern.

### 3.9 AERATION INSTALLATION

- A. Install aeration system per manufacturer's recommendations and as indicated on the drawings.

### 3.10 GROUND COVER AND PLANT PLANTING

- A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated on Drawings in even rows with triangular spacing.
- B. Use planting soil per Section 329113 "Planting Soils" for backfill.
- C. Dig holes large enough to allow spreading of roots.
- D. For rooted cutting plants supplied in flats, plant each in a manner that minimally disturbs the root system but to a depth not less than two nodes.

The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
- F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
- G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

### 3.11 PLANTING AREA MULCHING

- A. Mulch backfilled surfaces of planting areas and other areas indicated.
  - 1. Organic Mulch in Planting Areas: Apply 2-inch average thickness of organic mulch over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 3 inches of trunks or stems.

### 3.12 PLANT MAINTENANCE

- A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.
- B. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
- C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices when possible to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

### 3.13 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents according to authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- B. Pre-Emergent Herbicides (Selective and Nonselective): Apply to tree, shrub, and ground-cover areas according to manufacturer's written recommendations. Do not apply to seeded areas.
- C. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

### 3.14 REPAIR AND REPLACEMENT

- A. General: Repair or replace existing or new trees and other plants that are damaged by construction operations, in a manner approved by Architect.
  - 1. Submit details of proposed pruning and repairs.
  - 2. Perform repairs of damaged trunks, branches, and roots within 24 hours, if approved.
  - 3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.
- B. Remove and replace trees that are more than 25 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.
  - 1. Provide new plants of same size and species as those being replaced.

### 3.15 CLEANING AND PROTECTION

- A. During planting, keep adjacent paving and construction clean and work area in an orderly condition. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.
- C. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.
- D. After installation and before project completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

### 3.16 MAINTENANCE SERVICE

- A. Maintenance Service for Plants: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:
  - 1. Maintenance Period: 12 months from date of Substantial Completion.

END OF SECTION



## **SECTION 334100 - STORM DRAINAGE**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section includes gravity-flow, nonpressure storm drainage outside the building, with the following components:
  - 1. Cleanouts.
  - 2. Drains, Catch Basins, Inlets, & Headwalls.
  - 3. Precast concrete & Cast-in-place concrete manholes.

#### **1.3 DEFINITIONS**

- A. PE: Polyethylene plastic.
- B. PVC: Polyvinyl chloride plastic.
- C. ODOT: Ohio Department of Transportation

#### **1.4 PERFORMANCE REQUIREMENTS**

- A. Gravity-Flow, Nonpressure, Drainage-Piping Pressure Rating: 10-foot head of water. Pipe joints shall be at least silttight, unless otherwise indicated.

#### **1.5 SUBMITTALS**

- A. Product Data: For the following:
  - 1. Pipe.
  - 2. Cleanouts.
  - 3. Trench Drains.
- B. Shop Drawings: For the following:
  - 1. Manholes: Include plans, sections, details, and frames and covers.
  - 2. Catch Basins, Headwalls and Stormwater Inlets. Include plans, sections, details, and frames, covers, and grates.

3. Stormwater Detention Structures: Include plans, sections, details, frames, grates, and covers.
- C. Coordination Drawings: Show pipe sizes, and locations. Show other piping in same trench and clearances from storm drainage system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.
- D. Profile Drawings (as necessary): Show system piping in elevation view. Draw profiles at horizontal scale of not less than 1 inch equals 50 feet and vertical scale of not less than 1 inch equals 5 feet. Indicate manholes and piping. Show types, sizes, materials, and locations of other utilities crossing system piping.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic manholes, pipe, and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.
- C. Handle manholes according to manufacturer's written rigging instructions.
- D. Handle catch basins, headwalls, and stormwater inlets according to manufacturer's written rigging instructions.

#### 1.7 PROJECT CONDITIONS

- A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
  1. Notify Construction Manager no fewer than two days in advance of proposed interruption of service.
  2. Do not proceed with interruption of service without Construction Manager 's permission.

### **PART 2 - PRODUCTS**

#### 2.1 GENERAL:

- A. Public Roadway Culverts: Refer to The Ohio Department of Transportation Construction and Material Specifications Item 603.02, Type A Conduits.
- B. Conduit Under Pavement: Refer to The Ohio Department of Transportation Construction and Material Specifications Item 603.02, Type B Conduits.
- C. Conduit Not Under Pavement: Refer to The Ohio Department of Transportation Construction and Material Specifications Item 603.02, Type C Conduits.

