UNIVERSITY OF SOUTH CAROLINA GIBBES GREEN HISTORIC FACILITIES RENOVATION— PETIGRU COLLEGE SITEWORK

STATE PROJECT #H27-9835-PD-C

JANUARY 15, 2014 CONSTRUCTION DOCUMENTS



# DIVISION 0

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## University of South Carolina Gibbes Green Historic Facilities Renovation Petigru College Sitework Columbia, South Carolina

#### SECTION 00001 - PROJECT TITLE PAGE

**OWNER**: USC Campus Planning and Construction 743 Greene Street Columbia, South Carolina 29208 ARCHITECTS, MECHANICAL AND ELECTRICAL ENGINEERS: GMK Associates, Inc. 1201 Main Street, Suite 2100 Columbia, South Carolina 29201 tel: 803.256.0000 fax: 803.255.7243 www.gmka.com Architect: Jerome K. Simons [jsimons@gmka.com] Electrical: Brell Foster [bfoster@gmka.com] CIVIL ENGINEER: Cox and Dinkins 724 Beltline Boulevard Columbia, South Carolina 29205 tel. 803.254.0518 fax. 803.765.0993 Darren Holcombe [DHolcombe@coxanddinkins.com] LANDSCAPE ARCHITECT Grimball-Cotterill Landscape Architects 600 Beltline Boulevard Columbia, South Carolina 29205 tel. 803.738.9525 fax. 803.782.3916 Mark Cotterill [mcotterill@grimball-cotterill.com]

# END OF PROJECT TITLE PAGE

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University of South Carolina Gibbes Green Historic Gibbes Facilities Renovation Petigru College Sitework Columbia, South Carolina

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# **SE-310 REOUEST FOR ADVERTISEMENT**

PROJECT NAME: Gibbes Green Historic Facilities Renovation – Petigru College Sitework

PROJECT NUMBER: H27-9835-PD-C

PROJECT LOCATION: University of South Carolina, Columbia, SC

Contractor may be subject to performance appraisal at close of project

BID SECURITY REQUIRED? Yes 🛛 No 🗌

#### PERFORMANCE & PAYMENT BONDS REQUIRED? Yes 🛛 No 🗌

CONSTRUCTION COST RANGE: \$300,000 - \$400,000

DESCRIPTION OF	The project consist of rework of the existing site including brick and concrete pavement, curb and			
<b>PROJECT:</b> gutter, brick columns, erosion control, concrete car stops, storm drainage, inlets, fire hy				
	tree protection, grading, wrought iron gates, etc. Small and minority business participation is			
	encouraged.			

A/E NAME: GMK Associates

A/E CONTACT: Jerome K. Simons

A/E ADDRESS: Street/PO Box:1201 Main Street, Suite 2100

City: Columbia

State: South Carolina ZIP: 29201

EMAIL: jsimons@gmka.com

TELEPHONE: 803.256.0000

FAX: 803.255.7243

All questions & correspondence concerning this Invitation shall be addressed to the A/E.

BIDDING DOCUMENTS/PLANS MAY BE OBTAINED FROM: purchasing.sc.ed. see Facilities Construction Solicitations and Awards

PLAN DEPOSIT AMOUNT: N/A IS DEPOSIT REFUNDABLE: Yes No

Only those Bidding Documents/Plans obtained from the above listed source(s) are official. Bidders rely on copies of Bidding Documents/Plans obtained from any other source at their own risk.

BIDDING DOCUMENTS/PLANS ARE ALSO ON FILE FOR VIEWING PURPOSES ONLY AT (list name and location for each plan room or other entity):

purchasing.sc.edu. It is the contractor's responsibility to download any documents from the purchasing website

PRE-BID CONFERENCE? Yes 🛛 No 🗌 MANDATORY ATTENDANCE? Yes 🗔 No 🖂

DATE: 2/6/14 TIME: 10:00 am PLACE: 743 Greene Street, Conference Room 53, Columbia, SC 29208

AGENCY: University of South Carolina

NAME OF AGENCY PROCUREMENT OFFICER: Juaquana Brookins

**ADDRESS:** Street/PO Box:743 Greene Street

City: Columbia

State: South Carolina ZIP: 29208

EMAIL: jbrookin@fmc.sc.edu

TELEPHONE: 803.777.3596 BID CLOSING DATE: 2/20/14 TIME: 2:00 pm

LOCATION:	743 Greene Street, Conference Room 53
	Columbia SC 29208

**BID DELIVERY ADDRESSES:** 

HAND-DELIVERY:

Attn: Juaquana Brookins

**USC Facilities Office** 

743 Greene Street

Columbia, South Carolina 29208

MAIL SERVICE: Attn: Juaquana Brookins

Columbia, South Carolina 29208

**USC Facilities Office** 

743 Greene Street

FAX: 803-777-7334

#### IS PROJECT WITHIN AGENCY CONSTRUCTION CERTIFICATION? (Agency MUST check one) Yes X No

**APPROVED BY** (Office of State Engineer):

#### SECTION 00200 - INSTRUCTIONS TO BIDDERS

#### FORM OF INSTRUCTIONS TO BIDDERS

1.01 See AIA Document A701 (1997 Edition), Instructions to Bidders following this document.

- A. Copiesof this document may be obtained from The American Institute of Architects, 1522 Richland Street, Columbia, SC 29201. Phone: 803-252-6050.
- 1.02 Refer to document 00201-OSE for modifications to this document.

#### END OF INSTRUCTIONS TO BIDDERS

OWNER: <u>University of South Carolina</u> PROJECT NUMBER: <u>H27-9835-PD-C</u> PROJECT NAME: <u>Gibbes Green Historic Facilities Renovation – Petigru College Sitework</u> PROJECT LOCATION: <u>Columbia, South Carolina</u>

#### PROCUREMENT OFFICER: Juaquana Brookins

#### 1. STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

**1.1.** These Standard Supplemental Instructions To Bidders amend or supplement Instructions To Bidders (AIA Document A701-1997) and other provisions of Bidding and Contract Documents as indicated below.

**1.2.** Compliance with these Standard Supplemental Instructions is required by the Office of State Engineer (OSE) for all State projects when competitive sealed bidding is used as the method of procurement.

**1.3.** All provisions of A701-1997, which are not so amended or supplemented, remain in full force and effect.

**1.4.** Bidders are cautioned to carefully examine the Bidding and Contract Documents for additional instructions or requirements.

#### 2. MODIFICATIONS TO A701-1997

**2.1.** Delete Section 1.1 and insert the following:

**1.1** Bidding Documents, collectively referred to as the **Invitation for Bids**, include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement, Instructions to Bidders (A-701), Supplementary Instructions to Bidders, the bid form (SE-330), the Intent to Award Notice (SE-370), and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, all Addenda issued prior to execution of the Contract, and other documents set forth in the Bidding Documents. Any reference in this document to the Agreement between the Owner and Contractor, AIA Document A101, or some abbreviated reference thereof, shall mean the AIA A101, 2007 Edition as modified by OSE Form 00501 – Standard Modification to Agreement Between Owner and Contractor. Any reference in this document to the General Conditions of the Contract for Construction, AIA Document A201, or some abbreviated reference thereof, shall mean the AIA A101, or some abbreviated reference thereof, shall mean the AIA A201, 2007 Edition as modified by OSE Form 00811 – Standard Supplementary Conditions.

2.2. In Section 1.8, delete the words "and who meets the requirements set forth in the Bidding Documents".

**2.3.** In Section 2.1, delete the word "making" and substitute the word "submitting."

#### **2.4.** In Section 2.1.1:

After the words "Bidding Documents," delete the word "or" and substitute the word "and."

#### Insert the following at the end of this section:

Bidders are expected to examine the Bidding Documents and Contract Documents thoroughly and should request an explanation of any ambiguities, discrepancies, errors, omissions, or conflicting statements. Failure to do so will be at the Bidder's risk. Bidder assumes responsibility for any patent ambiguity that Bidder does not bring to the Owner's attention prior to bid opening.

#### **2.5.** In Section 2.1.3, insert the following after the term "Contract Documents" and before the period:

and accepts full responsibility for any pre-bid existing conditions that would affect the Bid that could have been ascertained by a site visit. As provided in Regulation 19-445.2042(B), A bidder's failure to attend an advertised prebid conference will not excuse its responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the State.

# OSE FORM 00201 Revised October 22, 2012 STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

**2.6.** Insert the following Sections 2.2 through 2.6:

#### 2.2 CERTIFICATION OF INDEPENDENT PRICE DETERMINATION

GIVING FALSE, MISLEADING, OR INCOMPLETE INFORMATION ON THIS CERTIFICATION MAY RENDER YOU SUBJECT TO PROSECUTION UNDER SECTION 16-9-10 OF THE SOUTH CAROLINA CODE OF LAWS AND OTHER APPLICABLE LAWS.

(a) By submitting an bid, the bidder certifies that—

(1) The prices in this bid have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other bidder or competitor relating to—

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(i) Those prices;

(ii) The intention to submit an bid; or

(iii) The methods or factors used to calculate the prices offered.

(2) The prices in this bid have not been and will not be knowingly disclosed by the bidder, directly or indirectly, to any other bidder or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the bidder to induce any other concern to submit or not to submit an bid for the purpose of restricting competition.

(b) Each signature on the bid is considered to be a certification by the signatory that the signatory—

(1) Is the person in the bidder's organization responsible for determining the prices being offered in this bid, and that the signatory has not participated and will not participate in any action contrary to paragraphs (a)(1) through (a)(3) of this certification; or

(2)(i) Has been authorized, in writing, to act as agent for the bidder's principals in certifying that those principals have not participated, and will not participate in any action contrary to paragraphs (a)(1) through (a)(3) of this certification [As used in this subdivision (b)(2)(i), the term "principals" means the person(s) in the bidder's organization responsible for determining the prices offered in this bid];

(ii) As an authorized agent, does certify that the principals referenced in subdivision (b)(2)(i) of this certification have not participated, and will not participate, in any action contrary to paragraphs (a)(1) through (a)(3) of this certification; and

(iii) As an agent, has not personally participated, and will not participate, in any action contrary to paragraphs (a)(1) through (a)(3) of this certification.

(c) If the bidder deletes or modifies paragraph (a)(2) of this certification, the bidder must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

#### 2.3 DRUG FREE WORKPLACE

By submitting a bid, the Bidder certifies that Bidder will maintain a drug free workplace in accordance with the requirements of Title 44, Chapter 107 of South Carolina Code of Laws, as amended.

#### 2.4 CERTIFICATION REGARDING DEBARMENT AND OTHER RESPONSIBILITY MATTERS

(a) (1) By submitting an Bid, Bidder certifies, to the best of its knowledge and belief, that (i) Bidder and/or any of its Principals-

(A) Are not presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any state or federal agency;

(B) Have not, within a three-year period preceding this bid, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in

connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of bids; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property; and

(C) Are not presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in paragraph (a)(1)(i)(B) of this provision.

(ii) Bidder has not, within a three-year period preceding this bid, had one or more contracts terminated for default by any public (Federal, state, or local) entity.

(2) "Principals," for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions).

(b) Bidder shall provide immediate written notice to the Procurement Officer if, at any time prior to contract award, Bidder learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(c) If Bidder is unable to certify the representations stated in paragraphs (a)(1), Bid must submit a written explanation regarding its inability to make the certification. The certification will be considered in connection with a review of the Bidder's responsibility. Failure of the Bidder to furnish additional information as requested by the Procurement Officer may render the Bidder nonresponsible.

(d) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and information of an Bidder is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Bidder knowingly or in bad faith rendered an erroneous certification, in addition to other remedies available to the State, the Procurement Officer may terminate the contract resulting from this solicitation for default.

#### 2.5 ETHICS CERTIFICATE

By submitting a bid, the bidder certifies that the bidder has and will comply with, and has not, and will not, induce a person to violate Title 8, Chapter 13 of the South Carolina Code of Laws, as amended (ethics act). The following statutes require special attention: Section 8-13-700, regarding use of official position for financial gain; Section 8-13-705, regarding gifts to influence action of public official; Section 8-13-720, regarding offering money for advice or assistance of public official; Sections 8-13-755 and 8-13-760, regarding restrictions on employment by former public official; Section 8-13-775, prohibiting public official with economic interests from acting on contracts; Section 8-13-790, regarding recovery of kickbacks; Section 8-13-1150, regarding statements to be filed by consultants; and Section 8-13-1342, regarding restrictions on contributions by contractor to candidate who participated in awarding of contract. The state may rescind any contract and recover all amounts expended as a result of any action taken in violation of this provision. If contractor participates, directly or indirectly, in the evaluation or award of public contracts, including without limitation, change orders or task orders regarding a public contract, contractor shall, if required by law to file such a statement, provide the statement required by Section 8-13-1150 to the procurement officer at the same time the law requires the statement to be filed.

#### 2.6 RESTRICTIONS APPLICABLE TO BIDDERS & GIFTS

Violation of these restrictions may result in disqualification of your bid, suspension or debarment, and may constitute a violation of the state Ethics Act. (a) After issuance of the solicitation, *bidder agrees not to discuss this procurement activity in any way with the Owner or its employees, agents or officials*. All communications must be solely with the Procurement Officer. This restriction may be lifted by express written permission from the Procurement Officer. This restriction expires once a contract has been formed. (b) Unless otherwise approved in writing by the Procurement

Officer, *bidder agrees not to give anything to the Owner, any affiliated organizations, or the employees, agents or officials of either, prior to award.* (c) Bidder acknowledges that the policy of the State is that a governmental body should not accept or solicit a gift, directly or indirectly, from a donor if the governmental body has reason to believe the donor has or is seeking to obtain contractual or other business or financial relationships with the governmental body. Regulation 19-445.2165(C) broadly defines the term donor.

**2.7.** Delete Section 3.1.1 and substitute the following:

**3.1.1** Bidders may obtain complete sets of the Bidding Documents from the issuing office designated in the Advertisement in the number and for the deposit sum, if any, stated therein. If so provided in the Advertisement, the deposit will be refunded to all plan holders who return the Bidding Documents in good condition within ten days after receipt of Bids. The cost of replacement of missing or damaged documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the Bidding Documents and the Bidder's deposit will be refunded.

- **2.8.** Delete the language of Section 3.1.2 and insert the word "Reserved."
- **2.9.** In Section 3.1.4, delete the words "and Architect may make" and substitute the words "has made."

#### **2.10.** Insert the following Section 3.1.5

**3.1.5** All persons obtaining Bidding Documents from the issuing office designated in the Advertisement shall provide that office with Bidder's contact information to include the Bidder's name, telephone number, mailing address, and email address.

#### **2.11.** In Section 3.2.2:

Delete the words "and Sub-bidders"

Delete the word "seven" and substitute the word "ten"

#### **2.12.** In Section 3.2.3:

In the first Sentence, insert the word "written" before the word "Addendum."

#### Insert the following at the end of the section:

As provided in Regulation 19-445.2042(B), nothing stated at the pre-bid conference shall change the Bidding Documents unless a change is made by written Addendum.

#### **2.13.** *Insert the following at the end of Section 3.3.1:*

Reference in the Bidding Documents to a designated material, product, thing, or service by specific brand or trade name followed by the words "or equal" and "or approved equal" shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition.

#### **2.14.** Delete Section 3.3.2 and substitute the following:

**3.3.2** No request to substitute materials, products, or equipment for materials, products, or equipment described in the Bidding Documents and no request for addition of a manufacturer or supplier to a list of approved manufacturers or suppliers in the Bidding Documents will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten days prior to the date for receipt of Bids established in the Invitation for Bids. Any subsequent extension of the date for receipt of Bids by addendum shall not extend the date for receipt of such requests unless the addendum so specifies. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

#### **2.15.** *Delete Section 3.4.3 and substitute the following:*

**3.4.3** Addenda will be issued no later than 120 hours prior to the time for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

Revised October 22, 2012

**2.16.** *Insert the following Sections 3.4.5 and 3.4.6:* 

**3.4.5** When the date for receipt of Bids is to be postponed and there is insufficient time to issue a written Addendum prior to the original Bid Date, Owner will notify prospective Bidders by telephone or other appropriate means with immediate follow up with a written Addendum. This Addendum will verify the postponement of the original Bid Date and establish a new Bid Date. The new Bid Date will be no earlier than the fifth (5th) calendar day after the date of issuance of the Addendum postponing the original Bid Date.

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**3.4.6.** If an emergency or unanticipated event interrupts normal government processes so that bids cannot be received at the government office designated for receipt of bids by the exact time specified in the solicitation, the time specified for receipt of bids will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal government processes resume. In lieu of an automatic extension, an Addendum may be issued to reschedule bid opening. If state offices are closed at the time a pre-bid or pre-proposal conference is scheduled, an Addendum will be issued to reschedule the conference. Useful information may be available at: <a href="http://www.scemd.org/scgovweb/weather\_alert.html">http://www.scemd.org/scgovweb/weather\_alert.html</a>

- **2.17.** In Section 4.1.1, delete the word "forms" and substitute the words "SE-330 Bid Form."
- **2.18.** Delete Section 4.1.2 and substitute the following:

**4.1.2** Any blanks on the bid form to be filled in by the Bidder shall be legibly executed in a non-erasable medium. Bids shall be signed in ink or other indelible media.

- 2.19. Delete Section 4.1.3 and substitute the following:4.1.3 Sums shall be expressed in figures.
- **2.20.** Insert the following at the end of Section 4.1.4:

Bidder shall not make stipulations or qualify his bid in any manner not permitted on the bid form. An incomplete Bid or information not requested that is written on or attached to the Bid Form that could be considered a qualification of the Bid, may be cause for rejection of the Bid.

**2.21.** Delete Section 4.1.5 and substitute the following:

**4.1.5** All requested Alternates shall be bid. The failure of the bidder to indicate a price for an Alternate shall render the Bid non-responsive. Indicate the change to the Base Bid by entering the dollar amount and marking, as appropriate, the box for "ADD TO" or "DEDUCT FROM". If no change in the Base Bid is required, enter "ZERO" or "No Change." For add alternates to the base bid, Subcontractor(s) listed on page BF-2 of the Bid Form to perform Alternate Work shall be used for both Alternates and Base Bid Work if Alternates are accepted.

**2.22.** Delete Section 4.1.6 and substitute the following:

**4.1.6** Pursuant to Title 11, Chapter 35, Section 3020(b)(i) of the South Carolina Code of Laws, as amended, Section 7 of the Bid Form sets forth a list of subcontractor specialties for which Bidder is required to list only the subcontractors Bidder will use to perform the work of each listed specialty. Bidder must follow the Instructions in the Bid Form for filling out this section of the Bid Form. Failure to properly fill out Section 7 may result in rejection of Bidder's bid as non-responsive.

**2.23.** Delete Section 4.1.7 and substitute the following:

**4.1.7** Each copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

**2.24.** Delete Section 4.2.1 and substitute the following:

**4.2.1** If required by the Invitation for Bids, each Bid shall be accompanied by a bid security in an amount of not less than five percent of the Base Bid. The bid security shall be a bid bond or a certified cashier's check. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the 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 if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty.

#### **2.25.** *Delete Section 4.2.2 and substitute the following:*

- **4.2.2** If a surety bond is required, it shall be written on AIA Document A310, Bid Bond, and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the power of attorney. The bid bond shall:
  - .1 Be issued by a surety company licensed to do business in South Carolina;
  - .2 Be issued by a surety company having, at a minimum, a "Best Rating" of "A" as stated in the most current publication of "Best's Key Rating Guide, Property-Casualty", which company shows a financial strength rating of at least five (5) times the contract price.
  - .3 Be enclosed in the bid envelope at the time of Bid Opening, either in paper copy or as an electronic bid bond authorization number provided on the Bid Form and issued by a firm or organization authorized by the surety to receive, authenticate and issue binding electronic bid bonds on behalf the surety.

#### **2.26.** Delete Section 4.2.3 and substitute the following:

**4.2.3** By submitting a bid bond via an electronic bid bond authorization number on the Bid Form and signing the Bid Form, the Bidder certifies that an electronic bid bond has been executed by a Surety meeting the standards required by the Bidding Documents and the Bidder and Surety are firmly bound unto the State of South Carolina under the conditions provided in this Section 4.2.

#### **2.27.** Insert the following Section 4.2.4:

**4.2.4** The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and performance and payment bonds, if required, have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn or (c) all Bids have been rejected.

#### **2.28.** Delete Section 4.3.1 and substitute the following:

**4.3.1** All copies of the Bid, the bid security, if any, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall, unless hand delivered by the Bidder, be addressed to the Owner's designated purchasing office as shown in the Invitation for Bids. The envelope 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 or special delivery service (UPS, Federal Express, etc.), the envelope should be labeled "BID ENCLOSED" on the face thereof. Bidders hand delivering their Bids shall deliver Bids to the place of the Bid Opening as shown in the Invitation for Bids. Whether or not Bidders attend the Bid Opening, they shall give their Bids to the Owner's procurement officer or his/her designee as shown in the Invitation for Bids prior to the time of the Bid Opening.