- D. Private Drive Pipes and Bikeways: Refer to The Ohio Department of Transportation Construction and Material Specifications Item 603.02, Type B Conduits.

## 2.2 ALUMINIZED CORRUGATED METAL PIPE AND FITTINGS

- A. Per the latest version of the ODOT Construction and Material Specifications and as noted on the Drawings.

## 2.3 PE PIPE AND FITTINGS

- A. Per the latest version of the ODOT Construction and Material Specifications and as noted on the Drawings.

## 2.4 PVC PIPE AND FITTINGS

- A. Per the latest version of the ODOT Construction and Material Specifications and as noted on the Drawings.
- B. PVC Sewer Pipe and Fittings, NPS 15 and Smaller: ASTM D 3034, SDR 35, with bell-and-spigot ends for gasketed joints with ASTM F 477, elastomeric seals.
- C. PVC Profile Gravity Sewer Pipe and Fittings: ASTM F 794 pipe, with bell-and-spigot ends; ASTM D 3034 fittings, with bell ends; and ASTM F 477, elastomeric seals.

## 2.5 REINFORCED CONCRETE PIPE AND FITTINGS

- A. Per the latest version of the ODOT Construction and Material Specifications and as noted on the Drawings.

## 2.6 DUCTILE IRON PIPE

- A. Per ODOT 748.01 conforming to ANSI/AWWA C151/A21.51, service and extra-heavy classes, for gasketed joints.
- B. Gaskets: ANSI/AWWA C111/A21.11, rubber, compression type, thickness to match class of pipe.

## 2.7 CLEANOUTS

- A. PVC with cast iron adaptor: Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping. Include cast iron adaptor and threaded brass closure plug.

## 2.8 DRAINS

- A. Yard Drains: As noted on the Drawings.
- B. Trench Drains: As noted on the Drawings.

## 2.9 MANHOLES

- A. Per the latest version of the ODOT Construction and Material Specifications and the latest version of the ODOT Standard Construction Drawings.
  - 1. Diameter: 48 inches minimum, unless otherwise indicated on the drawings.
  - 2. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
  - 3. Riser Sections: 4-inch minimum thickness, and of length to provide depth indicated.
  - 4. Top Section: Eccentric-cone type, unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings. Steps: ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP; Ductile Iron; or Cast Aluminum. Steps shall be wide enough to allow worker to place both feet on 1 step and designed to prevent lateral slippage off of step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Steps shall be equally spaced. Whenever possible steps shall not be placed directly above manhole flow channel. Omit steps if total depth from floor of manhole to finished grade is less than 48 inches.
  - 5. Manhole Frames and Covers: Include lettering cast into cover, using wording equivalent to "STORM SEWER."
    - a. Frames and Covers must be heavy duty

## 2.10 CONCRETE

- A. General: Cast-in-place concrete according to the latest version of the ODOT Construction and Material Specifications and the latest version of the ODOT Standard Construction Drawings

## 2.11 CATCH BASINS

- A. Per the latest version of the ODOT Construction and Material Specifications and the latest version of the ODOT Standard Construction Drawings.
  - 1. See drawings for schedule of specific types of catch basins
  - 2. Frames and Grates:
    - a. Are to be heavy duty.
    - b. Are to be ADA compliant.
    - c. Are to be Bicycle safe.

## 2.12 STORMWATER DETENTION STRUCTURES

- A. As indicated on the Drawings and Per the jurisdiction having authority.

## 2.13 PIPE INLETS AND OUTLETS

- A. Headwalls: Per the latest version of the ODOT Construction and Material Specifications and the latest version of the ODOT Standard Construction Drawings.
- B. Rock Channel Protection (Riprap): Per the latest version of the ODOT Construction and Material Specifications and as indicated on the Drawings.