#### **2.29.** Insert the following Section 4.3.6 and substitute the following:

**4.3.5** The official time for receipt of Bids will be determined by reference to the clock designated by the Owner's procurement officer or his/her designee. The procurement officer conducting the Bid Opening will determine and announce that the deadline has arrived and no further Bids or bid modifications will be accepted. All Bids and bid modifications in the possession of the procurement officer at the time the announcement is completed will be timely, whether or not the bid envelope has been date/time stamped or otherwise marked by the procurement officer.

#### **2.30.** Delete Section 4.4.2 and substitute the following:

**4.4.2** Prior to the time and date designated for receipt of Bids, a Bid submitted may be withdrawn in person or by written notice to the party receiving Bids at the place designated for receipt of Bids. Withdrawal by written notice shall be in writing over the signature of the Bidder.

#### **2.31.** In Section 5.1, delete everything following the caption "OPENING OF BIDS" and substitute the following:

**5.1.1** Bids received on time will be publicly opened and will be read aloud. Owner will not read aloud Bids that Owner determines, at the time of opening, to be non-responsive.

**5.1.2** At bid opening, Owner will announce the date and location of the posting of the Notice of Intended Award.

**5.1.3** Owner will send a copy of the final Bid Tabulation to all Bidders within ten (10) working days of the Bid Opening.

Revised October 22, 2012

# OSE FORM 00201 STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

**5.1.4** If Owner determines to award the Project, Owner will, after posting a Notice of Intended Award, send a copy of the Notice to all Bidders.

5.1.5 If only one Bid is received, Owner will open and consider the Bid.

**2.32.** In Section 5.2, insert the section number "5.2.1" before the words of the "The Owner" at the beginning of the sentence.

#### **2.33.** *Insert the following Sections 5.2.2 and 5.2.3:*

5.2.2 The reasons for which the Owner will reject Bids include, but are not limited to:

- .1 Failure by a Bidder to be represented at a Mandatory Pre-Bid Conference or site visit;
- .2 Failure to deliver the Bid on time;
- .3 Failure to comply with Bid Security requirements, except as expressly allowed by law;
- .4 Listing an invalid electronic Bid Bond authorization number on the bid form;
- .5 Failure to Bid an Alternate, except as expressly allowed by law;
- .6 Failure to list qualified Subcontractors as required by law;
- .7 Showing any material modification(s) or exception(s) qualifying the Bid;
- .8 Faxing a Bid directly to the Owner or their representative; or
- .9 Failure to include a properly executed Power-of-Attorney with the bid bond.

**5.2.3** The Owner may reject a Bid as nonresponsive if the prices bid are materially unbalanced between line items or sub-line items. A bid is materially unbalanced when it is based on prices significantly less than cost for some work and prices which are significantly overstated in relation to cost for other work, and if there is a reasonable doubt that the bid will result in the lowest overall cost to the Owner even though it may be the low evaluated bid, or if it is so unbalanced as to be tantamount to allowing an advance payment.

#### **2.34.** *Delete Section 6.1 and substitute the following:*

#### 6.1 CONTRACTOR'S RESPONSIBILITY

Owner will make a determination of Bidder's responsibility before awarding a contract. Bidder shall provide all information and documentation requested by the Owner to support the Owner's evaluation of responsibility. Failure of Bidder to provide requested information is cause for the Owner, at its option, to determine the Bidder to be non-responsible

- 2.35. Delete the language of Section 6.2 and insert the word "Reserved."
- 2.36. Delete the language of Sections 6.3.2, 6.3.3, and 6.3.4 and insert the word "Reserved" after each Section Number.

#### **2.37.** Insert the following Section 6.4

#### **6.4 CLARIFICATION**

Pursuant to Section 11-35-1520(8), the Procurement Officer may elect to communicate with a Bidder after opening for the purpose of clarifying either the Bid or the requirements of the Invitation for Bids. Such communications may be conducted only with Bidders who have submitted a Bid which obviously conforms in all material aspects to the Invitation for Bids and only in accordance with Appendix D (Paragraph A(6)) to the Manual for Planning and Execution of State Permanent Improvement, Part II. Clarification of a Bid must be documented in writing and included with the Bid. Clarifications may not be used to revise a Bid or the Invitation for Bids. [Section 11-35-1520(8); R.19-445.2080]

**2.38.** Delete Section 7.1.2 and substitute the following:

**7.1.2** The performance and payment bonds shall conform to the requirements of Section 11.4 of the General Conditions of the Contract. If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid.

- **2.39.** Delete the language of Section 7.1.3 and insert the word "Reserved."
- **2.40.** In Section 7.2, insert the words "CONTRACT, CERTIFICATES OF INSURANCE" into the caption after the word "Delivery."

**2.41.** *Delete Section 7.2.1 and substitute the following:* 

**7.2.1** After expiration of the protest period, the Owner will tender a signed Contract for Construction to the Bidder and the Bidder shall return the fully executed Contract for Construction to the Owner within seven days thereafter. The Bidder shall deliver the required bonds and certificate of insurance to the Owner not later than three days following the date of execution of the Contract. Failure to deliver these documents as required shall entitle the Owner to consider the Bidder's failure as a refusal to enter into a contract in accordance with the terms and conditions of the Bidder's Bid and to make claim on the Bid Security for re-procurement cost.

**2.42.** Delete the language of Section 7.2.2 and insert the word "Reserved."

#### **2.43.** *Delete the language of Article 8 and insert the following:*

Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on South Carolina Modified AIA Document A101, 2007, Standard Form of Agreement Between Owner and Contractor as modified by OSE Form 00501 – Standard Modification to Agreement Between Owner and Contractor.

#### **2.44.** *Insert the following Article 9:*

#### **ARTICLE 9 MISCELLANEOUS**

# 9.1 NONRESIDENT TAXPAYER REGISTRATION AFFIDAVIT INCOME TAX WITHHOLDING IMPORTANT TAX NOTICE - NONRESIDENTS ONLY

Withholding Requirements for Payments to Nonresidents: Section 12-8-550 of the South Carolina Code of Laws requires persons hiring or contracting with a nonresident conducting a business or performing personal services of a temporary nature within South Carolina to withhold 2% of each payment made to the nonresident. The withholding requirement does not apply to (1) payments on purchase orders for tangible personal property when the payments are not accompanied by services to be performed in South Carolina, (2) nonresidents who are not conducting business in South Carolina, (3) nonresidents for contracts that do not exceed \$10,000 in a calendar year, or (4) payments to a nonresident who (a) registers with either the S.C. Department of Revenue or the S.C. Secretary of State and (b) submits a Nonresident Taxpayer Registration Affidavit - Income Tax Withholding, Form I-312 to the person letting the contract.

For information about other withholding requirements (e.g., employee withholding), contact the Withholding Section at the South Carolina Department of Revenue at 803-898-5383 or visit the Department's website at: <u>www.sctax.org</u>

This notice is for informational purposes only. This Owner does not administer and has no authority over tax issues. All registration questions should be directed to the License and Registration Section at 803-898-5872 or to the South Carolina Department of Revenue, Registration Unit, Columbia, S.C. 29214-0140. All withholding questions should be directed to the Withholding Section at 803-898- 5383.

PLEASE SEE THE "NONRESIDENT TAXPAYER REGISTRATION AFFIDAVIT INCOME TAX WITHHOLDING" FORM (FORM NUMBER I-312) LOCATED AT: http://www.sctax.org/Forms+and+Instructions/withholding/default.htm .

#### 9.2 CONTRACTOR LICENSING

Contractors and Subcontractors listed in Section 7 of the Bid Form who are required by the South Carolina Code of Laws to be licensed, must be licensed at the time of bidding.

#### 9.3 SUBMITTING CONFIDENTIAL INFORMATION

For every document Bidder submits in response to or with regard to this solicitation or request, Bidder must separately mark with the word "CONFIDENTIAL" every page, or portion thereof, that Bidder contends contains information that is exempt from public disclosure because it is either (a) a trade secret as defined in Section 30-4-40(a)(1), or (b) privileged & confidential, as that phrase is used in Section 11-35-410. For every document Bidder submits in response to or with regard to this solicitation or request, Bidder must separately mark with the words "TRADE SECRET" every page, or portion thereof, that Bidder contends contains a trade secret as that term is defined by Section 39-8-20 of the Trade Secrets Act. For every document Bidder submits in response to or with regard to this solicitation or request, Bidder submits in response to or with regard to this solicitation or request, Bidder submits in response to or with regard to this solicitation or request, Bidder submits in response to or with regard to this solicitation or request, Bidder submits in response to or with regard to this solicitation or request, Bidder submits in response to or with regard to this solicitation or request, Bidder must separately mark with the word "PROTECTED" every page, or portion thereof, that Bidder contends is protected by Section 11-35-1810. All markings must be conspicuous; use color, bold, underlining, or some other method in order to conspicuously distinguish the mark from the other text. Do not mark your entire bid as confidential, trade secret, or protected! If your bid, or any part thereof, is improperly marked as confidential or trade

2011 Edition

secret or protected, the State may, in its sole discretion, determine it nonresponsive. If only portions of a page are subject to some protection, do not mark the entire page. By submitting a response to this solicitation, Bidder (1) agrees to the public disclosure of every page of every document regarding this solicitation or request that was submitted at any time prior to entering into a contract (including, but not limited to, documents contained in a response, documents submitted to clarify a response, & documents submitted during negotiations), unless the page is conspicuously marked "TRADE SECRET" or "CONFIDENTIAL" or "PROTECTED", (2) agrees that any information not marked, as required by these bidding instructions, as a "Trade Secret" is not a trade secret as defined by the Trade Secrets Act, & (3) agrees that, notwithstanding any claims or markings otherwise, any prices, commissions, discounts, or other financial figures used to determine the award, as well as the final contract amount, are subject to public disclosure. In determining whether to release documents, the State will detrimentally rely on Bidders's marking of documents, as required by these bidding instructions, as being either "Confidential" or "Trade Secret" or "PROTECTED". By submitting a response, Bidder agrees to defend, indemnify & hold harmless the State of South Carolina, its officers & employees, from every claim, demand, loss, expense, cost, damage or injury, including attorney's fees, arising out of or resulting from the State withholding information that Bidder marked as "confidential" or "trade secret" or "PROTECTED".

#### 9.4 POSTING OF INTENT TO AWARD

Notice of Intent to Award, SE-370, will be posted at the following location:

Room or Area of Posting: Reception Area

Building Where Posted: Facilities Management Center

Address of Building: 743 Greene Street, Columbia, South Carolina 29208

WEB site address (if applicable): <u>purchasing.sc.edu</u>

**Posting date will be announced at bid opening.** In addition to posting the notice, the Owner will promptly send all responsive bidders a copy of the notice of intent to award and the final bid tabulation

#### 9.5 PROTEST OF SOLICITATION OR AWARD

Any prospective bidder, offeror, contractor, or subcontractor who is aggrieved in connection with the solicitation of a contract shall protest within fifteen days of the date of issuance of the applicable solicitation document at issue. Any actual bidder, offeror, contractor, or subcontractor who is aggrieved in connection with the intended award or award of a contract shall protest within ten days of the date notification of intent to award is posted in accordance with Title 11, Chapter 35, Section 4210 of the South Carolina Code of Laws, as amended. A protest shall be in writing, shall set forth the grounds of the protest and the relief requested with enough particularity to give notice of the issues to be decided, and must be received by the State Engineer within the time provided.

Any protest must be addressed to the CPO, Office of State Engineer, and submitted in writing:

- (a) by email to protest-ose@mmo.sc.gov,
- (b) by facsimile at 803-737-0639, or
- (c) by post or delivery to 1201 Main Street, Suite 600, Columbia, SC 29201.

By submitting a protest to the foregoing email address, you (and any person acting on your behalf) consent to receive communications regarding your protest (and any related protests) at the e-mail address from which you sent your protest.

#### 9.6 SOLICITATION INFORMATION FROM SOURCES OTHER THAN OFFICIAL SOURCE

South Carolina Business Opportunities (SCBO) is the official state government publication for State of South Carolina solicitations. Any information on State agency solicitations obtained from any other source is unofficial and any reliance placed on such information is at the bidder's sole risk and is without recourse under the South Carolina Consolidated Procurement Code.

#### 9.7 BUILDER'S RISK INSURANCE

Bidder's are directed to Article 11.3 of the South Carolina Modified AIA Document A201, 2007 Edition, which, unless provided otherwise in the bid documents, requires the contractor to provide builder's risk insurance on the project.

#### 9.8 TAX CREDIT FOR SUBCONTRACTING WITH MINORITY FIRMS

Pursuant to Section 12-6-3350, taxpayers, who utilize certified minority subcontractors, may take a tax credit equal to 4% of the payments they make to said subcontractors. The payments claimed must be based on work performed directly for a South Carolina state contract. The credit is limited to a maximum of fifty thousand dollars annually. The taxpayer is eligible to claim the credit for 10 consecutive taxable years beginning with the taxable year in which the first payment is made to the subcontractor that qualifies for the credit. After the above ten consecutive taxable years, the taxpayer is no longer eligible for the credit. The credit may be claimed on Form TC-2, "Minority Business Credit." A copy of the subcontractor's certificate from the Governor's Office of Small and Minority Business (OSMBA) is to be attached to the contractor's income tax return. Taxpayers must maintain evidence of work performed for a State contract by the minority subcontractor. Questions regarding the tax credit and how to file are to be referred to: SC Department of Revenue, Research and Review, Phone: (803) 898-5786, Fax: (803) 898-5888. The subcontractor must be certified as to the criteria of a "Minority Firm" by the Governor's Office of Small and Minority Business Assistance (OSMBA). Certificates are issued to subcontractors upon successful completion of the certification process. Questions regarding subcontractor certification are to be referred to: Governor's Office of Small and Minority Business Assistance Assistance, Phone: (803) 734-0657, Fax: (803) 734-2498. Reference: SC §11-35-5010 – Definition for Minority Subcontractor & SC §11-35-5230 (B) – Regulations for Negotiating with State Minority Firms.

#### § 9.9 OTHER SPECIAL CONDITIONS OF THE WORK

Section 00210 - Supplement A - Request for Information

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\_\_\_\_\_

**END OF DOCUMENT** 

2011 Edition

Revised October 22, 2012

TO: GMK ASSOCIATES. INC F	FROM:
ATTENTION: JEROME K. SIMON	IS
DATE/TIME:	TELEPHONE #:
FAX NUMBER: 803.255.7243	FAX #:
NUMBER OF PAGES	CONTACT:
PROJECT NAME: GIBBES GREE COLLEGE SITEWORK	N HISTORIC FACILITIES RENOVATION - PETIGRU
INSTRUCTIONS: IN SPACES PRO AND/OR PLAN SHEET FOR WHI FOLLOWED BY DESCRIPTION ( COPIES OF REQUEST FOR INFO REQUESTS. LIMIT TO ONE QUE	OVIDED BELOW, LIST SPECIFICATION SECTION CH INFORMATION OR CLARIFICATION IS NEEDI OR REQUIRED INFORMATION. USE ADDITIONAL RMATION FORMS AS NEEDED FOR ADDITIONAL STION OR SUBJECT INQUIRY PER R.F.I.
SPECIFICATION SECTION(S):	
DRAWING SHEET(S):	
DRAWING SHELI(S).	

#### SECTION 00300 - BID BOND

#### FORM OF BID BOND

- 1.01 See AIA Document A310 (2010 Edition), Bid Bond available at the office of GMK Associates, Inc., 1201 Main Street Suite 2100, Columbia, SC 29201. 803-256-0000 OR,
  - A. Copies of this document may be obtained from The American Institute of Architects, 1522 Richland Street., Columbia, SC 29201. 803-252-6050.

#### **END OF SECTION**

Bidders shall submit bids on only Bid Form SE-330.

BID SUBMITTED BY: (Bidder's Name) BID SUBMITTED TO: University of South Carolina (Owner's Name) FOR PROJECT: PROJECT NAME Gibbes Green Historic Facilities Renovation Petigru College Sitework PROJECT NUMBER H27-9835-PD-C

#### **OFFER**

**§ 1.** In response to the Invitation for Construction Bids and in compliance with the Instructions to Bidders for the above-named Project, the undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into a Contract with the Owner on the terms included in the Bidding Documents, and to perform all Work as specified or indicated in the Bidding Documents, for the prices and within the time frames indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

**§ 2.** Pursuant to Section 11-32-3030(1) of the SC Code of Laws, as amended, Bidder has submitted Bid Security as follows in the amount and form required by the Bidding Documents:

Bid Bond with Power of Attorney	Electronic Bid Bond	Cashier's Check
(Bidder	check one)	

**§ 3.** Bidder acknowledges the receipt of the following Addenda to the Bidding Documents and has incorporated the effects of said Addenda into this Bid:

#### ADDENDUM No:

**§ 4.** Bidder accepts all terms and conditions of the Invitation for Bids, including, without limitation, those dealing with the disposition of Bid Security. Bidder agrees that this Bid, including all Bid Alternates, if any, may not be revoked or withdrawn after the opening of bids, and shall remain open for acceptance for a period of <u>60</u> Days following the Bid Date, or for such longer period of time that Bidder may agree to in writing upon request of the Owner.

**§ 5.** Bidder herewith offers to provide all labor, materials, equipment, tools of trades and labor, accessories, appliances, warranties and guarantees, and to pay all royalties, fees, permits, licenses and applicable taxes necessary to complete the following items of construction work:

§ 6.1 BASE BID WORK (as indicated in the Bidding Documents and generally described as follows): The project consist of rework of the existing site including brick and concrete pavement, curb and gutter, brick columns, erosion control, concrete car stops, storm drainage, inlets, fire hydrant relocation, tree protection, grading, wrought iron gates, etc. Small and minority business participation is encouraged.

\_, which sum is hereafter called the Base Bid.

(Bidder - insert Base Bid Amount on line above)

§ 6.2 BID ALTERNATES - as indicated in the Bidding Documents and generally described as follows:

ALTERNATE # 1 (Brief Description): Center Greene Street stair which includes; brick columns (2) with precast cap, low brick wall, low brick cheek wall, brick pavement, brick steps and handrails and all other work associated with center stair as indicated on the drawings..

ADD TO or DEDUCT FROM BASE BID:

(Bidder to Mark appropriate box to clearly indicate the price adjustment offered for each alternate)

ALTERNATE # 2 (Brief Description): N/A

ADD TO or DEDUCT FROM BASE BID:

(Bidder to Mark appropriate box to clearly indicate the price adjustment offered for each alternate)

ALTERNATE # 3 (Brief Description): <u>N/A</u>

ADD TO or DEDUCT FROM BASE BID:

(Bidder to Mark appropriate box to clearly indicate the price adjustment offered for each alternate)

#### § 7. LISTING OF PROPOSED SUBCONTRACTORS PURSUANT TO SECTION 3020(b)(i), CHAPTER 35, TITLE 11 OF THE SOUTH CAROLINA CODE OF LAWS, AS AMENDED – (See Instructions on the following page BF-2A)

Bidder shall use the below-listed Subcontractors in the performance of the Subcontractor Specialty work listed:

SUBCONTRACTOR SPECIALTY By License Classification and/or Subclassification (Completed by Owner)	SUBCONTRACTOR'S PRIME CONTRACTOR'S NAME (Must be completed by Bidder) BASE BID	SUBCONTRACTOR'S PRIME CONTRACTOR'S SC LICENSE NUMBER	
N/A	N/A	N/A	
	ALTERNATE 1		
N/A	N/A	N/A	
	ALTERNATE 2	1	
ALTERNATE 3			
		· · · ·	

If a Bid Alternate is accepted, Subcontractors listed for the Bid Alternate shall be used for the work of both the Alternate and the Base Bid work.

# INSTRUCTIONS FOR SUBCONTRACTOR LISTING

1. Section 7 of the Bid Form sets forth a list of subcontractor specialties for which bidder is required to identify by name the subcontractor(s)Bidder will use to perform the work of each listed specialty. Bidder must identify only the subcontractor(s) who will perform the work and no others.

**2.** For purposes of subcontractor listing, a Subcontractor is an entity who will perform work or render service to the prime contractor to or about the construction site. Material suppliers, manufacturers, and fabricators that will not perform physical work at the site of the project but will only supply materials or equipment to the bidder or proposed subcontractor(s) are not subcontractors and Bidder should not insert their names in the spaces provided on the bid form. Likewise, Bidder should not insert the names of sub-subcontractors in the spaces provided on the bid form but only the names of those entities with which bidder will contract directly.

**3**. Bidder must only insert the names of subcontractors who are qualified to perform the work of the listed specialties as specified in the Bidding Documents and South Carolina Licensing Laws.

**4.** If under the terms of the Bidding Documents, Bidder is qualified to perform the work of a specialty listed and Bidder does not intend to subcontract such work but to use Bidder's own employees to perform such work, the Bidder must insert its own name in the space provided for that specialty.

**5.** If Bidder intends to use multiple subcontractors to perform the work of a single specialty listing, Bidder must insert the name of each subcontractor Bidder will use, preferably separating the name of each by the word **"and"**. If Bidder intends to use both his own employees to perform a part of the work of a single specialty listing and to use one or more subcontractors to perform the remaining work for that specialty listing, bidder must insert his own name and the name of each subcontractor, preferably separating the name of each with the word **"and"**.

**6**. Bidder may not list subcontractors in the alternative nor in a form that may be reasonably construed at the time of bid opening as a listing in the alternative. A listing that requires subsequent explanation to determine whether or not it is a listing in the alternative is non-responsive. If bidder intends to use multiple entities to perform the work for a single specialty listing, bidder must clearly set forth on the bid form such intent. Bidder may accomplish this by simply inserting the word "**and**" between the name of each entity listed for that specialty. Owner will reject as non-responsive a listing that contains the names of multiple subcontractors separated by a blank space, the word "or", a virgule (that is a /), or any separator that the Owner may reasonably interpret as a listing in the alternative.

**7.** If Bidder is awarded the contract, bidder must, except with the approval of the owner for good cause shown, use the listed entities to perform the work for which they are listed.

**8**. If bidder is awarded the contract, bidder will not be allowed to substitute another entity as subcontractor in place of a subcontractor listed in Section 7 of the Bid except for one or more of the reasons allowed by the SC Code of Laws.

9. Bidder's failure to insert a name for each listed specialty subcontractor will render the Bid non-responsive.

# § 8. LIST OF MANUFACTURERS, MATERIAL SUPPLIERS, AND SUBCONTRACTORS OTHER THAN SUBCONTRACTORS LISTED IN SECTION 7 ABOVE (*FOR INFORMATION ONLY*): Pursuant to instructions in the Invitation for Bids, if any, Bidder will provide to Owner upon the Owner's request and within 24 hours of such request, a listing of manufacturers, material suppliers, and subcontractors, other than those listed in Section 7 above, that Bidder intends to use on the project. Bidder acknowledges and agrees that this list is provided for purposes of determining responsibility and not pursuant to the subcontractor listing requirements of SC Code Ann § 11-35-3020(b)(i).

#### § 9. TIME OF CONTRACT PERFORMANCE AND LIQUIDATED DAMAGES

a. CONTRACT TIME: Bidder agrees that the Date of Commencement of the Work shall be established in a Notice to Proceed to be issued by the Owner. Bidder agrees to substantially complete the Work within <u>90</u> calendar days from the Date of Commencement, subject to adjustments as provided in the Contract Documents.

b. LIQUIDATED DAMAGES: Bidder further agrees that from the compensation to be paid, the Owner shall retain as Liquidated Damages the sum of \$150.00 for each calendar day the actual construction time required to achieve Substantial Completion exceeds the specified or adjusted time for Substantial Completion as provided in the Contract Documents. This sum is intended by the parties as the predetermined measure of compensation for actual damages, not as a penalty for nonperformance.

#### § 10. AGREEMENTS

a. Bidder agrees that this bid is subject to the requirements of the law of the State of South Carolina.

b. Bidder agrees that at any time prior to the issuance of the Notice to Proceed for this Project, this Project may be canceled for the convenience of, and without cost to, the State.

c. Bidder agrees that neither the State of South Carolina nor any of its agencies, employees or agents shall be responsible for any bid preparation costs, or any costs or charges of any type, should all bids be rejected or the Project canceled for any reason prior to the issuance of the Notice to Proceed.

#### § 11. ELECTRONIC BID BOND

By signing below, the Principal is affirming that the identified electronic bid bond has been executed and that the Principal and Surety are firmly bound unto the State of South Carolina under the terms and conditions of the AIA Document A310, Bid Bond, included in the Bidding Documents.

Electronic Bid Bond Number: \_\_\_\_\_

#### **BIDDER'S TAXPAYER IDENTIFICATION**

FEDERAL EMPLOYER'S IDENTIFICATION NUMBER:

OR

SOCIAL SECURITY NUMBER:

#### CONTRACTOR'S CLASSIFICATIONS AND SUBCLASSIFICATIONS WITH LIMITATIONS

Classification(s)& Limits: \_\_\_\_\_

Subclassification(s) & Limits:

SC Contractor's License Number(s):\_\_\_\_\_

BY SIGNING THIS BID, THE PERSON SIGNING REAFFIRMS ALL REPRESENTATIONS AND CERTIFICATIONS MADE BY BOTH THE PERSON SIGNING AND THE BIDDER, INCLUDING WITHOUT LIMITATION, THOSE APPEARING IN ARTICLE 2 OF THE INSTRUCTIONS TO BIDDER. THE INVITATION FOR BIDS, AS DEFINED IN THE INSTRUCTIONS TO BIDDERS, IS EXPRESSLY INCORPORATE BY REFERENCE.

#### SIGNATURE

BIDDER'S LEGAL NAME:	
ADRESS:	
BY:	DATE:
TITLE:	
TELEPHONE:	

#### **SECTION 00500 - AGREEMENT**

PART 1 GENERAL

FORM OF AGREEMENT

- 2.01 RELATED REQUIREMENTS
  - A. Section 00700 General Conditions.
- PART 2 PRODUCTS (NOT USED)
- PART 3 EXECUTION (NOT USED)
- AIA DOCUMENT A101-2007, STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR, FORMS THE BASIS OF CONTRACT BETWEEN THE OWNER AND CONTRACTOR.

5.01 This document is not bound within the project manual.

- A. Copies of this document may be obtained from The American Institute of Architects, 1522 Richland Street., Columbia, SC 29201. 803-252-6050.
- B. OR it can be viewed at the offices of GMK Associates, Inc., 1201 Main Street Suite 2100 Columbia, SC 29201 (803)256-0000

5.02 Refer to document 00501-OSE 2011 for modifications to this document.

END OF AGREEMENT

# OSE FORM 00501 STANDARD MODIFICATIONS TO AGREEMENT BETWEEN OWNER AND CONTRACTOR

# OWNER: <u>University of South Carolina</u> PROJECT NUMBER: <u>H27-9835-PD-C</u> PROJECT NAME: <u>Gibbes Green Historic Facilities Renovation – Petigru College Sitework</u>

#### 1. STANDARD MODIFICATIONS TO AIA A101-2007

**1.1.** These Standard Modifications amend or supplement the *Standard Form of Agreement Between Owner and Contractor* (AIA Document A101-2007) and other provisions of Bidding and Contract Documents as indicated below.

**1.2.** All provisions of A101-2007, which are not so amended or supplemented, remain in full force and effect.

#### 2. MODIFICATIONS TO A101

#### **2.1.** *Insert the following at the end of Article 1:*

Any reference in this document to the Agreement between the Owner and Contractor, AIA Document A101, or some abbreviated reference thereof, shall mean the AIA A101, 2007 Edition as modified by OSE Form 00501 – Standard Modification to Agreement Between Owner and Contractor. Any reference in this document to the General Conditions of the Contract for Construction, AIA Document A201, or some abbreviated reference thereof, shall mean the AIA A201, 2007 Edition as modified by OSE Form 00811 – Standard Supplementary Conditions.

**2.2.** Delete Section 3.1 and substitute the following:

**3.1** The Date of Commencement of the Work shall be the date fixed in a Notice to Proceed issued by the Owner. The Owner shall issue the Notice to Proceed to the Contractor in writing, no less than seven days prior to the Date of Commencement. Unless otherwise provided elsewhere in the contract documents, and provided the contractor has secured all required insurance and surety bonds, the contractor may commence work immediately after receipt of the Notice to Proceed.

**2.3.** Delete Section 3.2 and substitute the following:

**3.2** The Contract Time shall be measured from the Date of Commencement as provided in Section 9(a) of the Bid Form (SE-330) for this Project. Contractor agrees that if the Contractor fails to achieve Substantial Completion of the Work within the Contract Time, the Owner shall be entitled to withhold or recover from the Contractor liquidated damages in the amounts set forth in Section 9(b) of the Bid Form (SE-330, subject to adjustments of this Contract Time as provided in the Contract Documents.

- **2.4.** In Section 5.1.1, insert the words "and Owner" after the phrase "Payment submitted to the Architect."
- **2.5.** Delete Section 5.1.3 and substitute the following:

**5.1.3** The Owner shall make payment of the certified amount to the Contractor not later than 21 days after receipt of the Application for Payment.

**2.6.** In Section 5.1.6, Insert the following after the phrase "Subject to other provisions of the Contract Documents":

and subject to Title 12, Chapter 8, Section 550 of the South Carolina Code of Laws, as amended (Withholding Requirements for Payments to Non-Residents)

In the spaces provided in Sub-Sections 1 and 2 for inserting the retainage amount, insert "three and onehalf percent (3.5%)."

# OSE FORM 00501 Rev. 7/11/2011 STANDARD MODIFICATIONS TO AGREEMENT BETWEEN OWNER AND CONTRACTOR

**2.7.** In Section 5.1.8, delete the word "follows" and the colon and substitute the following:

set forth in S.C. Code Ann. § 11-35-3030(4).

- **2.8.** In Section 5.1.9, delete the words "Except with the Owner's prior approval, the" before the word "Contractor."
- **2.9.** In Section 5.2.2, delete the number 30 and substitute the number 21, delete everything following the words "Certificate for Payment" and place a period at the end of the resulting sentence.
- **2.10.** Delete the language of Sections 6.1 and 6.2 and substitute the word "Reserved" for the deleted language of each Section .
- **2.11.** Delete the language of Section 8.2 and substitute the word "Reserved."
- **2.12.** In Section 8.3, make the word "Representative" in the title plural, delete everything following the title, and substitute the following:

**8.3.1** Owner designates the individual listed below as its Senior Representative ("Owner's Senior Representative"), which individual has the responsibility for and, subject to Section 7.2.1 of the General Conditions, the authority to resolve disputes under Section 15.6 of the General Conditions:

 Name: Tom Opal

 Title: USC Senior Project Manager

 Address: 743 Greene Street, Columbia, South Carolina 29208

 Telephone: 803-777-5996

 FAX: 803-777-8739

 Email: topal@fmk.sc.edu

**8.3.2** Owner designates the individual listed below as its Owner's Representative, which individual has the authority and responsibility set forth in Section 2.1.1 of the General Conditions:

Name: Ann DerrickTitle: USC Project ManagerAddress: 743 Greene Street, Columbia, South Carolina 29208Telephone: (803) 777-5811FAX: 803-777-8739Email: aderrick@fmc.sc.edu

**2.13.** In Section 8.4, make the word "Representative" in the title plural, delete everything following the title, and substitute the following:

**8.4.1** Contractor designates the individual listed below as its Senior Representative ("Contractor's Senior Representative"), which individual has the responsibility for and authority to resolve disputes under Section 15.6 of the General Conditions:

Name:	
Title:	
Address:	
Telephone:	FAX:
Email:	

# OSE FORM 00501 STANDARD MODIFICATIONS TO AGREEMENT BETWEEN OWNER AND CONTRACTOR

**8.4.2** Contractor designates the individual listed below as its Contractor's Representative, which individual has the authority and responsibility set forth in Section 3.1.1 of the General Conditions:

Name:	
Title:	
Address:	
Telephone:	FAX:
Email:	

**2.14**. Add the following Section 8.6.1:

**8.6.1** The Architect's representative:

Name: Ed PearceTitle: Project ArchitectAddress: 1201 Main Street, Suite 2100Telephone: 803-256-0000FAX: 803-255-7243Email: epearce@gmka.com

**2.15.** In Section 9.1.7, Sub-Section 2, list the following documents in the space provided for listing documents:

Invitation for Construction Bids (SE-310) Instructions to Bidders (AIA Document A701-1997) Standard Supplemental Instructions to Bidders (OSE Form 00201) Contractor's Bid (Completed SE-330) Notice of Intent to Award (Completed SE-370) Certificate of procurement authority issued by the SC Budget & Control Board

**2.16.** *In Article 10, delete everything after the first sentence.* 

#### **END OF DOCUMENT**

#### **SECTION 00700 - GENERAL CONDITIONS**

#### FORM OF GENERAL CONDITIONS

#### **RELATED REQUIREMENTS**

- 2.01 Section 00800 Supplementary Conditions.
- AIA DOCUMENT A201, 2007 EDITION, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, IS THE GENERAL CONDITIONS BETWEEN THE OWNER AND CONTRACTOR.
- 3.01 This document is not bound within the project manual.
  - A. Copies of this document may be obtained from The American Institute of Architects, 1522 Richland Street., Columbia, SC 29201. 803-252-6050.
  - B. OR it can be viewed at the offices of GMK Associates, Inc., 1201 Main Street Suite 2100 Columbia, SC 29201 (803)256-0000

#### SUPPLEMENTARY CONDITIONS

4.01 Refer to Document 00811-OSE 2011 for amendments to these General Conditions.

#### END OF DOCUMENT 00700

#### SECTION 00800 - SUPPLEMENTARY CONDITIONS

PART 1 GENERAL

- 1.01 SUMMARY
- 1.02 These Supplementary Conditions amend and supplement the General Conditions defined in Document 00700 and other provisions of the Contract Documents as indicated below. All provisions that are not so amended or supplemented remain in full force and effect.

1.03 MODIFICATIONS TO GENERAL CONDITIONS

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF DOCUMENT

#### OWNER: <u>University of South Carolina</u> PROJECT NUMBER: <u>H27-9835-PD-C</u> PROJECT NAME: <u>Gibbes Green Historic Facilities Renovation – Petigru College Sitework</u>

#### 1 GENERAL CONDITIONS

The *General Conditions of the Contract for Construction*, AIA Document A201, 2007 Edition, Articles 1 through 15 inclusive, is a part of this Contract and is incorporated as fully as if herein set forth. For brevity, AIA Document A201 is also referred to in the Contract Documents collectively as the "General Conditions."

#### 2 STANDARD SUPPLEMENTARY CONDITIONS

- **2.1** The following supplements modify, delete and/or add to the General Conditions. Where any portion of the General Conditions is modified or any paragraph, Section or clause thereof is modified or deleted by these Supplementary Conditions, the unaltered provisions of the General Conditions shall remain in effect.
- **2.2** Unless otherwise stated, the terms used in these Standard Supplementary Conditions which are defined in the General Conditions have the meanings assigned to them in the General Conditions.

#### 3 MODIFICATIONS TO A201-2007

**3.1** *Insert the following at the end of Section 1.1.1:* 

Any reference in this document to the Agreement between the Owner and Contractor, AIA Document A101, or some abbreviated reference thereof, shall mean the AIA A101, 2007 Edition as modified by OSE Form 00501 – Standard Modification to Agreement Between Owner and Contractor. Any reference in this document to the General Conditions of the Contract for Construction, AIA Document A201, or some abbreviated reference thereof, shall mean the AIA A201, 2007 Edition as modified by OSE Form 00811 – Standard Supplementary Conditions.

- **3.2** Delete the language of Section 1.1.8 and substitute the word "Reserved."
- **3.3** Add the following Section 1.1.9:

#### **1.1.9 NOTICE TO PROCEED**

Notice to Proceed is a document issued by the Owner to the Contractor, with a copy to the Architect, directing the Contractor to begin prosecution of the Work in accordance with the requirements of the Contract Documents. The Notice to Proceed shall fix the date on which the Contract Time will commence.

**3.4** *Insert the following at the end of Section 1.2.1:* 

In the event of patent ambiguities within or between parts of the Contract Documents, the contractor shall 1) provide the better quality or greater quantity of Work, or 2) comply with the more stringent requirement, either or both in accordance with the Architect's interpretation.

**3.5** Delete Section 1.5.1 and substitute the following:

**1.5.1** The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service 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 a violation of the Architect's or Architect's consultants' reserved rights.

# OSE FORM 00811 STANDARD SUPPLEMENTARY CONDITIONS

**3.6** Delete Section 2.1.1 and substitute the following:

**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 provided in Section 7.1.2. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's Representative. [Reference § 8.2 of the Agreement.]

#### **3.7** Delete Section 2.1.2 and substitute the following:

**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 post Notice of Project Commencement pursuant to Title 29, Chapter 5, Section 23 of the South Carolina Code of Laws, as amended..

**3.8** Delete Section 2.2.3 and substitute the following:

**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. Subject to the Contractor's obligations, including those in Section 3.2, the Contractor shall be entitled to rely on the accuracy of information furnished by the Owner pursuant to this Section but shall exercise proper precautions relating to the safe performance of the Work.

**3.9** *Replace the period at the end of the last sentence of Section 2.2.4 with a semicolon and insert the following after the inserted semicolon:* 

"however, the Owner does not warrant the accuracy of any such information requested by the Contractor that is not otherwise required of the Owner by the Contract Documents. Neither the Owner nor the Architect shall be required to conduct investigations or to furnish the Contractor with any information concerning subsurface characteristics or other conditions of the area where the Work is to be performed beyond that which is provide in the Contract Documents."

**3.10** Delete Section 2.2.5 and substitute the following:

**2.2.5** Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor with ten copies of the Contract Documents. The Contractor may make reproductions of the Contract Documents pursuant to Section 1.5.2. All copies of the drawings and specifications, except the Contractor's record set, shall be returned or suitably accounted for to the Owner, on request, upon completion of the Work.

3.11 Add the following Sections 2.2.6 and 2.2.7:

**2.2.6** The Owner assumes no responsibility for any conclusions or interpretation made by the Contractor based on information made available by the Owner.

**2.2.7** The Owner shall obtain, at its own cost, general building and specialty inspection services as required by the Contract Documents. The Contractor shall be responsible for payment of any charges imposed for reinspections.

#### **3.12** Delete Section 2.4 and substitute the following:

**2.4** 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, including but not limited to providing necessary resources, 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 Directive 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 Architect's additional services made necessary by such default, neglect or failure. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

# OSE FORM 00811 STANDARD SUPPLEMENTARY CONDITIONS

**3.13** *Insert the following at the end of Section 3.2.1:* 

The Contractor acknowledges that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost, including but not limited to (1) conditions bearing upon transportation, disposal, handling, and storage of materials; (2) the availability of labor, water, electric power, and roads; (3) uncertainties of weather, river stages, tides, or similar physical conditions at the site; (4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during work performance. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the Owner, as well as from the drawings and specifications made a part of this contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the Owner.

- 3.14 In the third sentence of Section 3.2.4, insert the word "latent" before the word "errors."
- 3.15 In the last sentence of Section 3.3.1, insert the words "by the Owner in writing" after the word "instructed."
- **3.16** Delete the third sentence of Section 3.5 and substitute the following sentences:

Work, materials, or equipment not conforming to these requirements shall be considered defective. Unless caused by the Contractor or a subcontractor at any tier, the Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage.

**3.17** *Insert the following at the end of Section 3.6:* 

The Contractor shall comply with the requirements of Title 12, Chapter 9 of the South Carolina Code of Laws, as amended, regarding withholding tax for nonresidents, employees, contractors and subcontractors.

**3.18** In Section 3.7.1, delete the words "the building permit as well as for other" and insert the following sentence at the end of this section:

Pursuant to Title 10, Chapter 1, Section 180 of the South Carolina Code of Laws, as amended, no local general or specialty building permits are required for state buildings.

**3.19** Delete the last sentence of Section 3.7.5 and substitute the following:

Adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 7.3.3.

**3.20** Delete the last sentence of Section 3.8.2.3 and substitute the following:

The amount of the Change Order shall reflect the difference between actual costs, as documented by invoices, and the allowances under Section 3.8.2.1.

**3.21** In Section 3.9.1, insert a comma after the word "superintendent" in the first sentence and insert the following after the inserted comma:

acceptable to the Owner,

**3.22** Delete Section 3.9.2 and substitute the following:

**3.9.2** The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner the name and qualifications of a proposed superintendent. The Owner may reply within 14 days to the Contractor in writing stating (1) whether the Owner has reasonable objection to the proposed superintendent or (2) that the

# OSE FORM 00811 STANDARD SUPPLEMENTARY CONDITIONS

Owner requires additional time to review. Failure of the Owner to reply within the 14-day period shall constitute notice of no reasonable objection.

**3.23** After the first sentence in Section 3.9.3, insert the following sentence:

The Contractor shall notify the Owner, in writing, of any proposed change in the superintendent, including the reason therefore, prior to making such change.