## PART 3 - EXECUTION

### 3.1 EARTHWORK

- A. General:
  - 1. Conduit Under Pavement: Refer to The Ohio Department of Transportation Construction and Material Specifications Item 603.02, Type B Conduits.
  - 2. Conduit Not Under Pavement: Refer to The Ohio Department of Transportation Construction and Material Specifications Item 603.02, Type C Conduits.
- B. Excavation For Utility Trenches:
  - 1. Excavate trenches to indicated slopes, lines, depths, and invert elevations.
  - 2. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit.
  - 3. Excavate trench walls per ODOT Item 603.05 and geotechnical report as identified on the Drawings.
  - 4. Where encountering rock or another unyielding bearing surface, carry trench excavation 6 inches below invert elevation to receive bedding course.
- C. Utility Trench Backfill:
  - 1. Place and compact bedding course as required by ODOT specifications Item 603.06 and geotechnical report. Type 2 bedding consists of structural backfill extending at least 3 inches (75 mm) for all ODOT Item 706 rigid pipe conduits and 6 inches (150 mm) for all other conduits below the bottom of the conduit for the full width of the trench. Extend the bedding up around the pipe for a depth of not less than 30 percent of the rise of the conduit. Shape the bedding to fit the conduit with recesses shaped to receive the bell of bell-and-spigot pipe. Leave the bedding below the middle one-third of the pipe span uncompacted. Compact the remaining bedding according to ODOT Item 603.11.
  - 2. Use Type 2 bedding for Types A, B, C, and D conduits except for long span structures and for conduits that require Type 3 bedding.
  - 3. Type 3 bedding consists of a natural foundation with recesses shaped to receive the bell of bell-and-spigot pipe. Scarify and loosen the middle one-third of the pipe span.
  - 4. Use Type 3 bedding for Type C and Type D conduits of the following materials: ODOT Items 706.01, 706.02, or 706.03.
  - 5. Structural backfill for ODOT Item 603 bedding and backfill shall consist of limestone, gravel, natural sand, sand manufactured from stone, or foundry sand. Provide Type I or Type II structural backfill per the requirements of ODOT Item 703.11
  - 6. Non-structural backfill should consist of clean, inorganic soil free of any miscellaneous materials, cobbles, and boulders. The fill should be placed in uniform, thin lifts and carefully compacted to a unit dry weight equal to 100 percent in structure areas and at least 98 percent of the maximum dry weight below pavement areas. The moisture content of the fill should be maintained at -2 to +1 percent of the optimum moisture

content as determined in the laboratory by the Standard Test Methods for Moisture-Density Relations of Soils (ASTM D 698). Fill should not be placed in a frozen condition or upon a frozen subgrade.

7. Place backfill to the limits described and according to the compaction requirements of ODOT Item 603.11. Place the backfill in the trench and embankment outside the trench uniformly on both sides of the conduit for all conduit installations.
  - a. Type A and B. Backfill Types A and B conduits except for long span structures as follows
    - 1) In a cut situation, place and compact structural backfill above the bedding for the full depth of the trench. Within the trench and more than 4 feet (1.2 m) above the top of the conduit, if the trench can accommodate compaction equipment, the Contractor may construct Item 203 Embankment. For plastic pipe with an ID 8 inch (200 mm) or less, place and compact structural backfill above the bedding for the full depth of the trench.
    - 2) In a fill situation, place and compact structural backfill above the bedding for the full depth of the trench specified in 603.05.B. Above these limits, uniformly place the lesser of one pipe span or 4 feet (1.2 m) of structural backfill on each side of the conduit and to a depth of 2 feet (0.6 m) above the top of the conduit. Construct the embankment outside the limits of the backfill. For plastic pipe with an ID 8 inch (200 mm) or less, place and compact structural backfill above the bedding for the full depth of the trench.
  - b. Type C and D. Backfill Type C and D conduits as follows:
    - 1) In a cut situation, for plastic pipe, place and compact structural backfill above the bedding and to 12 inches (300 mm) over the top of the pipe. All other conduit material types place and compact backfill. For plastic pipe with an ID 8 inch (200 mm) or less, place and compact structural backfill above the bedding for the full depth of the trench.
    - 2) In a fill situation, for plastic pipe, place and compact structural backfill above the bedding for the full depth of the trench specified in 603.05.B. Above these limits, uniformly place the lesser of one pipe span or 4 feet (1.2 m) of structural backfill on each side of the conduit and vertically to the top of the conduit. Then place for a depth of 12 inches (300 mm) structural backfill over the top of the pipe equal to the trench width centered on the pipe center line. Construct the embankment outside the limits of the backfill. All other conduit material types place and compact backfill. For plastic pipe with an ID 8 inch (200 mm) or less, place and compact structural backfill above the bedding for the full depth of the trench.
8. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.
9. All fill soils shall be placed in accordance with the article "Compaction of Soil Backfills and Fills" from the Earth Moving Specification Section 312000.
10. Coordinate backfilling with utilities testing.
11. Fill voids with approved backfill materials as shoring and bracing, and sheeting is removed.
12. Place and compact final backfill of satisfactory soil material to final subgrade.