**3.24** *Delete Section 3.10.3 and substitute the following:* 

**3.10.3** Additional requirements, if any, for the constructions schedule are as follows: *(Check box if applicable to this Contract))* 

 $\boxtimes$  The construction schedule shall be in a detailed precedence-style critical path management (CPM) or primavera-type format satisfactory to the Owner and the Architect that shall also (1) provide a graphic representation of all activities and events that will occur during performance of the work; (2) identify each phase of construction and occupancy; and (3) set forth dates that are critical in ensuring the timely and orderly completion of the Work in accordance with the requirements of the Contract Documents (hereinafter referred to as "Milestone Dates"). Upon review and acceptance by the Owner and the Architect of the Milestone Dates, the construction schedule shall be deemed part of the Contract Documents and attached to the Agreement as Exhibit "A." If not accepted, the construction schedule shall be promptly revised by the Contractor in accordance with the recommendations of the Owner and the Architect and resubmitted for acceptance. The Contactor shall monitor the progress of the Work for conformance with the requirements of the construction schedule and shall promptly advise the Owner of any delays or potential delays. Whenever the approved construction schedule no longer reflects actual conditions and progress of the work or the Contract Time is modified in accordance with the terms of the Contract Documents, the Contractor shall update the accepted construction schedule to reflect such conditions. In the event any progress report indicates any delays, the Contractor shall propose an affirmative plan to correct the delay, including overtime and/or additional labor, if necessary. In no event shall any progress report constitute an adjustment in the Contract Time, any Milestone Date, or the Contract Sum unless any such adjustment is agreed to by the Owner and authorized pursuant to Change Order.

#### **3.25** Add the following Section 3.10.4:

**3.10.4** Owner's review and acceptance of Contractor's schedule is not conducted for the purpose of either determining its accuracy and completeness or approving the construction means, methods, techniques, sequences or procedures. The Owner's approval shall not relieve the Contractor of any obligations. Unless expressly addressed in a Modification, the Owner's approval of a schedule shall not change the Contract Time.

**3.26** Add the following Section 3.12.5.1:

**3.12.5.1** The fire sprinkler shop drawings shall be prepared by a licensed fire sprinkler contractor and shall accurately reflect actual conditions affecting the required layout of the fire sprinkler system. The fire sprinkler contractor shall certify the accuracy of his shop drawings prior to submitting them for review and approval. The fire sprinkler shop drawings shall be reviewed and approved by the Architect's engineer of record who, upon approving the sprinkler shop drawings will submit them to the State Fire Marshal or other authorities having jurisdiction for review and approval. The Architect's engineer of record will submit a copy of the State Fire Marshal's approval letter to the Contractor, Architect, and OSE. Unless authorized in writing by OSE, neither the Contractor nor subcontractor at any tier shall submit the fire sprinkler shop drawings directly to the State Fire Marshal or other authorities having jurisdiction for approval.

**3.27** In the fourth sentence of Section 3.12.10, after the comma following the words "licensed design professional," insert the following:

who shall comply with reasonable requirements of the Owner regarding qualifications and insurance and

**3.28** In Section 3.13, insert the section number "3.13.1" before the before the opening words "The Contractors shall."
**3.29** Add the following Sections 3.13.2 and 3.13.3:

**3.13.2** Protection of construction materials and equipment stored at the Project site from weather, theft, vandalism, damage, and all other adversity is solely the responsibility of the Contractor. The Contractor shall perform the work in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work shall be performed, to the fullest extent reasonably possible, in such a manner that public areas adjacent to the site of the Work shall be free from all debris, building materials, and equipment likely to cause hazardous conditions.

**3.13.3** The Contractor and any entity for whom the Contractor is responsible shall not erect any sign on the Project site without the prior written consent of the Owner.

**3.30** In the first sentence of Section 3.18.1, after the parenthetical "...(other than the Work itself),..." and before the word "...but...", insert the following:

including loss of use resulting therefrom,

**3.31** Delete Section 4.1.1 and substitute the following:

**4.1.1** The Architect is that person or entity identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

**3.32** Insert the following at the end of Section 4.2.1:

Any reference in the Contract Documents to the Architect taking action or rendering a decision with a "reasonable time" is understood to mean no more than fourteen days, unless otherwise specified in the Contract Documents or otherwise agreed to by the parties.

**3.33** Delete the first sentence of Section 4.2.2 and substitute the following:

The Architect will visit the site as necessary to fulfill its obligation to the Owner for inspection services, if any, and, at a minimum, to assure conformance with the Architect's design as shown in the Contract Documents and to observe the progress and quality of the various components of the Contractor's Work, and to determine 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.

**3.34** Delete the first sentence of Section 4.2.3 and substitute the following:

On the basis of the site visits, the Architect will keep the Owner informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work.

**3.35** In Section 4.2.5, after the words "evaluations of the" and before the word "Contractor's," insert the following:

Work completed and correlated with the

**3.36** Delete the first sentence of Section 4.2.11 and substitute the following:

**4.2.11** The Architect will, in the first instance, interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. Upon receipt of such request, the Architect will promptly provide the non-requesting party with a copy of the request.

**3.37** Insert the following at the end of Section 4.2.12:

If either party disputes the Architects interpretation or decision, that party may proceed as provided in Article 15. The Architect's interpretations and decisions may be, but need not be, accorded any deference in any review conducted pursuant to law or the Contract Documents.

### **3.38** Delete Section 4.2.14 and substitute the following:

The Architect will review and respond to requests for information about the Contract Documents so as to avoid delay to the construction of the Project. The Architect's response to such requests will be made in writing with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information. Any response to a request for information must be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. Unless issued pursuant to a Modification, supplemental Drawings or Specifications will not involve an adjustment to the Contract Sum or Contract Time.

#### **3.39** Delete Section 5.2.1 and substitute the following:

**5.2.1** Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, within fourteen days after posting of the Notice of Intent to Award the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (excluding Listed Subcontractors but including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Owner may reply within 14 days to the Contractor in writing stating (1) whether the Owner has reasonable objection to any such proposed person or entity. Failure of the Owner to reply within the 14 day period shall constitute notice of no reasonable objection.

**3.40** Delete Section 5.2.2 and substitute the following:

**5.2.2** The Contractor shall not contract with a proposed person or entity to whom the Owner has made reasonable and timely objection. The Owner shall not direct the Contractor to contract with any specific individual or entity for supplies or services unless such supplies and services are necessary for completion of the Work and the specified individual or entity is the only source of such supply or services.

- **3.41** *In the first sentence of Section 5.2.3, delete the words "…or Architect…" in the two places they appear.*
- **3.42** Delete the words "...or Architect..." in the in the first sentence of Section 5.2.4 and insert the following sentence at the end of Section 5.2.4:

The Contractor's request for substitution must be made to the Owner in writing accompanied by supporting information.

**3.43** Add the following Section 5.2.5:

**5.2.5** A Subcontractor identified in the Contractor's Bid in response the specialty subcontractor listing requirements of Section 7 of the Bid Form (SE-330) may only be substituted in accordance with and as permitted by the provisions of Title 11, Chapter 35, Section 3021 of the South Carolina Code of Laws, as amended. A proposed substitute for a Listed Subcontractor shall be subject to the Owner's approval as set forth is Section 5.2.3.

**3.44** In Section 5.3, delete everything following the heading "SUBCONTRACTUAL RELATIONS" and insert the following Sections 5.3.1, 5.3.2, 5.3.3, and 5.3.4:

**5.3.1** By appropriate written agreement, 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 the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect 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 herein or 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.

**§ 5.3.2** Without limitation on the generality of Section 5.3.1, each Subcontract agreement and each Sub-subcontract agreement shall include, and shall be deemed to include, the following Sections of these General Conditions: 3.2, 3.5, 3.18, 5.3, 5.4, 6.2.2, 7.3.3, 7.5, 7.6, 13.1, 13.12, 14.3, 14.4, and 15.1.6.

**§ 5.3.3** Each Subcontract Agreement and each Sub-subcontract agreement shall exclude, and shall be deemed to exclude, Sections 13.2.1 and 13.6 and all of Article 15, except Section 15.1.6, of these General Conditions. In the place of these excluded sections of the General Conditions, each Subcontract Agreement and each Sub-subcontract may include Sections 13.2.1 and 13.6 and all of Article 15, except Section 15.1.6, of AIA Document A201-2007, Conditions of the Contract, as originally issued by the American Institute of Architects.

**§ 5.3.4** The Contractor shall assure the Owner that all agreements between the Contractor and its Subcontractor incorporate the provisions of Subparagraph 5.3.1 as necessary to preserve and protect the rights of the Owner and the Architect under the Contract Documents with respect to the work to be performed by Subcontractors so that the subcontracting thereof will not prejudice such rights. The Contractor's assurance shall be in the form of an affidavit or in such other form as the Owner may approve. Upon request, the Contractor shall provide the Owner or Architect with copies of any or all subcontracts or purchase orders.

- **3.45** Delete the last sentence of Section 5.4.1.
- **3.46** Add the following Sections 5.4.4, 5.4.5 and 5.4.6:

**§ 5.4.4** Each subcontract shall specifically provide that the Owner shall only be responsible to the subcontractor for those obligations of the Contractor that accrue subsequent to the Owner's exercise of any rights under this conditional assignment.

**§ 5.4.5** Each subcontract shall specifically provide that the Subcontractor agrees to perform portions of the Work assigned to the Owner in accordance with the Contract Documents.

**§ 5.4.6** Nothing in this Section 5.4 shall act to reduce or discharge the Contractor's payment bond surety's obligations to claimants for claims arising prior to the Owner's exercise of any rights under this conditional assignment.

- **3.47** Delete the language of Section 6.1.4 and substitute the word "Reserved."
- **3.48** *Insert the following at the end of Section 7.1.2:*

If the amount of a Modification exceeds the limits of the Owner's Construction Change Order Certification (reference Section 9.1.7.2 of the Agreement), then the Owner's agreement is not effective, and Work may not proceed, until approved in writing by the Office of State Engineer.

**3.49** Delete Section 7.2.1 and substitute the following:

**7.2.1** A Change Order is a written instrument prepared by the Architect (using State Form SE-480 "Construction Change Order") and signed by the Owner, Contractor and Architect 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.

### **3.50** Add the following Sections 7.2.2, 7.2.3, 7.2.4, and 7.2.5:

**7.2.2** If a Change Order provides for an adjustment to the Contract Sum, the adjustment must be calculated in accordance with Section 7.3.3.

**7.2.3** At the Owner's request, the Contractor shall prepare a proposal to perform the work of a proposed Change Order setting forth the amount of the proposed adjustment, if any, in the Contract Sum; and the extent of the proposed adjustment, if any, in the Contract Time. Any proposed adjustment in the Contract sum shall be prepared in accordance with Section 7.2.2. The Owner's request shall include any revisions to the Drawings or Specifications necessary to define any changes in the Work. Within fifteen days of receiving the request, the Contractor shall submit the proposal to the Owner and Architect along with all documentation required by Section 7.6.

**7.2.4** If the Contractor requests a Change Order, the request shall set forth the proposed change in the Work and shall be prepared in accordance with Section 7.2.3. If the Contractor requests a change to the Work that involves a revision to either the Drawings or Specifications, the Contractor shall reimburse the Owner for any expenditures associated with the Architects' review of the proposed revisions, except to the extent the revisions are accepted by execution of a Change Order.

**7.2.5** Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including, but not limited to, any adjustments to the Contract Sum or the Contract Time.

**3.51** *Delete* 7.3.3 *and substitute the following:* 

### 7.3.3 PRICE ADJUSTMENTS

**§ 7.3.3.1** If any Modification, including a Construction Change Directive, provides for an adjustment to the Contract Sum, the adjustment shall be based on whichever of the following methods is the most valid approximation of the actual cost to the contractor, with overhead and profit as allowed by Section 7.5:

- .1 Mutual acceptance of a lump sum;
- .2 Unit prices stated in the Contract Documents, except as provided in Section 7.3.4, or subsequently agreed upon;
- .3 Cost attributable to the events or situations under applicable clauses with adjustment of profits or fee, all as specified in the contract, or subsequently agreed upon by the parties, or by some other method as the parties may agree; or
- .4 As provided in Section 7.3.7.

**§ 7.3.3.2**Consistent with Section 7.6, costs must be properly itemized and supported by substantiating data sufficient to permit evaluation before commencement of the pertinent performance or as soon after that as practicable. All costs incurred by the Contractor must be justifiably compared with prevailing industry standards. Except as provided in Section 7.5, all adjustments to the Contract Price shall be limited to job specific costs and shall not include indirect costs, overhead, home office overhead, or profit.

#### **3.52** Delete Section 7.3.7 and substitute the following:

**7.3.7** If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall make an initial determination, consistent with Section 7.3.3, of 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 Section 7.5. In such case, and also under Section 7.3.3.1.3, the Contractor shall keep and present, in such form as the Architect 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; and
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work.
- **3.53** Delete Section 7.3.8 and substitute the following:

**7.3.8** Using the percentages stated in Section 7.5, any adjustment to the Contract Sum for deleted work shall include any overhead and profit attributable to the cost for the deleted Work.

**3.54** Add the following Sections 7.5 and 7.6:

# 7.5 AGREED OVERHEAD AND PROFIT RATES

**7.5.1** For any adjustment to the Contract Sum for which overhead and profit may be recovered, other than those made pursuant to Unit Prices stated in the Contract Documents, the Contractor agrees to charge and accept, as full payment for overhead and profit, the following percentages of costs attributable to the change in the Work. The percentages cited below shall be considered to include all indirect costs including, but not limited to: field and office managers, supervisors and assistants, incidental job burdens, small tools, and general overhead allocations. The allowable percentages for overhead and profit are as follows:

.1 To the Contractor for work performed by the Contractor's own forces, 17% of the Contractor's actual costs.

.2 To each Subcontractor for work performed by the Subcontractor's own forces, 17% of the subcontractor's actual costs.

.3 To the Contractor for work performed by a subcontractor, 10% of the subcontractor's actual costs (not including the subcontractor's overhead and profit).

### 7.6 PRICING DATA AND AUDIT

### § 7.6.1 Cost or Pricing Data.

Upon request of the Owner or Architect, Contractor shall submit cost or pricing data prior to execution of a Modification which exceeds \$500,000. Contractor shall certify that, to the best of its knowledge and belief, the cost or pricing data submitted is accurate, complete, and current as of a mutually determined specified date prior to the date of pricing the Modification. Contractor's price, including profit, shall be adjusted to exclude any significant sums by which such price was increased because Contractor furnished cost or pricing data that was inaccurate, incomplete, or not current as of the date specified by the parties. Notwithstanding Subparagraph 9.10.4, such adjustments may be made after final payment to the Contractor.

**§ 7.6.2** Cost or pricing data means all facts that, as of the date specified by the parties, prudent buyers and sellers would reasonably expect to affect price negotiations significantly. Cost or pricing data are factual, not judgmental; and are verifiable. While they do not indicate the accuracy of the prospective contractor's judgment about estimated future costs or projections, they do include the data forming the basis for that judgment. Cost or pricing data are more than historical accounting data; they are all the facts that can be reasonably expected to contribute to the soundness of estimates of future costs and to the validity of determinations of costs already incurred.

# § 7.6.3 Records Retention.

As used in Section 7.6, the term "records" means any books or records that relate to cost or pricing data that Contractor is required to submit pursuant to Section 7.6.1. Contractor shall maintain records for three years from the date of final payment, or longer if requested by the chief procurement officer. The Owner may audit Contractor's records at reasonable times and places.

**3.55** Delete Section 8.2.2 and substitute the following:

**8.2.2** The Contractor shall not knowingly commence operations on the site or elsewhere prior to the effective date of surety bonds and 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 surety bonds or insurance.

### **3.56** *Delete Section 8.3.1 and substitute the following:*

**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 or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the control of the Contractor and any subcontractor at any tier; or by delay authorized by the Owner pending dispute resolution; or by other causes that the Architect determines may justify delay, then to the extent such delay will prevent the Contractor from achieving Substantial Completion within the Contract Time and provided the delay (1) is not caused by the fault or negligence of the Contractor or a subcontractor at any tier and (2) is not due to unusual delay in the delivery of supplies, machinery, equipment, or services were obtainable from other sources in sufficient time for the Contractor to meet the required delivery, the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

**3.57** *Insert the following at the end of Section 9.1:* 

All changes to the Contract Sum shall be adjusted in accordance with Section 7.3.3.

**3.58** Delete Section 9.2 and substitute the following:

### 9.2 SCHEDULE OF VALUES

**9.2.1** The Contractor shall submit to the Architect, within ten days of full execution of the Agreement, 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 Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. As requested by the Architect, the Contractor and each Subcontractor shall prepare a trade payment breakdown for the Work for which each is responsible, such breakdown being submitted on a uniform standardized format approved by the Architect and Owner. The breakdown shall be divided in detail, using convenient units, sufficient to accurately determine the value of completed Work during the course of the Project. The Contractor shall update the schedule of values as required by either the Architect or Owner as necessary to reflect:

- .1 the description of Work (listing labor and material separately);
- .2 the total value;
- .3 the percent and value of the Work completed to date;
- .4 the percent and value of previous amounts billed; and
- .5 the current percent completed and amount billed.

**9.2.2** Any schedule of values or trade breakdown that fails to include sufficient detail, is unbalanced, or exhibits "front-loading" of the value of the Work shall be rejected. If a schedule of values or trade breakdown is used as the basis for payment and later determined to be inaccurate, sufficient funds shall be withheld from future Applications for Payment to ensure an adequate reserve (exclusive of normal retainage) to complete the Work.

# **3.59** Delete Section 9.3.1 and substitute the following:

Monthly, the Contractor shall submit to the Architect 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 or Architect may require (such as copies of requisitions from Subcontractors and material suppliers) and shall reflect retainage and any other adjustments provided in Section 5 of the Agreement. If required by the Owner or Architect, the Application for Payment shall be accompanied by a current construction schedule.

**3.60** In Section 9.3.2, add the following words to the end of the second sentence:

provided such materials or equipment will be subsequently incorporated in the Work

Insert the following at the end of Section 9.3.2:

The Contractor shall 1) protect such materials from diversion, vandalism, theft, destruction, and damage, 2) mark such materials specifically for use on the Project, and 3) segregate such materials from other materials at the storage facility. The Architect and the Owner shall have the right to make inspections of the storage areas at any time.

**3.61** In Section 9.4.2, in the first sentence, after the words "Work has progressed to the point indicated," insert the following:

in both the Application for Payment and, if required to be submitted by the Contractor, the accompanying current construction schedule

In the last sentence, delete the third item starting with "(3) reviewed copies" and ending with "Contractor's right to payment,"

**3.62** In Section 9.5.1, in the first sentence, delete the word "may" after the opening words "The Architect" and substitute the word "shall."

In Section 9.5.1, insert the following sentence after the first sentence:

The Architect shall withhold a Certificate of Payment if the Application for Payment is not accompanied by the current construction schedule required by Section 3.10.1.

**3.63** In Section 9.6.2, delete the word "The..." at the beginning of the first sentence and substitute the following:

Pursuant to Chapter 6 of Title 29 of the South Carolina Code of Laws, as amended, the

**3.64** *Delete Section 9.7 and substitute following:* 

#### 9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment to the Owner, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the time established in the Contract Documents the amount certified by the Architect or awarded by a final dispute resolution order, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, 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, in accordance with the provisions of Section 7.3.3, 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.

**3.65** Insert the following words at the end of the sentence in Section 9.8.1:

and when all required occupancy permits, if any, have been issued and copies of same have been delivered to the Owner.

- **3.66** In Section 9.8.2, insert the word "written" after the word "comprehensive" and before the word "list."
- **3.67** Delete Section 9.8.3 and substitute the following:

**9.8.3.1** Upon receipt of the Contractor's list, the Architect, with the Owner and any other person the Architect or the Owner choose, will make an inspection on a date and at a time mutually agreeable to the Architect, Owner, and Contractor, to determine whether the Work or designated portion thereof is substantially complete. The Contractor shall furnish access for the inspection and testing as provided in this Contract. The inspection shall include a

demonstration by the Contractor that all equipment, systems and operable components of the Work function properly and in accordance with the Contract Documents. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with 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 Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion. If more than one Substantial Completion inspection is required, the Contractor shall reimburse the Owner for all costs of reinspections or, at the Owner's option, the costs may be deducted from payments due to the Contractor.

**9.8.3.2** If the Architect and Owner concur in the Contractor's assessment that the Work or a portion of the Work is safe to occupy, the Owner and Contractor may arrange for a Certificate of Occupancy Inspection by OSE. The Owner, Architect, and Contractor shall be present at OSE's inspection. Upon verifying that the Work or a portion of the Work is substantially complete and safe to occupy, OSE will issue, as appropriate, a Full or Partial Certificate of Occupancy.

**3.68** In the second sentence of Section 9.8.5, delete the words "and consent of surety, if any."

- **3.69** In the first sentence of Section 9.9.1, delete the words "Section 11.3.1.5" and substitute the words "Section 11.3.1.3."
- **3.70** Delete Section 9.10.1 and substitute the following:

9.10.1 Unless the parties agree otherwise in the Certificate of Substantial Completion, the Contractor shall achieve Final Completion no later than thirty days after Substantial Completion. Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect, with the Owner and any other person the Architect or the Owner choose, will make an inspection on a date and at a time mutually agreeable to the Architect, Owner, and Contractor, and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's 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 Architect's final 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. If more than one Final Completion inspection is required, the Contractor shall reimburse the Owner for all costs of reinspections or, at the Owner's option, the costs may be deducted from payments due to the Contractor. If the Contractor does not achieve final completion within thirty days after Substantial Completion or the timeframe agreed to by the parties in the Certificate of Substantial Completion, whichever is greater, the Contractor shall be responsible for any additional Architectural fees resulting from the delay.