### 3.2 PIPING INSTALLATION

- A. All installation shall be per the latest version of the ODOT Construction and Material Specifications item 603 and the latest version of the ODOT Standard Construction Drawings.

- B. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical. Where specific installation is not indicated, contact architect.
- C. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
- D. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- E. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- F. Install gravity-flow, nonpressure drainage piping according to the following:
  - 1. Install piping pitched down in direction of flow, at minimum slope of 1 percent, unless otherwise indicated.
  - 2. Install piping with 12 inches minimum cover, unless otherwise indicated on the drawings. Notify architect if less than 12 inches of cover will exist.
  - 3. During construction protect installed piping from damage. Maintain manufacturers recommended minimum cover.

### 3.3 PIPE JOINT CONSTRUCTION

- A. All joint construction shall be per the latest version of the ODOT Construction and Material Specifications item 603 and the latest version of the ODOT Standard Construction Drawings.
- B. Join dissimilar pipe materials with pressure-type couplings, or concrete collar.

### 3.4 CLEANOUT INSTALLATION

- A. Install cleanouts and riser extension from sewer pipe to cleanout at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
  - 1. Use medium-duty, top-loading classification cleanouts in earth or unpaved foot-traffic areas.
  - 2. Use heavy-duty, top-loading classification cleanouts in paved foot-traffic, vehicle-traffic, roads, and service areas.
- B. Set cleanout frames and covers in earth in cast-in-place concrete block, 18 by 18 by 12 inches deep. Set with tops 1 inch above surrounding earth grade.
- C. Set cleanout frames and covers in asphalt or concrete pavement with tops flush with pavement surface.

### 3.5 DRAIN INSTALLATION

- A. Install type of drains in locations indicated.
  - 1. Use medium-duty, top-loading classification drains in earth or unpaved foot-traffic areas.
  - 2. Use heavy-duty, top-loading classification drains in paved foot-traffic, vehicle-traffic, roads, and service areas.
- B. Install per manufacturer's written recommendations.

### 3.6 MANHOLE INSTALLATION

- A. General: Installation shall be per the latest version of the ODOT Construction and Material Specifications and the latest version of the ODOT Standard Construction Drawings.
- B. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches above finished surface elsewhere, unless otherwise indicated.

### 3.7 CATCH BASIN INSTALLATION

- A. General: Installation shall be per the latest version of the ODOT Construction and Material Specifications and the latest version of the ODOT Standard Construction Drawings.
- B. Set frames and grates to elevations indicated.

### 3.8 STORMWATER INLET AND OUTLET INSTALLATION

- A. General: Installation of Headwalls and Rock Channel Protection shall be per the latest version of the ODOT Construction and Material Specifications and the latest version of the ODOT Standard Construction Drawings.

### 3.9 CONCRETE PLACEMENT

- A. Place cast-in-place concrete according to ACI 318/318R.

### 3.10 CONNECTIONS

- A. Connect nonpressure, gravity-flow drainage piping in building's storm building drains specified in Division 22 Section "Facility Storm Drainage Piping."

### 3.11 FIELD QUALITY CONTROL

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
  - 1. Defects requiring correction include the following:



The Banks – Lot 28  
BP #2 – Park & Garage  
December 17, 2021  
THP No. 98090.40

- a. Alignment: Less than full diameter of inside of pipe is visible between structures.
  - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
  - c. Crushed, broken, cracked, or otherwise damaged piping.
2. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
  3. Reinspect and repeat procedure until results are satisfactory.
- B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
1. Do not enclose, cover, or put into service before inspection and approval.
  2. Test completed piping systems according to authorities having jurisdiction.
  3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
- C. Replace defective piping using new materials, and repeat testing until defect is within allowances specified.

### 3.12 CLEANING

- A. Clean interior of piping of dirt and superfluous materials.

**END OF SECTION 334100**

## **SECTION 334600 - SUBDRAINAGE**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes subdrainage systems for the following:
  - 1. Foundations.
  - 2. Underslab areas.
  - 3. Plaza decks.
  - 4. Retaining walls.
  - 5. Landscaped areas.

#### 1.3 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. HDPE: High-density polyethylene plastic.
- C. PE: Polyethylene plastic.
- D. PP: Polypropylene plastic.
- E. PS: Polystyrene plastic.
- F. PVC: Polyvinyl chloride plastic.
- G. Subdrainage: Drainage system that collects and removes subsurface or seepage water.