**3.71** Delete the first sentence of Section 9.10.2 and substitute the following:

Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (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 Contract Documents, (4) consent of surety, if any, to final payment (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 Documents and manuals, (8) any certificates of testing, inspection or approval required by the Contract Documents and not previously provided (9) all warranties and guarantees required under or pursuant to the Contract Documents, and (10) one copy of the Documents required by Section 3.11.

**3.72** Delete the first sentence of Section 9.10.3 and substitute the following:

If, after Substantial Completion of the Work, final completion thereof is delayed 60 days through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted.

#### **3.73** *Delete Section 9.10.5 and substitute the following:*

**§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 specific claims in stated amounts that have been previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

#### **3.74** Add the following Section 9.10.6:

**9.10.6** If OSE has not previously issued a Certificate of Occupancy for the entire Project, the Parties shall arrange for a representative of OSE to participate in the Final Completion Inspection. Representatives of the State Fire Marshal's Office and other authorities having jurisdiction may be present at the Final Completion Inspection or otherwise inspect the completed Work and advise the Owner whether the Work meets their respective requirements for the Project.

**3.75** Delete Section 10.3.1 and substitute the following:

**10.3.1** If the Contractor encounters a hazardous material or substance which was not discoverable as provided in Section 3.2.1 and not required by the Contract Documents, and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons or serious loss to real or personal property resulting from such material or substance 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 and Architect in writing. Hazardous materials or substances are those hazardous, toxic, or radioactive materials or substances subject to regulations by applicable governmental authorities having jurisdiction, such as, but not limited to, the S.C. Department of Health and Environmental Control, the U.S. Environmental Protection Agency, and the U.S. Nuclear Regulatory Commission.

**3.76** *Insert the following at the end of Section 10.3.2:* 

In the absence of agreement, the Architect will make an interim determination regarding any delay or impact on the Contractor's additional costs. The Architect's 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. Any adjustment in the Contract Sum shall be determined in accordance with Section 7.3.3.

**3.77** Delete Section 10.3.3 and substitute the following:

**10.3.3** The Work in the affected area shall be resumed immediately following the occurrence of any one of the following events: (a) the Owner causes remedial work to be performed that results in the absence of hazardous materials or substances; (b) the Owner and the Contractor, by written agreement, decide to resume performance of the Work; or (c) the Work may safely and lawfully proceed, as determined by an appropriate governmental authority or as evidenced by a written report to both the Owner and the Contractor, which is prepared by an environmental engineer reasonably satisfactory to both the Owner and the Contractor.

**3.78** In Section 10.3.5, delete the word "The" at the beginning of the sentence and substitute the following:

In addition to its obligations under Section 3.18, the

**3.79** Delete the language of Section 10.3.6 and substitute the word "Reserved."

**3.80** *Insert the following at the end of Section 10.4:* 

The Contractor shall immediately give the Architect notice of the emergency. This initial notice may be oral followed within five days by a written notice setting forth the nature and scope of the emergency. Within fourteen days of the start of the emergency, the Contractor shall give the Architect a written estimate of the cost and probable effect of delay on the progress of the Work.

#### **3.81** Delete 11.1.2 and substitute the following:

**11.1.2** The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified below or required by law, whichever coverage is greater. Coverages shall be written on an occurrence basis and shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

#### (1) COMMERCIAL GENERAL LIABILITY:

(a) General Aggregate (per project)	\$1,000,000
(b) Products/Completed Operations	\$1,000,000
(c) Personal and Advertising Injury	\$1,000,000
(d) Each Occurrence	\$1,000,000
(e) Fire Damage (Any one fire)	\$50,000
(f) Medical Expense (Any one person)	\$5,000

# (2) BUSINESS AUTO LIABILITY (including All Owned, Non-owned, and Hired Vehicles): (a) Combined Single Limit \_\_\_\_\_\_\$1,000,000

(3) WORKER'S COMPENSATION:

(a) State Statutory	
(b) Employers Liability	<u>\$100,000</u> Per Acc.
	\$500,000 Disease, Policy Limit
	<u>\$100,000</u> Disease, Each Employee

In lieu of separate insurance policies for Commercial General Liability, Business Auto Liability, and Employers Liability, the Contractor may provide an umbrella policy meeting or exceeding all coverage requirements set forth in this Section 11.1.2. The umbrella policy limits shall not be less than \$3,000,000.

**11.1.3** Prior to commencement of the Work, and thereafter upon replacement of each required policy of insurance, Contractor shall provide to the Owner a written endorsement to the Contractor's general liability insurance policy that:

(i) names the Owner as an additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations;

(ii) provides that no material alteration, cancellation, non-renewal, or expiration of the coverage contained in such policy shall have effect unless all additional insureds have been given at least ten (10) days prior written notice of cancellation for non-payment of premiums and thirty (30) days prior written notice of cancellation for any other reason; and

(iii) provides that the Contractor's liability insurance policy shall be primary, with any liability insurance of the Owner as secondary and noncontributory.

Prior to commencement of the Work, and thereafter upon renewal or replacement of each required policy of insurance, Contractor shall provide to the Owner a signed, original certificate of liability insurance (ACORD 25). Consistent with this Section 11.1, the certificate shall identify the types of insurance, state the limits of liability for each type of coverage, name the Owner a Consultants as Certificate Holder, provide that the general aggregate limit applies per project, and provide that coverage is written on an occurrence basis. Both the certificates and the

**<sup>3.82</sup>** Delete Section 11.1.3 and substitute the following:

endorsements must be received directly from either the Contractor's insurance agent or the insurance company. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, naming the Owner as an additional insured for claims made under the Contractor's completed operations, and otherwise meeting the above requirements, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

### **3.83** Delete Section 11.1.4 and substitute the following:

**11.1.4** A failure by the Owner either (i) to demand a certificate of insurance or written endorsement required by Section 11.1, or (ii) to reject a certificate or endorsement on the grounds that it fails to comply with Section 11.1 shall not be considered a waiver of Contractor's obligations to obtain the required insurance.

**3.84** In Section 11.3.1, delete the first sentence and substitute the following:

Unless otherwise provided in the Contract Documents, the Contractor 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.

- **3.85** Delete the language of Section 11.3.1.2 and substitute the word "Reserved."
- **3.86** Delete the language of Section 11.3.1.3 and substitute the word "Reserved."
- **3.87** Delete Section 11.3.2 and substitute the following:

#### **11.3.2 BOILER AND MACHINERY INSURANCE**

The Contractor 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, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall both be named insureds.

**3.88** Delete Section 11.3.3 and substitute the following:

#### **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. To the extent any losses are covered and paid for by such insurance, 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.

**3.89** Delete Section 11.3.4 and substitute the following:

**11.3.4** If the Owner 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 Contractor shall, if possible, include such insurance, and the cost thereof shall be charged to the Owner by appropriate Change Order.

- **3.90** Delete the language of Section 11.3.5 and substitute the word "Reserved."
- **3.91** Delete Section 11.3.6 and substitute the following:

**11.3.6** Before an exposure to loss may occur, the Contractor shall file with the Owner 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 Owner.

**3.92** Delete the first sentence of Section 11.3.7 and substitute the following:

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, subsubcontractors, agents and employees, each of the other, and (2) the Architect, Architect'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 the property insurance provided by the Contractor pursuant to this Section 11.3 covers and pays for the damage, except such rights as they have to proceeds of such insurance held by the Contractor as fiduciary.

**3.93** Delete the first sentence of Section 11.3.8 and substitute the following:

A loss insured under the Contractor's property insurance shall be adjusted by the Contractor as fiduciary and made payable to the Contractor as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10.

**3.94** *Delete Section 11.3.9 and substitute the following:* 

**11.3.9** If required in writing by a party in interest, the Contractor as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Contractor's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Contractor shall deposit in a separate account proceeds so received, which the Contractor shall distribute in accordance with such agreement as the parties in interest may reach. 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.

**3.95** Delete Section 11.3.10 and substitute the following:

**11.3.10** The Contractor as fiduciary 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 Contractor's exercise of this power; if such objection is made, the dispute shall be resolved in the manner provided in the contract between the parties in dispute as the method of binding dispute resolution. The Contractor as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with a final order or determination issued by the appropriate authority having jurisdiction over the dispute.

### **3.96** Delete Section 11.4.1 and substitute the following:

**11.4.1** Before commencing any services hereunder, the Contractor shall provide the Owner with Performance and Payment Bonds, each in an amount not less than the Contract Price set forth in Article 4 of the Agreement. The Surety shall have, at a minimum, a "Best Rating" of "A" as stated in the most current publication of "Best's Key Rating Guide, Property-Casualty". In addition, the Surety shall have a minimum "Best Financial Strength Category" of "Class V", and in no case less than five (5) times the contract amount. The Performance Bond shall be written on Form SE-355, "Performance Bond" and the Payment Bond shall written on Form SE-357, "Labor and Material Payment Bond", and both shall be made payable to the Owner.

**3.97** Delete Section 11.4.2 and substitute the following:

**11.4.2** The Performance and Labor and Material Payment Bonds shall:

- .1 be issued by a surety company licensed to do business in South Carolina;
- .2 be accompanied by a current power of attorney and certified by the attorney-in-fact who executes the bond on the behalf of the surety company; and
- .3 remain in effect for a period not less than one (1) year 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.

**3.98** Add the following Sections 11.4.3 and 11.4.4:

**11.4.3** Any bonds required by this Contract shall meet the requirements of the South Carolina Code of Laws and Regulations, as amended.

**11.4.4** 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 authorize a copy to be furnished.

**3.99** Delete Section 12.1.1 and substitute the following:

**12.1.1** If a portion of the Work is covered contrary to the to requirements specifically expressed in the Contract Documents, including inspections of work-in-progress required by all authorities having jurisdiction over the Project, it must, upon demand of the Architect or authority having jurisdiction, be uncovered for observation and be replaced at the Contractor's expense without change in the Contract Time.

- **3.100** In Section 12.2.2.1, delete the words "and to make a claim for breach of warranty" at the end of the third sentence.
- **3.101** In Section 12.2.2.3, add the following to the end of the sentence:

unless otherwise provided in the Contract Documents.

**3.102** *Insert the following at the end of Section 12.2.4:* 

If, prior to the date of Substantial Completion, the Contractor, a Subcontractor, or anyone for whom either is responsible, uses or damages any portion of the Work, including, without limitation, mechanical, electrical, plumbing, and other building systems, machinery, equipment, or other mechanical device, the Contractor shall cause such item to be restored to "like new" condition at no expense to the Owner.

**3.103** Delete Section 13.1 and substitute the following:

### 13.1 GOVERNING LAW

The Contract, any dispute, claim, or controversy relating to the Contract, and all the rights and obligations of the parties shall, in all respects, be interpreted, construed, enforced and governed by and under the laws of the State of South Carolina, except its choice of law rules.

**3.104** Delete Section 13.2, including its Sub-Sections 13.2.1 and 13.2.2, and substitute the following:

### **13.2 SUCCESSORS AND ASSIGNS**

The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract as a whole, or in part, without written consent of the other and then only in accordance with and as permitted by Regulation 19-445.2180 of the South Carolina Code of Regulations, as amended. 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.

**3.105** *Delete Section 13.3 and substitute the following:* 

### **13.3 WRITTEN NOTICE**

Unless otherwise permitted herein, all notices contemplated by the Contract Documents shall be in writing and shall be deemed given:

- .1 upon actual delivery, if delivery is by hand;
- .2 upon receipt by the transmitting party of confirmation or reply, if delivery is by electronic mail, facsimile, telex or telegram;
- .3 upon receipt, if delivery is by the United States mail.

# 2011 Edition

Rev. 9/7/2011

# OSE FORM 00811 STANDARD SUPPLEMENTARY CONDITIONS

Notice to Contractor shall be to the address provided in Section 8.3.2 of the Agreement. Notice to Owner shall be to the address provided in Section 8.2.2 of the Agreement. Either party may designate a different address for notice by giving notice in accordance with this paragraph.

**3.106** In Section 13.4.1, insert the following at the beginning of the sentence:

Unless expressly provided otherwise,

**3.107** Add the following Section 13.4.3:

**13.4.3** Notwithstanding Section 9.10.4, the rights and obligations which, by their nature, would continue beyond the termination, cancellation, rejection, or expiration of this contract shall survive such termination, cancellation, rejection, or expiration, including, but not limited to, the rights and obligations created by the following clauses:

1.5 Ownership and Use of Drawings, Specifications and Other Instruments of Service;
3.5 Warranty
3.17 Royalties, Patents and Copyrights
3.18 Indemnification
7.6 Cost or Pricing Data
11.1 Contractor's Liability Insurance
11.4 Performance and Payment Bond
15.1.6 Claims for Listed Damages
15.1.7 Waiver of Claims Against the Architect
15.6 Dispute Resolution
15.4 Service of Process

**3.108** Delete Section 13.6 and substitute the following:

### **13.6 INTEREST**

Payments due to the Contractor and unpaid under the Contract Documents shall bear interest only if and to the extent allowed by Title 29, Chapter 6, Article 1 of the South Carolina Code of Laws. Amounts due to the Owner shall bear interest at the rate of one percent a month or a pro rata fraction thereof on the unpaid balance as may be due.

- **3.109** Delete the language of Section 13.7 and substitute the word "Reserved."
- **3.110** Add the following Sections 13.8 through 13.16:

### **13.8 PROCUREMENT OF MATERIALS BY OWNER**

The Contractor accepts assignment of all purchase orders and other agreements for procurement of materials and equipment by the Owner that are identified as part of the Contract Documents. The Contractor shall, upon delivery, be responsible for the storage, protection, proper installation, and preservation of such Owner purchased items, if any, as if the Contractor were the original purchaser. The Contract Sum includes, without limitation, all costs and expenses in connection with delivery, storage, insurance, installation, and testing of items covered in any assigned purchase orders or agreements. Unless the Contract Documents specifically provide otherwise, all Contractor warranty of workmanship and correction of the Work obligations under the Contract Documents shall apply to the Contractor's installation of and modifications to any Owner purchased items,.

# **13.9 INTERPRETATION OF BUILDING CODES**

As required by Title 10, Chapter 1, Section 180 of the South Caroline Code of Laws, as amended, OSE shall determine the enforcement and interpretation of all building codes and referenced standards on state buildings. The Contractor shall refer any questions, comments, or directives from local officials to the Owner and OSE for resolution.

#### 13.10 MINORITY BUSINESS ENTERPRISES

Contractor shall notify Owner of each Minority Business Enterprise (MBE) providing labor, materials, equipment, or supplies to the Project under a contract with the Contractor. Contractor's notification shall be via the first monthly status report submitted to the Owner after execution of the contract with the MBE. For each such MBE, the Contractor shall provide the MBE's name, address, and telephone number, the nature of the work to be performed or materials or equipment to be supplied by the MBE, whether the MBE is certified by the South Carolina Office of Small and Minority Business Assistance, and the value of the contract.

# **13.11 SEVERABILITY**

If any provision or any part of a provision of the Contract Documents shall be finally determined to be superseded, invalid, illegal, or otherwise unenforceable pursuant to any applicable Legal Requirements, such determination shall not impair or otherwise affect the validity, legality, or enforceability of the remaining provision or parts of the provision of the Contract Documents, which shall remain in full force and effect as if the unenforceable provision or part were deleted.

#### **13.12 ILLEGAL IMMIGRATION**

Contractor certifies and agrees that it will comply with the applicable requirements of Title 8, Chapter 14 of the South Carolina Code of Laws and agrees to provide to the State upon request any documentation required to establish either: (a) that Title 8, Chapter 14 is inapplicable both to Contractor and its subcontractors or sub-subcontractors; or (b) that Contractor and its subcontractors or sub-subcontractors; or (b) that Contractor and its subcontractors or sub-subcontractors; or (b) that Contractor and its subcontractors or sub-subcontractors; or (b) that Contractor and its subcontractors or sub-subcontractors are in compliance with Title 8, Chapter 14. Pursuant to Section 8-14-60, "A person who knowingly makes or files any false, fictitious, or fraudulent document, statement, or report pursuant to this chapter is guilty of a felony, and, upon conviction, must be fined within the discretion of the court or imprisoned for not more than five years, or both." Contractor agrees to include in any contracts with its subcontractors language requiring its subcontractors to (a) comply with the applicable requirements of Title 8, Chapter 14, and (b) include in their contracts with the sub-subcontractors language requiring the sub-subcontractors to comply with the applicable requirements of Title 8, Chapter 14. (An overview is available at <a href="https://www.procurement.sc.gov">www.procurement.sc.gov</a>)

#### **13.13 SETOFF**

The Owner shall have all of its common law, equitable, and statutory rights of set-off.

#### **13.14 DRUG-FREE WORKPLACE**

The Contractor certifies to the Owner that Contractor will provide a Drug-Free Workplace, as required by Title 44, Chapter 107 of the South Carolina Code of Laws, as amended.

#### 13.15 FALSE CLAIMS

According to the S.C. Code of Laws § 16-13-240, "a person who by false pretense or representation obtains the signature of a person to a written instrument or obtains from another person any chattel, money, valuable security, or other property, real or personal, with intent to cheat and defraud a person of that property is guilty" of a crime.

#### **13.16 NON-INDEMNIFICATION:**

Any term or condition is void to the extent it requires the State to indemnify anyone. It is unlawful for a person charged with disbursements of state funds appropriated by the General Assembly to exceed the amounts and purposes stated in the appropriations. (§ 11-9-20) It is unlawful for an authorized public officer to enter into a contract for a purpose in which the sum is in excess of the amount appropriated for that purpose. It is unlawful for an authorized public officer to divert or appropriate the funds arising from any tax levied and collected for any one fiscal year to the payment of an indebtedness contracted or incurred for a previous year. (§ 11-1-40)

#### **3.111** Delete Section 14.1.1 and substitute the following:

**14.1.1** The Contractor may terminate the Contract if the Work is stopped for a period of 45 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 substantially all Work to be stopped; or

- **.2** An act of government, such as a declaration of national emergency that requires substantially all Work to be stopped.
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents and the Contractor has stopped work in accordance with Section 9.7
- **3.112** Insert the following at the end of Section 14.1.3:

Any adjustment to the Contract Sum pursuant to this Section shall be made in accordance with the requirements of Article 7.

- 3.113 In Section 14.1.4, replace the word "repeatedly" with the word "persistently."
- **3.114** *Delete Section 14.2.1 and substitute the following:*

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, or otherwise fails to prosecute the Work, or any separable part of the Work, with the diligence, resources and skill that will ensure its completion within the time specified in the Contract Documents, including any authorized adjustments;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the Contract Documents and 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.
- **3.115** In Section 14.2.2, delete the parenthetical statement ", upon certification by the Initial Decision Maker that sufficient cause exists to justify such action," immediately following the word "Owner" in the first line.
- 3.116 In Section 14.2.4, replace the words "Initial Decision Maker" with the word "Architect"
- 3.117 Add the following Section 14.2.5:

**14.2.5** If, after termination for cause, it is determined that the Owner lacked justification to terminate under Section 14.2.1, or that the Contractor's default was excusable, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of the Owner under Section 14.4.

**3.118** Delete the second sentence of Section 14.3.2 and substitute the following:

Any adjustment to the Contract Sum made pursuant to this section shall be made in accordance with the requirements of Article 7.3.3.

**3.119** Delete Section 14.4.1 and substitute the following:

**14.4.1** The Owner may, at any time, terminate the Contract, in whole or in part for the Owner's convenience and without cause. The Owner shall give written notice of the termination to the Contractor specifying the part of the Contract terminated and when termination becomes effective.

**3.120** Delete Section 14.4.2 and substitute the following:

**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;

- 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; and
- .4 complete the performance of the Work not terminated, if any.

### **3.121** Delete Section 14.4.3 and substitute the following:

**14.4.3** In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, costs incurred by reason of such termination, and any other adjustments otherwise allowed by the Contract. Any adjustment to the Contract Sum made pursuant to this Section 14.4 shall be made in accordance with the requirements of Article 7.3.3.

# **3.122** Add the following Sections 14.4.4, 14.4.5, and 14.5:

**14.4.4** Contractor's failure to include an appropriate termination for convenience clause in any subcontract shall not (i) affect the Owner's right to require the termination of a subcontract, or (ii) increase the obligation of the Owner beyond what it would have been if the subcontract had contained an appropriate clause.

**14.4.5** Upon written consent of the Contractor, the Owner may reinstate the terminated portion of this Contract in whole or in part by amending the notice of termination if it has been determined that:

- .1 the termination was due to withdrawal of funding by the General Assembly, Governor, or Budget and Control Board or the need to divert project funds to respond to an emergency as defined by Regulation 19-445.2110(B) of the South Carolina Code of Regulations, as amended;
- .2 funding for the reinstated portion of the work has been restored;
- .3 circumstances clearly indicate a requirement for the terminated work; and
- .4 reinstatement of the terminated work is advantageous to the Owner.

# 14.5 CANCELLATION AFTER AWARD BUT PRIOR TO PERFORMANCE

Pursuant to Title 11, Chapter 35 and Regulation 19-445.2085 of the South Carolina Code of Laws and Regulations, as amended, this contract may be canceled after award but prior to performance.

**3.123** Insert the following sentence after the second sentence of Section 15.1.1:

A voucher, invoice, payment application or other routine request for payment that is not in dispute when submitted is not a Claim under this definition.

**3.124** *Delete Section 15.1.2 and substitute the following:* 

# **15.1.2 NOTICE OF CLAIMS**

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Architect. Such notice shall include sufficient information to advise the Architect and other party of the circumstances giving rise to the claim, the specific contractual adjustment or relief requested and the basis of such request. Claims by either party arising prior to the date final payment is due must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later except as stated for adverse weather days in Section 15.1.5.2. By failing to give written notice of a Claim within the time required by this Section, a party expressly waives its claim.

**3.125** Delete Section 15.1.3 and substitute the following:

# **15.1.3 CONTINUING CONTRACT PERFORMANCE**

Pending final resolution of a Claim, including any administrative review allowed under Section 15.6, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will issue Certificates for Payment in accordance with the initial decisions and determinations of the Architect.

**3.126** *Insert the following at the end of Section 15.1.5.1:* 

Claims for an increase in the Contract Time shall be based on one additional calendar day for each full calendar day that the Contractor is prevented from working.

- **3.127** *Insert the following Sub-Sections at the end of Section 15.1.5.2:* 
  - .1 Claims for adverse weather shall be based on actual weather conditions at the job site or other place of performance of the Work, as documented in the Contractor's job site log.
  - .2 For the purpose of this Contract, a total of five (5) calendar days per calendar month (non-cumulative) shall be anticipated as "adverse weather" at the job site, and such time will not be considered justification for an extension of time. If, in any month, adverse weather develops beyond the five (5) days, the Contractor shall be allowed to claim additional days to compensate for the excess weather delays only to the extension of time only and is exclusive of all other rights and remedies available under the Contract Documents or imposed or available by law.
  - .3 The Contractor shall submit monthly with their pay application all claims for adverse weather conditions that occurred during the previous month. The Architect shall review each monthly submittal in accordance with Section 15.5 and inform the Contractor and the Owner promptly of its evaluation. Approved days shall be included in the next Change Order issued by the Architect. Adverse weather conditions not claimed within the time limits of this Subparagraph shall be considered to be waived by the Contractor. Claims will not be allowed for adverse weather days that occur after the scheduled (original or adjusted) date of Substantial Completion.
- **3.128** Delete Section 15.1.6 and substitute the following:

### **15.1.6 CLAIMS FOR LISTED DAMAGES**

Notwithstanding any other provision of the Contract Documents, including Section 1.2.1, but subject to a duty of good faith and fair dealing, the Contractor and Owner waive Claims against each other for listed damages arising out of or relating to this Contract.

**15.1.6.1** For the Owner, listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v) costs suffered by a third party unable to commence work, (vi) attorney's fees, (vii) any interest, except to the extent allowed by Section 13.6 (Interest), (viii) lost revenue and profit for lost use of the property, (ix) costs resulting from lost productivity or efficiency.

**15.1.6.2** For the Contractor, listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v) attorney's fees, (vi) any interest, except to the extent allowed by Section 13.6 (Interest); (vii) unamortized equipment costs; and, (viii) losses incurred by subcontractors for the types of damages the Contractor has waive as against the Owner. Without limitation, this mutual waiver is applicable to all damages due to either party's termination in accordance with Article 14. Nothing contained in this Section shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents. This mutual waiver is not applicable to amounts due or obligations under Section 3.18 (Indemnification).

### **3.129** Add the following Section 15.1.7:

### **15.1.7 WAIVER OF CLAIMS AGAINST THE ARCHITECT**

Notwithstanding any other provision of the Contract Documents, including Section 1.2.1, but subject to a duty of good faith and fair dealing, the Contractor waives all claims against the Architect and any other design professionals who provide design and/or project management services to the Owner, either directly or as independent contractors or subcontractors to the Architect, for listed damages arising out of or relating to this Contract. The listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v)

attorney's fees, (vi) any interest; (vii) unamortized equipment costs; and, (viii) losses incurred by subcontractors for the types of damages the Contractor has waive as against the Owner. This mutual waiver is not applicable to amounts due or obligations under Section 3.18 (Indemnification).

- **3.130** Delete the language of Sections 15.2, 15.3, and 15.4, including all Sub-Sections, and substitute the word "Reserved" for the deleted language of each Section and Sub-Section.
- **3.131** Add the following Sections 15.5 and 15.6 with their sub-sections:

# 15.5 CLAIM AND DISPUTES - DUTY OF COOPERATION, NOTICE, AND ARCHITECTS INITIAL DECISION

**15.5.1** Contractor and Owner are fully committed to working with each other throughout the Project to avoid or minimize claims. To further this goal, Contractor and Owner agree to communicate regularly with each other and the Architect at all times notifying one another as soon as reasonably possible of any issue that if not addressed may cause loss, delay, and/or disruption of the Work. If claims do arise, Contractor and Owner each commit to resolving such claims in an amicable, professional, and expeditious manner to avoid unnecessary losses, delays, and disruptions to the Work.

**15.5.2** Claims shall first be referred to the Architect for initial decision. An initial decision shall be required as a condition precedent to resolution pursuant to Section 15.6 of any Claim arising prior to the date of final payment, unless 30 days have passed after the Claim has been referred to the Architect with no decision having been rendered, or after all the Architect's requests for additional supporting data have been answered, whichever is later. The Architect will not address claims between the Contractor and persons or entities other than the Owner.

**15.5.3** The Architect will review Claims and within ten days of the receipt of a Claim (1) request additional supporting data from the claimant or a response with supporting data from the other party or (2) render an initial decision in accordance with Section 15.5.5.

**15.5.4** If the Architect 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 Architect when the response or supporting data will be furnished or (3) advise the Architect that all supporting data has already been provided. Upon receipt of the response or supporting data, the Architect will render an initial decision in accordance with Section 15.5.5.

**15.5.5** The Architect will render an initial decision in writing; (1) stating the reasons therefor; and (2) notifying the parties of any change in the Contract Sum or Contract Time or both. The Architect will deliver the initial decision to the parties within two weeks of receipt of any response or supporting data requested pursuant to Section 16.4, or within such longer period as may be mutually agreeable to the parties. If the parties accept the initial decision, the Architect shall prepare a Change Order with appropriate supporting documentation for the review and approval of the parties and the Office of State Engineer. If either the Contractor, Owner, or both, disagree with the initial decision, the Contractor and Owner shall proceed with dispute resolution in accordance with the provisions of Section 15.6.

**15.5.6** 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.

### **15.6 DISPUTE RESOLUTION**

**15.6.1** If a claim is not resolved pursuant to Section 15.5 to the satisfaction of either party, both parties shall attempt to resolve the dispute at the field level through discussions between Contractor's Representative and Owner's Representative. If a dispute cannot be resolved through Contractor's Representative, and Owner's Representative, then the Contractor's Senior Representative and the Owner's Senior Representative, upon the request of either party, shall meet as soon as conveniently possible, but in no case later than twenty-one days after such a request is made, to attempt to resolve such dispute. Prior to any meetings between the Senior Representatives, the parties will exchange relevant information that will assist the parties in resolving their dispute. The meetings required by this Section are a condition precedent to resolution pursuant to Section 15.6.2.

**15.6.2** If after meeting in accordance with the provisions of Section 15.6.1, the Senior Representatives determine that the dispute cannot be resolved on terms satisfactory to both the Contractor and the Owner, then either party may submit the dispute by written request to South Carolina's Chief Procurement Officer for Construction (CPOC). Except as otherwise provided in Article 15, all claims, claims, or controversies relating to the Contract shall be resolved exclusively by the appropriate Chief Procurement Officer in accordance with Title 11, Chapter 35, Article 17 of the South Carolina Code of Laws, or in the absence of jurisdiction, only in the Court of Common Pleas for, or in the absence of jurisdiction a federal court located in, Richland County, State of South Carolina. Contractor agrees that any act by the State regarding the Contract is not a waiver of either the State's sovereign immunity or the State's immunity under the Eleventh Amendment of the United State's Constitution.

**15.6.3** If any party seeks resolution to a dispute pursuant to Section 15.6.2, the parties shall participate in nonbinding mediation to resolve the claim. If the claim is governed by Title 11, Chapter 35, Article 17 of the South Carolina Code of Laws as amended and the amount in controversy is \$100,000.00 or less, the CPOC shall appoint a mediator, otherwise, the mediation shall be conducted by an impartial mediator selected by mutual agreement of the parties, or if the parties cannot so agree, a mediator designated by the American Arbitration Association ("AAA") pursuant to its Construction Industry Mediation Rules. The mediation will be governed by and conducted pursuant to a mediation agreement negotiated by the parties or, if the parties cannot so agree, by procedures established by the mediator.

**15.6.4** Without relieving any party from the other requirements of Sections 15.5 and 15.6, either party may initiate proceedings in the appropriate forum prior to initiating or completing the procedures required by Sections 15.5 and 15.6 if such action is necessary to preserve a claim by avoiding the application of any applicable statutory period of limitation or repose.

### **15.6.5 SERVICE OF PROCESS**

Contractor consents that any papers, notices, or process necessary or proper for the initiation or continuation of any claims, claims, or controversies relating to the Contract; for any court action in connection therewith; or for the entry of judgment on any award made, may be served on Contractor by certified mail (return receipt requested) addressed to Contractor at the address provided for the Contractor's Senior Representative or by personal service or by any other manner that is permitted by law, in or outside South Carolina. Notice by certified mail is deemed duly given upon deposit in the United States mail.

#### **3.132** *Add the following Article 16:*

#### ARTICLE 16 PROJECT-SPECIFIC REQUIREMENTS AND INFORMATION

**16.1. Inspection Requirements:** (Indicate the inspection services required by the Contract)

Special Inspections are required and are not part of the Contract Sum. (*see section 01400*)

Building Inspections are required and are not part of the Contract Sum. (see section 01400)

Building Inspections are required and are part of the Contract Sum. The inspections required for this Work

are : (Indicate which services are required and the provider)



Remarks: all inspections will be by the owner

**16.1.1** Contractor shall schedule and request inspections in an orderly and efficient manner and shall notify the Owner whenever the Contractor schedules an inspection in accordance with the requirements of Section 16.1. Contractor shall be responsible for the cost of inspections scheduled and conducted without the Owner's knowledge and for any increase in the cost of inspections resulting from the inefficient scheduling of inspections.

**16.2** List Cash Allowances, if any. (*Refer to attachments as needed* If *none, enter NONE*) <u>None</u>

**16.3.** Requirements for Record Drawings, if any. (*Refer to attachments as needed*. If *none, enter NONE*) <u>Refer to SECTION 01780 - CLOSEOUT SUBMITTALS</u>

**16.4.** Requirements for Shop Drawings and other submittals, if any, including number, procedure for submission, list of materials to be submitted, etc. (*Refer to attachments as needed. If none, enter NONE*) <u>Refer to SECTION 01300 - ADMINISTRATIVE REQUIRMENTS</u>

**16.5.** Requirements for signage, on-site office or trailer, utilities, restrooms, etc., in addition to the Contract, if any. (*Refer to attachments as needed. If none, enter NONE*) See Section 01500 Temporary Facilities and Controls

**16.6.** Requirements for Project Cleanup in addition to the Contract, if any. (*Refer to attachments as needed. If none, enter NONE*)

See Final Cleaning in Section 01700 - Execution Requirements

**16.7.** List all attachments that modify these General Conditions. (*If none, enter NONE*) <u>USC Supplemental Conditions</u>

KNOW ALL MEN BY THESE PRESENTS, that (Insert full name or legal title and address of Contractor)

Name: \_\_\_\_\_ Address: \_\_\_\_\_

hereinafter referred to as "Contractor", and (Insert full name and address of principal place of business of Surety)

Name: \_\_\_\_\_ Address:

hereinafter called the "surety", are jointly and severally held and firmly bound unto (Insert full name and address of Agency)

Name: <u>University of South Carolina</u> Address:743 Greene Street

Columbia, SC 29208

hereinafter referred to as "Agency", or its successors or assigns, the sum of \_\_\_\_\_\_\_, being the sum of the Bond to which payment to be well and truly made, the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated \_\_\_\_\_\_ entered into a contract with Agency to construct

State Project Name: <u>Gibbes Green Historic Facilities Renovation – Petigru College Sitework</u> State Project Number: <u>H27-9835-PD-C</u> Brief Description of Awarded Work, as found on the SE-330, Bid Form: <u>The project consist of rework of</u> the existing site including brick and concrete pavement, curb and gutter, brick columns, erosion control, concrete car stops, storm drainage, inlets, fire hydrant relocation, tree protection, grading, wrought iron

gates, etc. Small and minority business participation is encouraged. in accordance with Drawings and Specifications prepared by (*Insert full name and address of A/E*)

Name: <u>GMK Associates, Inc.</u> Address:<u>1201 Main Street, Suite 2100</u> Columbia, South Carolina 29201

which agreement is by reference made a part hereof, and is hereinafter referred to as the Contract.

**IN WITNESS WHEREOF**, Surety and Contractor, intending to be legally bound hereby, subject to the terms stated herein, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent or representative.

DATED thisday of, 2(shall be no earlier than Date of Contract)	BOND NUMBER
CONTRACTOR	SURETY
By:(Seal)	By:(Seal)
Print Name:	Print Name:
Print Title:	Print Title: (Attach Power of Attorney)
Witness:	Witness:
(Additional Signatures, if any, appear on attached pa	ige)

# Performance Bond

### NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

**1**. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Agency for the full and faithful performance of the contract, which is incorporated herein by reference

**2**. If the Contractor performs the contract, the Surety and the Contractor have no obligation under this Bond, except to participate in conferences as provided in paragraph 3.1.

**3.** The Surety's obligation under this Bond shall arise after:

**3.1** The Agency has notified the Contractor and the Surety at the address described in paragraph 10 below, that the Agency is considering declaring a Contractor Default and has requested and attempted to arrange a conference with the Contractor and the Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If the Agency, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive the Agency's right, if any, subsequently to declare a Contractor Default; or

**3.2** The Agency has declared a Contractor Default and formally terminated the Contractor's right to complete the Contract.

**4.** The Surety shall, within 15 days after receipt of notice of the Agency's declaration of a Contractor Default, and at the Surety's sole expense, take one of the following actions:

**4.1** Arrange for the Contractor, with consent of the Agency, to perform and complete the Contract; or

**4.2** Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or

**4.3** Obtain bids or negotiated proposals from qualified contractors acceptable to the Agency for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by the Agency and the contractor selected with the Agency's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the Bonds issued on the Contract, and pay to the Agency the amount of damages as described in paragraph 7 in excess of the Balance of the Contract Sum incurred by the Agency resulting from the Contractor Default; or

**4.4** Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and:

**4.4.1** After investigation, determine the amount for which it may be liable to the Agency and, within 60 days of waiving its rights under this paragraph, tender payment thereof to the Agency; or

**4.4.2** Deny liability in whole or in part and notify the Agency, citing the reasons therefore.

**5.** Provided Surety has proceeded under paragraphs 4.1, 4.2, or 4.3, the Agency shall pay the Balance of the Contract Sum to either:

**5.1** Surety in accordance with the terms of the Contract; or

**5.2** Another contractor selected pursuant to paragraph 4.3 to perform the Contract.

**5.3** The balance of the Contract Sum due either the Surety or another contractor shall be reduced by the amount of damages as described in paragraph 7.

**6.** If the Surety does not proceed as provided in paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond 15 days after receipt of written notice from the Agency to the Surety demanding that the Surety perform its obligations under this Bond, and the Agency shall be entitled to enforce any remedy available to the Agency.

6.1 If the Surety proceeds as provided in paragraph 4.4, and the

Agency refuses the payment tendered or the Surety has denied liability, in whole or in part, then without further notice the Agency shall be entitled to enforce any remedy available to the Agency.

**6.2** Any dispute, suit, action or proceeding arising out of or relating to this Bond shall be governed by the Dispute Resolution process defined in the Contract Documents and the laws of the State of South Carolina.

**7.** After the Agency has terminated the Contractor's right to complete the Contract, and if the Surety elects to act under paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the Agency shall be those of the Contractor under the Contract, and the responsibilities of the Agency to the Surety shall those of the Agency under the Contract. To a limit of the amount of this Bond, but subject to commitment by the Agency of the Balance of the Contract Sum to mitigation of costs and damages on the Contract, the Surety is obligated to the Agency without duplication for:

**7.1** The responsibilities of the Contractor for correction of defective Work and completion of the Contract; and

**7.2** Additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under paragraph 4; and

**7.3** Damages awarded pursuant to the Dispute Resolution Provisions of the Contract. Surety may join in any Dispute Resolution proceeding brought under the Contract and shall be bound by the results thereof; and

**7.4** Liquidated Damages, or if no Liquidated Damages are specified in the Contract, actual damages caused by delayed performance or non-performance of the Contractor.

**8.** The Surety shall not be liable to the Agency or others for obligations of the Contractor that are unrelated to the Contract, and the Balance of the Contract Sum shall not be reduced or setoff on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Agency or its heirs, executors, administrators, or successors.

**9.** The Surety hereby waives notice of any change, including changes of time, to the contract or to related subcontracts, purchase orders and other obligations.

**10.** Notice to the Surety, the Agency or the Contractor shall be mailed or delivered to the address shown on the signature page. **11.** Definitions

**11.1** Balance of the Contract Sum: The total amount payable by the Agency to the Contractor under the Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts to be received by the Agency in settlement of insurance or other Claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Contract.

**11.2** Contractor Default: Failure of the Contractor, which has neither been remedied nor waived, to perform the Contract or otherwise to comply with the terms of the Contract.

KNOW ALL MEN BY THESE PRESENTS, that (Insert full name or legal title and address of Contractor)

Name: \_\_\_\_\_ Address:\_\_\_\_\_

hereinafter referred to as "Contractor", and (Insert full name and address of principal place of business of Surety)

Name: \_\_\_\_\_ Address: \_\_\_\_\_

hereinafter called the "surety", are jointly and severally held and firmly bound unto (Insert full name and address of Agency)

Name: <u>University of South Carolina</u> Address:743 Greene Street

Columbia, SC 29208

hereinafter referred to as "Agency", or its successors or assigns, the sum of \_\_\_\_\_\_(\$\_\_\_\_), being the sum of the Bond to which payment to be well and truly made, the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated \_\_\_\_\_\_ entered into a contract with Agency to construct

Project Name: Gibbes Green Historic Facilities Renovation - Petigru College Sitework

Project Number: H27-9835-PD-C

Brief Description of Awarded Work, as found on the SE-330, Bid Form: <u>The project consist of rework of</u> the existing site including brick and concrete pavement, curb and gutter, brick columns, erosion control, concrete car stops, storm drainage, inlets, fire hydrant relocation, tree protection, grading, wrought iron gates, etc. Small and minority business participation is encouraged.

in accordance with Drawings and Specifications prepared by (Insert full name and address of A/E)

Name: <u>GMK Associates</u> Address:<u>1201 Main Street, Suite 2100</u> Columbia, South Carolina 29201

which agreement is by reference made a part hereof, and is hereinafter referred to as the Contract.

**IN WITNESS WHEREOF**, Surety and Contractor, intending to be legally bound hereby, subject to the terms stated herein, do each cause this Labor and Material Payment Bond to be duly executed on its behalf by its authorized officer, agent or representative.

DATED thisday of, 2(shall be no earlier than Date of Contract)	BON	D NUMBER	
CONTRACTOR		SURETY	
By:(S	Seal)	By:	(Seal)
Print Name:		Print Name:	
Print Title:		Print Title: (Attach Power of Attorney)	
Witness:		Witness:	
	1		

(Additional Signatures, if any, appear on attached page)

# SE-357 Labor and Material Payment Bond

# NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

**1**. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Agency to pay for all labor, materials and equipment required for use in the performance of the Contract, which is incorporated herein by reference.

**2**. With respect to the Agency, this obligation shall be null and void if the Contractor:

**2.1** Promptly makes payment, directly or indirectly, for all sums due Claimants; and

**2.2** Defends, indemnifies and holds harmless the Agency from all claims, demands, liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Contract.

**3**. With respect to Claimants, this obligation shall be null and void if the Contractor promptly makes payment, directly or indirectly, for all sums due.