#### 1.4 SUBMITTALS

- A. Product Data: For the following:
  - 1. Perforated-wall pipe and fittings.
  - 2. Solid-wall pipe and fittings.
  - 3. Drainage conduits.
  - 4. Geotextile filter fabrics.

## **PART 2 - PRODUCTS**

### 2.1 PIPING MATERIALS

- A. Refer to the "Piping Applications" Article in Part 3 for applications of pipe, fitting, and joining materials.

### 2.2 PERFORATED-WALL PIPES AND FITTINGS

- A. Perforated PE Pipe and Fittings: ASTM F 405 or AASHTO M 252, Type CP; corrugated, for coupled joints.
  - 1. Couplings: Manufacturer's standard, band type.
- B. Perforated PVC Sewer Pipe and Fittings: ASTM D 2729, bell-and-spigot ends, for loose joints.

### 2.3 SOLID-WALL PIPES AND FITTINGS

- A. Cast-Iron Soil Pipe and Fittings: ASTM A 74, Service and Extra-Heavy classes, hub-and-spigot ends, gray, for gasketed joints.
  - 1. Gaskets: ASTM C 564, rubber, of thickness matching class of pipe.
- B. PE Drainage Tubing and Fittings: AASHTO M 252, Type S, corrugated, with smooth waterway, for coupled joints.
  - 1. Couplings: AASHTO M 252, corrugated, band type, matching tubing and fittings.
- C. PVC Sewer Pipe and Fittings: ASTM D 3034, SDR 35, bell-and-spigot ends, for gasketed joints.
  - 1. Gaskets: ASTM F 477, elastomeric seal.

### 2.4 SPECIAL PIPE COUPLINGS

- A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined and corrosion-resistant metal tension band and tightening mechanism on each end.
  - 1. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant metal tension band and tightening mechanism on each end.
  - 2. Shielded Flexible Couplings: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant metal tension band and tightening mechanism on each end.

## 2.5 CLEANOUTS

- A. Description: ASME A112.36.2M, round, cast-iron housing with clamping device and round, secured, scoriated, cast-iron cover. Include cast-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug. Use units with top-loading classifications according to the following applications:
- B. Light Duty: In earth or grass, foot-traffic areas.
- C. Medium Duty: In paved, foot-traffic areas.
- D. Heavy Duty: In vehicle-traffic service areas.
- E. Extra Heavy Duty: In roads.
- F. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, service class, cast-iron soil pipe and fittings.

## 2.6 SOIL MATERIALS

- A. Backfill, drainage course, impervious fill, and satisfactory soil materials are specified in Division 31 Section "Earth Moving."

## 2.7 GEOTEXTILE FILTER FABRICS

- A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq. ft. when tested according to ASTM D 4491.
  - 1. Structure Type: Nonwoven, needle-punched continuous.
  - 2. Style(s): Flat.

## **PART 3 - EXECUTION**

### 3.1 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving."

### 3.2 PIPING APPLICATIONS

- A. Underground Subdrainage Piping:
  - 1. Perforated PE pipe and fittings, couplings, and coupled joints.
  - 2. Perforated PVC sewer pipe and fittings for loose, bell-and-spigot joints.
- B. Underslab Subdrainage Piping:
  - 1. Perforated PE pipe and fittings, couplings, and coupled joints.

2. Perforated PVC sewer pipe and fittings and loose, bell-and-spigot joints.

### 3.3 FOUNDATION DRAINAGE INSTALLATION

- A. Place impervious fill material on subgrade adjacent to bottom of footing after concrete footing forms have been removed. Place and compact impervious fill to dimensions indicated, but not less than 6 inches deep and 12 inches wide.
- B. Place impervious fill on subgrade adjacent to bottom of footing and compact to dimensions indicated, but not less than 6 inches deep and 12 inches wide after concrete footing forms have been removed.
- C. Lay flat-style geotextile filter fabric in trench and overlap trench sides.
- D. Place supporting layer of drainage course over compacted subgrade and geotextile filter fabric, to compacted depth of not less than 4 inches.
- E. Encase pipe with sock-style geotextile filter fabric before installing pipe. Connect sock sections with adhesive.
- F. Install drainage piping as indicated in Part 3 "Piping Installation" Article for foundation subdrainage.
- G. Add drainage course to width of at least 6 inches on side away from wall and to top of pipe to perform tests.
- H. After satisfactory testing, cover drainage piping to width of at least 6 inches on side away from footing and above top of pipe to within 12 inches of finish grade.
- I. Install drainage course and wrap top of drainage course with flat-style geotextile filter fabric.
- J. Place layer of flat-style geotextile filter fabric over top of drainage course, overlapping edges at least 4 inches.
- K. Place initial backfill material over compacted drainage course. Place material in loose-depth layers not exceeding 6 inches. Thoroughly compact each layer. Final backfill to finish elevations and slope away from building.