**4.** With respect to Claimants, and subject to the provisions of Title 29, Chapter 5 and the provisions of §11-35-3030(2)(c) of the SC Code of Laws, as amended, the Surety's obligation under this Bond shall arise as follows:

**4.1** Every person who has furnished labor, material or rental equipment to the Contractor or its subcontractors for the work specified in the Contract, and who has not been paid in full therefore before the expiration of a period of ninety (90) days after the date on which the last of the labor was done or performed by him or material or rental equipment was furnished or supplied by him for which such claim is made, shall have the right to sue on the payment bond for the amount, or the balance thereof, unpaid at the time of institution of such suit and to prosecute such action for the sum or sums justly due him.

**4.2** A remote claimant shall have a right of action on the payment bond upon giving written notice by certified or registered mail to the Contractor within ninety (90) days from the date on which such person did or performed the last of the labor or furnished or supplied the last of the material or rental equipment upon which such claim is made.

**4.3** Every suit instituted upon a payment bond shall be brought in a court of competent jurisdiction for the county or circuit in which the construction contract was to be performed, but no such suit shall be commenced after the expiration of o ne year after the day on which the last of the labor was performed or material or rental equipment was supplied by the person bringing suit.

**5.** When the Claimant has satisfied the conditions of paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:

**5.1** Send an answer to the Claimant, with a copy to the Agency, within sixty (60) days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

5.2 Pay or arrange for payment of any undisputed amounts.

5.3 The Surety's failure to discharge its obligations under this paragraph 5 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a claim. However, if the Surety fails to discharge its obligations under this paragraph 5, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs to recover any sums found to be due and owing to the Claimant.
6. Amounts owed by the Agency to the Contractor under the

Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any Performance Bond. By the Contractor furnishing and the Agency accepting this Bond, they agree that all funds earned by the contractor in the performance of the Contract are dedicated to satisfy obligations of the Contractor and the Surety under this Bond, subject to the Agency's prior right to use the funds for the completion of the Work.

7. The Surety shall not be liable to the Agency, Claimants or others for obligations of the Contractor that are unrelated to the Contract. The Agency shall not be liable for payment of any costs or expenses of any claimant under this bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

**8.** The Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.

**9**. Notice to the Surety, the Agency or the Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, the Agency or the contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

**10**. By the Contractor furnishing and the Agency accepting this Bond, they agree that this Bond has been furnished to comply with the statutory requirements of the South Carolina Code of Laws, as amended, and further, that any provision in this Bond conflicting with said statutory requirements shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

**11.** Upon request of any person or entity appearing to be a potential beneficiary of this bond, the Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

**12**. Any dispute, suit, action or proceeding arising out of or relating to this Bond shall be governed by the laws of the State of South Carolina.

#### **13. DEFINITIONS**

**13.1** Claimant: An individual or entity having a direct contract with the Contractor or with a Subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of the Contractor and the Contractor's Subcontractors, and all other items for which a mechanic's lien might otherwise be asserted.

**13.2** Remote Claimant: A person having a direct contractual relationship with a subcontractor of the Contractor or subcontractor, but no contractual relationship expressed or implied with the Contractor.

**13.3** Contract: The agreement between the Agency and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

# USC SUPPLEMENTAL GENERAL CONDITIONS FOR CONSTRUCTION PROJECTS

- 1. Contractor 's employees shall take all reasonable means not to interrupt the flow of student traffic in building corridors, lobbies and stairs. All necessary and reasonable safety precautions shall be taken to prevent injury to building occupants while transporting materials and equipment through the building to the work area. Providing safe, accessible, plywood pedestrian ways around construction may be required if a suitable alternative route is not available.
- 2. Fraternization between Contractor's employees and USC students, faculty or staff is strictly prohibited-zero tolerance!
- 3. USC will not tolerate rude, abusive or degrading behavior on the job site. Heckling and catcalling directed toward students, faculty or staff or any other person on USC property is strictly prohibited. Any contractor whose employees violate this requirement will be assessed a fine of up to \$500 per violation.
- 4. Contractor 's employees must adhere to the University 's policy of maintaining a drug-free and smoke-free/tobacco free workplace.
- 5. Contractor must sign a Contractor Key Receipt/Return form before any keys are issued. Keys must be returned immediately upon the completion of the work. The Contractor will bear the cost of any re-keying necessary due to the loss of or failure to return keys.
- 6. A welding permit must be issued by the University Fire Marshall before any welding can begin inside a building. Project Manager will coordinate.
- 7. Contractor must notify the University immediately upon the discovery of suspect material such as those potentially containing asbestos or other such hazardous materials. These materials **must not** be disturbed until approved by the USC Project Manager.
- 8. At the beginning of the project, the USC Project Manager will establish the Contractor's laydown area. This area will also be used for the Contractor's work vehicles. No personal vehicles will be allowed in this area, or in any areas surrounding the construction site that are not regular or authorized parking lots. Personal vehicles must be parked in the perimeter parking lots. Parking permits can be obtained at the USC Parking Office located in the Pendleton Street parking garage. The lay down area will be clearly identified to the contractor by the PM, with a sketch or drawing provided to Parking. In turn, the contractor will mark off this area with a sign containing the project name, PM name, Contractor name and contact number, and end date. Where this area is subject to foot traffic, protective barriers will be provided as specified by the PM. The area will be maintained in a neat and orderly fashion. Vehicles parked in the lay down area (or designated parking areas) will be clearly marked or display a CPC furnished placard for identification.
- 9. Contractor will be responsible for providing its own temporary toilet facilities, unless prior arrangements are made with the USC Project Manager.
- 10. Use of USC communications facilities (telephones, computers, etc.) by the Contractor is prohibited, unless prior arrangements are made with the USC Project Manager.

Updated: July 15, 2011

- 11. For all projects over \$100,000, including IDC 's, an SE-395, Contractor Performance Evaluation, will be completed by the USC Project Manager and reviewed with the GC at the beginning of the project and a copy given to the GC. At the end of the project the form will be completed and a Construction Performance rating will be established.
- 12. Contractor is responsible for removal of all debris from the site, and is required to provide the necessary dumpsters which will be emptied at least 2 times per week. Construction waste must not be placed in University dumpsters. THE CONSTRUCTION SITE MUST BE THOROUGHLY CLEANED WITH ALL TRASH PICKED UP AND PROPERLY DISPOSED OF ON A DAILY BASIS AND THE SITE MUST BE LEFT IN A SAFE AND SANITARY CONDITION EACH DAY. THE UNIVERSITY WILL INSPECT JOB SITES REGULARLY AND WILL FINE ANY CONTRACTOR FOUND TO BE IN VIOLATION OF THIS REQUIREMENT AN AMOUNT OF UP TO \$1,000 PER VIOLATION.

# 13. <u>Contractor must provide all O&M manuals, as-built drawings, and training of USC</u> personnel on new equipment, controls, etc. prior to Substantial Completion. Final payment will not be made until this is completed.

- 14. The contractor will comply with all regulations set forth by OSHA and SCDHEC. Contractor must also adhere to USC's internal policies and procedures (available by request). As requested, the contractor will submit all Safety Programs and Certificates of Insurance to the University for review.
- 15. Tree protection fencing is required to protect existing trees and other landscape features to be preserved within a construction area. The limits of this fence will be evaluated for each situation with the consultant, USC Arborist and USC Project Manager. The tree protection fence shall be 5' high chain link fence unless otherwise approved by USC Project Manager. No entry or materials storage will be allowed inside the tree protection zone. A 4" layer of mulch shall be placed over the tree protection area to maintain moisture in the root zone.
- 16. Where it is necessary to cross walks, tree root zones (i.e., under canopy) or lawns the following measures shall be taken: For single loads up to 9,000 lbs., a 3/4" minimum plywood base shall be placed over areas impacted. For single loads over 9,000 lbs., two layers of 3/4" plywood is required.
- 17. For projects requiring heavy loads to cross walks tree root zones or lawns. A construction entry road consisting of 10' X 16' oak logging mates on 12" coarse, chipped, hardwood base. Mulch and logging mats shall be supplemented throughout the project to keep matting structurally functional.
- 18. Any damage to existing landscaping (including lawn areas) will be remediated before final payment is made.
- 19. Orange safety fence to be provided by the contractor. (USC Arborist, Kevin Curtis may be contacted at 777-0033 or 315-0319)

# CAMPUS VEHICLE EXPECTATIONS

- 1. All motorized vehicles on the University campus are expected to travel and park on roadways and/or in parking stalls.
- 2. All motorized vehicle traffic on USC walkways must first receive the Landscape Manager=s authorization. Violators may be subject to fines and penalties.
- 3. All motorized vehicles that leak or drip liquids are prohibited from traveling or parking on walks or landscaped areas.
- 4. Contractors, vendors, and delivery personnel are required to obtain prior parking authorization before parking in a designated space. Violators may be subject to fines and/or penalties. See Item 10 below.
- 5. Drivers of equipment or motor vehicles that damage university hardscape or landscape will be held personally responsible for damages and restoration expense.
- 6. Vehicle drivers who park on landscape or drives must be able to produce written evidence of need or emergency requiring parking on same.
- 7. All vehicles parked on landscape, hardscape, or in the process of service delivery, must display adequate safety devices, i.e. flashing lights, cones, signage, etc.
- 8. All drivers of equipment and vehicles will be respectful of University landscape, equipment, structures, fixtures and signage.
- 9. All incidents of property damage will be reported to Parking Services or the Work Management Center.
- 10. Parking on campus is restricted to spaces designated by Parking Services at the beginning of the project. Once the project manager and contractor agree on how many spaces are needed, the project manager will obtain a placard for each vehicle. This placard must be hung from the mirror of the vehicle, otherwise a ticket will be issued and these tickets cannot be "fixed". Parking spaces are restricted to work vehicles only; no personal vehicles.

# **University of South Carolina Gibbes Green Historic Gibbes Facilities Renovation** Petigru College Sitework **Columbia, South Carolina**

Project Name: Gibbes Green Historic Facilities Renovation - Petigru College Sitework

Project Number: H27-9835-PD-C

University of South Carolina

# CONTRACTOR'S ONE YEAR GUARANTEE

\_\_\_\_\_

STATE OF

COUNTY OF

WE

as General Contractor on the above-named project, do hereby guarantee that all work executed under the requirements of the Contract Documents shall be free from defects due to faulty materials and /or workmanship for a period of one (1) year from date of acceptance of the work by the Owner and/or Architect/Engineer; and hereby agree to remedy defects due to faulty materials and/or workmanship, and pay for any damage resulting wherefrom, at no cost to the Owner, provided; however, that the following are excluded from this guarantee;

Defects or failures resulting from abuse by Owner.

Damage caused by fire, tornado, hail, hurricane, acts of God, wars, riots, or civil commotion.

[Name of Contracting Firm]

\*By\_\_\_\_\_

Title

\*Must be executed by an office of the Contracting Firm.

SWORN TO before me this \_\_\_\_\_ day of \_\_\_\_\_, 2\_\_\_ (seal)

My commission expires \_\_\_\_\_

# DIVISION 1

E Ν E R A L R E Q U I R E  $\mathbf{M}$ E

G

N T S

# SECTION 01200 - PRICE AND PAYMENT PROCEDURES

### PART 1 GENERAL

# 1.01 SECTION INCLUDES

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Sum and Contract Time.
- C. Coordinate the Schedule of Values and Applications for Payment with the Contractor's Construction Schedule, List of Subcontracts, and Submittal Schedule.
- D. The Contractor's Construction Schedule and Submittal Schedule are included in other sections of Division 1.
- E. See also the payment requirements in Supplementary Conditions.
- F. Change procedures.
- G. Correlation of Contractor submittals based on changes.
- H. Procedures for preparation and submittal of application for final payment.

# **1.02 RELATED REQUIREMENTS**

- A. Document 00500 Agreement: Contract Sum.
- B. Document 00700 General Conditions: Additional requirements for progress payments, final payment, changes in the Work.

# 1.03 SCHEDULE OF VALUES

- A. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to GMK Associates for approval.
- B. Forms filled out by hand will not be accepted.
- C. Submit Schedule of Values in duplicate within 30 days after date of Owner-Contractor Agreement.
- D. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification Section. Identify site mobilization and bonds and insurance.
  - 1. Provide minimum of 1% of the Construction Cost for Project Record Drawings.
  - 2. Provide minimum of 1% of the Construction Cost for Operating and Maintenance Data.
  - 3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Break principal subcontract amounts down into several line items.
- E. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
  - 1. Contractor's construction schedule.
  - 2. Application for Payment form.
  - 3. List of Subcontractors.
  - 4. Schedule of allowances.

- 5. List of principal suppliers and fabricators.
- 6. Schedule of submittals.
- F. Sub-Schedules: Where the Work is separated into phases that require separately phased payments, provide sub-schedules showing values correlated with each phase of payment.
- G. Identification: Include the following Project identification on the Schedule of Values:
  - 1. Project name and location.
  - 2. Name of the Architect.
  - 3. Contractor's name and address.
  - 4. Date of submittal.
- H. Round amounts off to the nearest whole dollar; the total shall equal the Contract Sum.
- I. Include within each line item, a direct proportional amount of Contractor's overhead and profit.
- J. For each part of the Work where an Application for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed, provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
- K. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown as separate line items in the Schedule of Values.
- L. Revise schedule to list approved Change Orders, with each Application For Payment.

# 1.04 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Forms filled out by hand will not be accepted.
- C. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of the first Application for Payment include the following:
  - 1. List of Subcontractors.
  - 2. List of principal suppliers and fabricators.
  - 3. Schedule of Values.
  - 4. Contractor's Construction Schedule (preliminary if not final).
  - 5. Schedule of principal products.
  - 6. Submittal Schedule (preliminary if not final).
  - 7. List of Contractor's staff assignments.
  - 8. List of Contractor's principal consultants.
  - 9. Copies of building permits.
  - 10. Copies of authorizations and licenses from governing authorities for performance of the Work.
  - 11. Initial progress report.
  - 12. Report of pre-construction meeting.
  - 13. Certificates of insurance and insurance policies.
  - 14. Performance and payment bonds (if required).
  - 15. Data needed to acquire Owner's insurance.
  - 16. Initial settlement survey and damage report, if required.

- D. For each item, provide a column for listing each of the following:
  - 1. Item Number.
  - 2. Description of work.
  - 3. Scheduled Values.
  - 4. Previous Applications.
  - 5. Work in Place and Stored Materials under this Application.
  - 6. Authorized Change Orders.
  - 7. Total Completed and Stored to Date of Application.
  - 8. Percentage of Completion.
  - 9. Balance to Finish.
  - 10. Retainage.
- E. Execute certification by signature of authorized officer.
  - 1. Incomplete applications will be returned without action.
- F. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored Products.
- G. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of Work.
- H. Submit three copies of each Application for Payment.
- I. Waiver Forms: Submit waivers of lien on forms, and executed in a manner, acceptable to Owner.
- J. Include the following with the application:
  - 1. Transmittal letter as specified for Submittals in Section 01300.
  - 2. Construction progress schedule, revised and current as specified in Section 01325.
  - 3. Partial release of liens from major Subcontractors and vendors.
  - 4. Project record documents as specified in Section 01780, for review by Owner which will be returned to the Contractor.
- K. Waiver Delays: Submit each Application for Payment with the Contractor's waiver of mechanics lien for the period of construction covered by the application.
- L. When an application shows completion of an item, submit final or full waivers.
- M. When GMK Associates requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.
- N. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment; this application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- O. Administrative actions and submittals that shall proceed or coincide with this application include:
  - 1. Occupancy permits and similar approvals.
  - 2. Warranties (guarantees) and maintenance agreements.
  - 3. Test/adjust/balance records.
  - 4. Meter readings.

- 5. Start-up performance reports.
- 6. Change-over information related to Owner's occupancy, use, operation and maintenance.
- 7. Final cleaning.
- 8. Application for reduction of retainage, and consent of surety.
- 9. Advice on shifting insurance coverages.
- P. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.
- Q. Contractor is required to assemble and complete information required by SC Department of Health and Environmental Control for project close-out. Copies of these regulations and guidelines are available from SCDHEC or will be given to successful bidder upon start of work. Three copies of all information is required.

# 1.05 MODIFICATION PROCEDURES

- A. Submit name of the individual authorized to receive change documents and who will be responsible for informing others in Contractor's employ or subcontractors of changes to the Contract Documents.
- B. For minor changes not involving an adjustment to the Contract Price or Contract Time, GMK Associates will issue instructions directly to Contractor.
- C. For other required changes, GMK Associates will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
  - 1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
  - 2. Promptly execute the change.
- D. For changes for which advance pricing is desired, GMK Associates will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 14 days.
- E. Contractor may propose a change by submitting a request for change to GMK Associates, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 01600.
- F. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
  - 1. For change requested by GMK Associates for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
  - 2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by GMK Associates.
  - 3. For pre-determined unit prices and quantities, the amount will based on the fixed unit prices.

- 4. For change ordered by GMK Associates without a quotation from Contractor, the amount will be determined by GMK Associates based on the Contractor's substantiation of costs as specified for Time and Material work.
- G. Substantiation of Costs: Provide full information required for evaluation.
  - 1. Provide following data:
    - a. Quantities of products, labor, and equipment.
    - b. Taxes, insurance, and bonds.
    - c. Overhead and profit.
    - d. Justification for any change in Contract Time.
    - e. Credit for deletions from Contract, similarly documented.
  - 2. Support each claim for additional costs with additional information:
    - a. Origin and date of claim.
    - b. Dates and times work was performed, and by whom.
    - c. Time records and wage rates paid.
    - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
  - 3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
- H. Execution of Change Orders: GMK Associates will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- I. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- J. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- K. Promptly enter changes in Project Record Documents.

# 1.06 APPLICATION FOR FINAL PAYMENT

- A. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of Work covered by the application who could lawfully be entitled to a lien.
- B. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- C. Final Payment Application: Administrative actions and submittals which must precede or coincide with submittal of the final payment Application for Payment include the following:
  - 1. Completion of Project closeout requirements.
  - 2. Completion of items specified for completion after Substantial Completion.
  - 3. Assurance that unsettled claims will be settled.
  - 4. Assurance that Work not complete and accepted will be completed without undue delay.
  - 5. Transmittal of required Project construction records to Owner.
  - 6. Certified property survey.
  - 7. Proof that taxes, fees and similar obligations have been paid.
  - 8. Removal of temporary facilities and services.

- 9. Removal of surplus materials, rubbish and similar elements.
- 10. Change of door locks to Owner's access.
- D. Application for Final Payment will not be considered until the following have been accomplished:
  - 1. All closeout procedures specified in Section 01700.

# **END OF SECTION**
# **SECTION 01230 - ALTERNATES**

#### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Description of alternatess.
- B. Procedures for pricing base bids.
- C. Documentation of changes to Contract Sum and Contract Time.

# 1.02 RELATED REQUIREMENTS

A. Document 00200 - Instructions to Bidders: Instructions for preparation of pricing for alternatives.

#### 1.03 ACCEPTANCE OF BASE BIDS

- A. Alternates quoted on SE-330 will be reviewed and accepted or rejected at Owner's option. Accepted alternates will be identified in the Owner-Contractor Agreement.
- B. Coordinate related work and modify surrounding work to integrate the Work of each alternate.

# 1.04 SCHEDULE OF ALTERNATES

- A. Alternate No. 1 Description:
  - 1. Includes; brick columns (2) with precast cap, low brick wall, low brick cheek wall, brick pavement, brick steps and handrails.

# PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

# **END OF SECTION**

#### **SECTION 01300 - ADMINISTRATIVE REQUIREMENTS**

#### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Preconstruction meeting.
- B. Progress meetings.
- C. Coordination drawings.
- D. Submittals for review, information, and project closeout.
- E. Number of copies of submittals.
- F. Submittal procedures.

#### **1.02 RELATED REQUIREMENTS**

- A. Document 00700 General Conditions: Dates for applications for payment.
- B. Section 01325 Construction Progress Schedule: Form, content, and administration of schedules.
- C. Section 01700 Execution Requirements: Additional coordination requirements.
- D. Section 01780 Closeout Submittals: Project record documents.

#### PART 2 PRODUCTS - NOT USED

#### PART 3 EXECUTION

#### 3.01 PRECONSTRUCTION MEETING

- A. Owner will schedule a meeting after Notice of Award.
- B. Attendance Required:
  - 1. Owner.
  - 2. GMK Associates.
  - 3. Contractor.

# C. Agenda:

- 1. Execution of Owner-Contractor Agreement.
- 2. Submission of executed bonds and insurance certificates.
- 3. Distribution of Contract Documents.
- 4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
- 5. Designation of personnel representing the parties to Contract, Owner, and GMK Associates.
- 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
- 7. Scheduling.
- 8. Scheduling activities of Special Inspector.
- D. Contractor to record minutes and distribute copies within two days after meeting to participants, with two copies to GMK Associates, Owner, participants, and those affected

by decisions made.