### 3.4 UNDERSLAB DRAINAGE INSTALLATION

- A. Excavate for underslab drainage system after subgrade material has been compacted but before drainage course has been placed. Include horizontal distance of at least 6 inches between drainage pipe and trench walls. Grade bottom of trench excavations to required slope, and compact to firm, solid bed for drainage system.
- B. Lay flat-style geotextile filter fabric in trench and overlap trench sides.
- C. Place supporting layer of drainage course over compacted subgrade and geotextile filter fabric, to compacted depth of not less than 4 inches.

- D. Encase pipe with sock-style geotextile filter fabric before installing pipe. Connect sock sections with adhesive.
- E. Install drainage piping as indicated in Part 3 "Piping Installation" Article for underslab subdrainage.
- F. Add drainage course to width of at least 6 inches on side away from wall and to top of pipe to perform tests.
- G. After satisfactory testing, cover drainage piping with drainage course to elevation of bottom of slab, and compact and wrap top of drainage course with flat-style geotextile filter fabric.

### 3.5 PIPING INSTALLATION

- A. Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in filtering material. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated.
  - 1. Foundation Subdrainage: Install piping pitched down in direction of flow, at a minimum slope of 0.5 percent and with a minimum cover of **36 inches**, unless otherwise indicated.
  - 2. Underslab Subdrainage: Install piping pitched down in direction of flow, at a minimum slope of 0.5 percent.
  - 3. Lay perforated pipe with perforations down.
  - 4. Excavate recesses in trench bottom for bell ends of pipe. Lay pipe with bells facing upslope and with spigot end entered fully into adjacent bell.
- B. Use increasers, reducers, and couplings made for different sizes or materials of pipes and fittings being connected. Reduction of pipe size in direction of flow is prohibited.
- C. Install PE piping according to ASTM D 2321.
- D. Install PVC piping according to ASTM D 2321.

### 3.6 PIPE JOINT CONSTRUCTION

- A. Cast-Iron Soil Pipe and Fittings: Hub and spigot, with rubber compression gaskets according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook." Use gaskets that match class of pipe and fittings.
- B. Join PE pipe, tubing, and fittings with couplings for soil-tight joints according to AASHTO's "Standard Specifications for Highway Bridges," Division II, Section 26.4.2.4, "Joint Properties."
- C. Join perforated, PE pipe and fittings with couplings for soil-tight joints according to AASHTO's "Standard Specifications for Highway Bridges," Division II, Section 26.4.2.4, "Joint Properties"; or according to ASTM D 2321.
- D. Join PVC pipe and fittings according to ASTM D 3034 with elastomeric seal gaskets according to ASTM D 2321.

- E. Join perforated PVC pipe and fittings according to ASTM D 2729, with loose bell-and-spigot joints.
- F. Special Pipe Couplings: Join piping made of different materials and dimensions with special couplings made for this application. Use couplings that are compatible with and fit materials and dimensions of both pipes.

### 3.7 CLEANOUT INSTALLATION

- A. Install cleanouts and riser extension from sewer pipe to cleanout at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
- B. Set cleanout frames and covers in earth in a cast-in-place concrete block, 18 by 18 by 12 inches deep. Set with tops 1 inch (25 mm) above surrounding final earth grade.
- C. Set cleanout frames and covers in concrete paving with tops flush with surface of paving.

### 3.8 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect low elevations of subdrainage system to building's solid-wall-piping storm drainage system.
- C. Where required, connect low elevations of foundation subdrainage to stormwater sump pumps.

### 3.9 FIELD QUALITY CONTROL

- A. Testing: After installing drainage course to top of piping, test drain piping with water to ensure free flow before backfilling. Remove obstructions, replace damaged components, and repeat test until results are satisfactory.

### 3.10 CLEANING

- A. Clear interior of installed piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed. Place plugs in ends of uncompleted pipe at end of each day or when work stops.

**END OF SECTION 334600**