### 3.02 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum weekly intervals on day and time convenient for all parties involved.
- B. Make arrangements for meetings, prepare agenda with copies for participants prior to meetings, preside at meetings.
- C. Attendance Required: Job superintendent, major Subcontractors and suppliers as appropriate to agenda topics for each meeting. The Architect and Owner may attend.
- D. Agenda:
  - 1. Review minutes of previous meetings.
  - 2. Review of Work progress.
  - 3. Field observations, problems, and decisions.
  - 4. Identification of problems that impede, or will impede, planned progress.
  - 5. Review of submittals schedule and status of submittals.
  - 6. Review of status of Request for Information (RFI).
  - 7. Review of status of Architectural Supplemental Instructions (ASI).
  - 8. Review of status of proposal requests (PR).
  - 9. Review of status of Change Orders (CO).
  - 10. Review of off-site fabrication and delivery schedules.
  - 11. Maintenance of progress schedule.
  - 12. Corrective measures to regain projected schedules.
  - 13. Planned progress during succeeding work period.
  - 14. Coordination of projected progress.
  - 15. Maintenance of quality and work standards.
  - 16. Effect of proposed changes on progress schedule and coordination.
  - 17. Other business relating to Work.
- E. Record minutes and distribute copies within five days after meeting to participants, with three copies to GMK Associates, one copy to Owner, participants, and those affected by decisions made.

#### 3.03 COORDINATION DRAWINGS

A. Review drawings prior to submission to GMK Associates.

#### 3.04 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
  - 1. Product data.
    - a. When product data submittals are prepared specifically for this project (in the absence of standard printed information) submit such information as shop drawings and not as product data submittals.
    - b. Content:
      - 1) Identify the particular product being submitted; submit only pertinent pages.
      - 2) Show compliance with properties specified.
      - 3) Identify which options and accessories are applicable.
      - 4) Show compliance with the specific standards referenced.

- 5) Show compliance with specified testing agency listings; show the limitations of their labels or seals, if any.
- 6) Identify dimensions which have been verified by field measurement.
- 7) Show special coordination requirements for the product.
- 2. Shop drawings.
  - a. Original drawings, prepared by Contractor, Subcontractor, supplier or distributor, which illustrate portion of the work, showing fabrication, layout, setting and erection details.
  - b. Do not reproduce the Contract Drawings for the shop drawing submittals. Electronic media of the Construction Documents are not available for the Contractor's Subcontractor's, or material suppliers use.
  - c. Identify details by reference to drawing sheet number(s) and pertinent detail number(s).
  - d. Shop drawings shall not include the phrase by others, except when relating to materials, products or equipment not included under the total Contract.
- 3. Samples.
  - a. Provide samples that are the same as proposed product.
  - b. Where products are to match a sample prepared by other entities, prepare sample to match.
  - c. Preparation:
    - 1) Attach a description to each sample.
    - 2) Attach name of manufacturer or source to each sample.
    - 3) Where compliance with specified properties is required, attach documentation showing compliance.
    - 4) Where selection is required, the first submittal may be a single set of all options; after return of submittal with selection indicated, submit standard number of sets of selected item.
  - d. Keep final sample set(s) at the project site, available for use during progress of the work.
  - e. Contractor shall be responsible for submitting all interior and exterior materials samples that require a color and/or finish selection or is required to be part of a mock up assembly at the same time. The Contractor shall include the color, finish, material selection schedule in the shop drawing submittal schedule. The Architect will provide final color, finish, and material selections only when they have all been submitted by the Contractor.
- B. Submit to GMK Associates for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- C. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01780 CLOSEOUT SUBMITTALS.

# 3.05 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
  - 1. Design data.
  - 2. Certificates.
  - 3. Test reports.

- 4. Inspection reports.
- 5. Manufacturer's instructions.
- 6. Manufacturer's field reports.
- 7. Other types indicated.
- B. Submit for GMK Associates's knowledge as contract administrator or for Owner. No action will be taken.

# 3.06 SUBMITTALS FOR PROJECT CLOSEOUT

- A. When the following are specified in individual sections, submit them at project closeout:
  - 1. Project record documents.
  - 2. Operation and maintenance data.
  - 3. Warranties.
  - 4. Bonds.
  - 5. Other types as indicated.
- B. Submit for Owner's benefit during and after project completion.

# 3.07 NUMBER OF COPIES OF SUBMITTALS

- A. Documents for Review:
  - 1. Small Size Sheets, Not Larger Than 8-1/2 x 11 inches: Submit the number of copies that Contractor requires, plus two copies that will be retained by GMK Associates.
- B. Documents for Information: Submit two copies.
- C. Documents for Project Closeout: Make one reproduction of submittal originally reviewed. Submit one extra of submittals for information.

### 3.08 SUBMITTAL PROCEDURES

- A. Transmit each submittal with AIA Form G810, in duplicate.
  - 1. Submittals received without a transmittal form will be returned without review or action.
  - 2. Fill out a separate transmittal form for each submittal; also include the following:
    - a. Other relevant information.
    - b. Requests for additional information.
  - 3. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- B. Identify Project name and numbers, Contractor's, Subcontractor's or supplier's name and address, Architect's name and address, Manufacturer's name ; pertinent drawing and detail number, and specification section number, as appropriate on each copy.
- C. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, quantities, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
  - 1. Contractor's responsibility regarding errors and omissions in submittals is not relieved by Architect's review of submittals.
  - 2. Contractor's responsibility regarding deviations in submittals from requirements of Contract Documents is not relieved by Architect's review submittals, unless Architect

gives written acceptance of specific deviations as approved by Owner.

- 3. When work is directly related and involves more than one trade, shop drawings shall be coordinated by the submitting Contractor/Subcontractor with other trades prior submission and related work submitted under one cover.
  - a. After shop drawing has been submitted for review, no changes may be made to that Drawing other than changes resulting from review notes made by the Architect unless such changes are clearly identified and circled before being resubmitted. Any failure to comply with this requirement shall nullify and invalidate the Architect's review.
- 4. Submittals without Contractor's stamp of review will not be reviewed and will be returned for resubmission.
- D. Submittals will be accepted from the Contractor only. Submittals received from other entities will be returned without review or action.
- E. Do not submit substitute items that have not been approved by means of the procedure specified elsewhere.
- F. Do not include requests for substitution (either direct or indirect) on submittals; comply with procedures for substitutions specified elsewhere.
- G. Schedule submittals to expedite the Project, and coordinate submission of related items.
  - 1. Prepare and submit, in accordance with the approved Project Construction Schedule, a separate document listing dates by which shop drawings, product data and samples must be submitted for each material, product or equipment item requiring submittal.
  - 2. The schedule shall reflect an orderly sequence so as to cause no delay in the Work.
  - 3. Coordinate submittals and activities that must be performed in sequence, so that the Architect has enough information to properly review the submittals.
  - 4. Coordinate submittals of different types for the same product or system so that the Architect has enough information to properly review each submittal.
  - 5. The dates indicated shall allow reasonable time for the review process of checking, correcting and resubmitting and reasonable time for procurement.
  - 6. No extension of time will be granted to the Contractor/Subcontractor because of failure to expeditiously submit shop drawings and samples in reasonable time to allow for review process.
  - 7. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor. Architect shall review with reasonable promptness.
- H. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
- I. Provide space for Contractor and GMK Associates review stamps. Submittals to receive Architect's action marking: Provide blank space on the label or on the submittal itself for action marking; 4 inches wide by 6 inches high.
- J. Do not commence work which requires review of any submittals until receipt of returned submittals with an acceptable action.
  - 1. Stamped Reviewed, no corrections or resubmissions required, fabrication may proceed.
  - 2. Stamped Revise and Resubmit.
    - a. If Contractor/Subcontractor complies with noted corrections, fabrication may proceed.

- 3. If for any reason the Contractor/Subcontractor cannot comply with the noted corrections, fabrication shall not proceed and Contractor/Subcontractor shall resubmit, following procedures outlined herein before.
- 4. Stamped Revise and Resubmit or Resubmit.
  - a. Contractor/Subcontractor shall revise and resubmit for review. Fabrication shall not proceed.
- K. When revised for resubmission, identify all changes made since previous submission.
- L. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- M. Submittals not requested will not be recognized or processed.

# **END OF SECTION**

#### **SECTION 01325 - CONSTRUCTION PROGRESS SCHEDULE**

#### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Preliminary schedule.
- B. Construction progress schedule, bar chart type.
- C. Reports.

#### 1.02 SUBMITTALS

- A. Within 7 days after date established in Notice to Proceed, submit preliminary schedule defining planned operations for the first 45 days of Work, with a general outline for remainder of Work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 3 working days.
- C. Within 10 days after date established in Notice to Proceed, submit draft of proposed complete schedule for review.
  - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 3 days after Architect's review, submit complete schedule.
- E. Submit Daily Construction Reports every week.
- F. Submit updated schedule and Progress Reports with each Application for Payment.
- G. Submit the number of opaque reproductions that Contractor requires, plus three copies that will be retained by GMK Associates.
- H. Submit under transmittal letter form specified in Section 01300.

#### 1.03 QUALITY ASSURANCE

A. Scheduler: Contractor's personnel or specialist Consultant specializing in CPM scheduling with one years minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.

### 1.04 SCHEDULE FORMAT

- A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.
- B. Diagram Sheet Size: Maximum 22 x 17 inches or width required.
- C. Sheet Size: Multiples of  $8-1/2 \times 11$  inches.
- D. Scale and Spacing: To allow for notations and revisions.

#### 1.05 COORDINATION

A. In preparation of schedules, take into account the time allowed or required for the

# CONSTRUCTION PROGRESS SCHEDULE

Architect's administrative procedures.

- PART 2 PRODUCTS NOT USED
- PART 3 EXECUTION
- 3.01 PRELIMINARY SCHEDULE
  - A. Prepare preliminary schedule in the form of a horizontal bar chart.

# 3.02 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Provide full description of work in each phase and overall impact of phasing on the project.
- C. Identify each item by specification section number.
- D. Identify work of separate stages and other logically grouped activities.
- E. Provide sub-schedules to define critical portions of the entire schedule.
- F. Include conferences and meetings in schedule.
- G. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- H. Provide separate schedule of submittal dates for shop drawings, product data, and samples, owner-furnished products, Products identified under Allowances, and dates reviewed submittals will be required from GMK Associates. Indicate decision dates for selection of finishes.
- I. Indicate delivery dates for owner-furnished products.
- J. Coordinate content with schedule of values specified in Section 01200.
- K. Provide legend for symbols and abbreviations used.
- L. Use the same terminology as that used in the Contract Documents.

# 3.03 BAR CHARTS

- A. Include a separate bar for each major portion of Work or operation.
- B. Identify the first work day of each week.
- C. Coordinate each element on the schedule with other construction activities.
- D. Show activities in proper sequence.
- E. Include cost bar at top of chart, showing estimated and actual costs of work performed at the date of each application for payment.
- F. Use vertical lines to mark the time scale at not more than one week intervals.

# 3.04 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Provide construction schedule in the form of bar charts:
  - 1. Use the same items of work as shown in the schedule of values.

# CONSTRUCTION PROGRESS SCHEDULE

- 2. Where related activities must be performed in sequence, show relationship graphically.
- 3. Incorporate the submittal schedule specified elsewhere.
- 4. Incorporate the quality control activities schedule specified elsewhere.
- 5. Show dates of:
  - a. Each activity that influences the construction time.
  - b. Preconstruction meeting.
  - c. Ordering dates for products requiring long lead time.
  - d. Completion of demolition for each phase.
  - e. Completion of mechanical work for each phase.
  - f. Completion of electrical work for each phase.
  - g. Instruction of the Owner's personnel in operation and maintenance of equipment and systems.
  - h. Substantial and final completion of each phase, with time frames for the Architect's completion procedures and owner move in dates.
- 6. In developing the schedule take into account:
  - a. Continued occupancy of areas adjacent to the work area as well as throughout the building.
  - b. Interruption of services to occupied facilities
  - c. The owner will require a week to move staff between phases of the project.
  - d. Each phase will require Certificate of Occupancy from the Office of the State Engineer.
  - e. Each phase will have a punch list produced and must be completed prior to the owner's acceptance of the space and occupancy.
  - f. Site limitations

### 3.05 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Annotate diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit progress reports required to support recommended changes.

# 3.06 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules and reports to Contractor's project site file, to Subcontractors, suppliers, GMK Associates, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

### 3.07 REPORTS

A. Daily Construction Logs: Every day, record the following information concerning events at the site:

- 1. Approximate number of persons at the site.
- 2. Visitors to the site.
- 3. Modifications to the contract received; modifications implemented.
- 4. Changes in occupancy.
- 5. Delays; reasons for delay.
- 6. Emergencies and accidents.
- 7. Equipment and system start-ups and tests.
- 8. Losses of material and property.
- 9. Meetings held and significant decisions made there.
- 10. Names of Subcontractors at site.
- 11. Orders and requests of representatives of governing authorities.
- 12. Unusual events.
- 13. Utility service disconnections and connections.
- B. Progress Reports: Prepare a narrative report describing the general state of completion of the work and describing in detail the following:
  - 1. Actual and anticipated delays, their impact on the schedule, and corrective actions taken or proposed.
  - 2. Actual and potential problems.
  - 3. Status of change order work.
  - 4. Effect of delays, problems, and changes on the schedules of Subcontractors.
  - 5. Outstanding change proposal requests.
  - 6. Status of corrective work ordered by the Architect

# **END OF SECTION**

# **SECTION 01400 - QUALITY REQUIREMENTS**

# PART 1 GENERAL

### 1.01 SECTION INCLUDES

- A. References and standards.
- B. Mock-ups.
- C. Control of installation.
- D. Tolerances.
- E. Testing and inspection services.
- F. Manufacturers' field services.

#### **1.02 RELATED REQUIREMENTS**

- A. Document 00700 General Conditions: Inspections and approvals required by public authorities.
- B. Section 01300 Administrative Requirements: Submittal procedures.
- C. Section 01600 Product Requirements: Requirements for material and product quality.

#### 1.03 SUBMITTALS

- A. Design Data: Submit for GMK Associates's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.
- B. Test Reports: After each test/inspection, promptly submit two copies of report to GMK Associates and to Contractor.
  - 1. Include:
    - a. Date issued.
    - b. Project title and number.
    - c. Name of inspector.
    - d. Date and time of sampling or inspection.
    - e. Identification of product and specifications section.
    - f. Location in the Project.
    - g. Type of test/inspection.
    - h. Date of test/inspection.
    - i. Results of test/inspection.
    - j. Conformance with Contract Documents.
    - k. When requested by GMK Associates, provide interpretation of results.
  - 2. Test report submittals are for GMK Associates's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.
- C. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to GMK Associates, in quantities specified for Product Data.
  - 1. Indicate material or product conforms to or exceeds specified requirements. Submit

supporting reference data, affidavits, and certifications as appropriate.

- D. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- E. Manufacturer's Field Reports: Submit reports for GMK Associates's benefit as contract administrator or for Owner.
  - 1. Submit report within 10 days of observation to GMK Associates for information.
  - 2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
- F. Erection Drawings: Submit drawings for GMK Associates's benefit as contract administrator or for Owner.
  - 1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
  - 2. Data indicating inappropriate or unacceptable Work may be subject to action by GMK Associates or Owner.

# 1.04 REFERENCES AND STANDARDS

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from GMK Associates before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of GMK Associates shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

### 1.05 TESTING AND INSPECTION AGENCIES

- A. Owner will employ and pay for services of an independent testing agency to perform other specified testing.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

QUALITY REQUIREMENTS

# 3.01 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from GMK Associates before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have Work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

### 3.02 MOCK-UPS

- A. Tests will be performed under provisions identified in this section and identified in the respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be a comparison standard for the remaining Work.
- D. Where mock-up has been accepted by GMK Associates and is specified in product specification sections to be removed, remove mock-up and clear area when directed to do so.

### 3.03 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from GMK Associates before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

# 3.04 TESTING AND INSPECTION

- A. See individual specification sections for testing required.
- B. Testing Agency Duties:
  - 1. Test samples of mixes submitted by Contractor.
  - 2. Provide qualified personnel at site. Cooperate with GMK Associates and Contractor in performance of services.
  - 3. Perform specified sampling and testing of products in accordance with specified standards.

- 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
- 5. Promptly notify GMK Associates and Contractor of observed irregularities or non-conformance of Work or products.
- 6. Perform additional tests and inspections required by GMK Associates.
- 7. Submit reports of all tests/inspections specified.
- C. Limits on Testing/Inspection Agency Authority:
  - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
  - 2. Agency may not approve or accept any portion of the Work.
  - 3. Agency may not assume any duties of Contractor.
  - 4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
  - 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
  - 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
  - 3. Provide incidental labor and facilities:
    - a. To provide access to Work to be tested/inspected.
    - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
    - c. To facilitate tests/inspections.
    - d. To provide storage and curing of test samples.
  - 4. Notify GMK Associates and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
  - 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
  - 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- E. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by GMK Associates.
- F. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

# 3.05 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

#### 3.06 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not conforming to specified requirements.
- B. If, in the opinion of GMK Associates, it is not practical to remove and replace the Work,

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GMK Associates will direct an appropriate remedy or adjust payment.

# **END OF SECTION**

# SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

# PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Temporary utilities.
- B. Temporary sanitary facilities.
- C. Temporary Controls: fencing.
- D. Security requirements.
- E. Vehicular access and parking.
- F. Waste removal facilities and services.
- G. Field offices.
- H. Campus Policy

#### 1.02 SUBMITTALS

A. Implementation and Termination Schedule: Submit a schedule indicating implementation and termination of each temporary utility connection within 10 days of the date established for commencement of the Work.

#### 1.03 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations if authorities having jurisdiction, including but not limited to:
  - 1. Building Code requirements.
  - 2. Health and safety regulations.
  - 3. Utility company regulations.
  - 4. Police, Fire Department and Rescue Squad rules.
  - 5. Environmental protection regulations.
- B. Standards: Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and NECA Electrical Design Library, "Temporary Electrical Facilities."
- C. Electrical Service: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service in compliance with National Electric Code (NFPA 70).
- D. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

#### **1.04 PROJECT CONDITIONS**

A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility connection. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of the permanent service.

1.05 MATERIALS

- A. General: Provide new materials; if acceptable to the Architect, undamaged previously used materials in serviceable condition may be used. Provide materials suitable for the use intended.
- B. Gypsum Wallboard: Provide gypsum wallboard complying with requirements of ASTM C 36 on interior walls of temporary offices.
- C. Paint: Comply with requirements of Division-9 Section "Paints and Coatings."
- D. Water: Provide potable water approved by local health authorities.

# 1.06 EQUIPMENT

- A. General: Provide new equipment; if acceptable to the Architect, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for use intended.
- B. Water Hoses: Provide 3/4" heavy-duty, abrasion-resistant, flexible rubber hoses 100 ft. long, with pressure rating greater than the maximum pressure of the water distribution system; provide adjustable shut-off nozzles at hose discharge.
- C. Electrical Outlets: Provide properly configured NEMA polarized outlets to prevent insertion of 110-120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for connection of power tools and equipment.
- D. Electrical Power Cords: Provide grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas where construction activities are in progress.
- E. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered glass enclosures, where exposed to breakage. Provide exterior fixtures where exposed to moisture.
- F. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM or another recognized trade association related to the type of fuel being consumed.
- G. Temporary Toilet Units: Provide and maintain temporary portable units. Location as directed by owner.
- H. First Aid Supplies: Comply with governing regulations. All accidents or injuries shall be reported to Owner.
- I. Fire Extinguishers: Provide hand-carried, portable UL-rated, class "A" fire extinguishers for temporary offices and similar spaces. In other locations provide hand-carried, portable, UL-rated, class "ABC" dry chemical extinguishers, or a combination of extinguishers of NFPA recommended classes for the exposures.
- J. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.
- K. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit them to interfere with progress. Do not allow hazardous

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dangerous or unsanitary conditions, or public nuisances to develop or persist on the site

# 1.07 TEMPORARY UTILITIES

A. Existing facilities may be used.

# 1.08 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Use of existing facilities is not permitted as directed by Owner.
- C. Maintain daily in clean and sanitary condition.

# 1.09 FENCING

- A. Construction: Commercial grade chain link fence.
- B. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

### 1.10 SECURITY

- A. Provide security and facilities to protect Work, and Owner's operations from unauthorized entry, vandalism, or theft.
- B. Store combustible materials in containers in fire-safe locations
- C. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, might be contaminated or polluted, or that other undesirable effects might result.
- D. Coordinate with Owner's security program.

### 1.11 VEHICULAR ACCESS AND PARKING

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and Owner.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets.
- E. Designated existing on-site roads may be used for construction traffic.
- F. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.
- G. Existing parking areas may be used for construction parking as directed by Owner.

# 1.12 WASTE REMOVAL

A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

- B. Provide containers with lids. Remove trash from site periodically.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

# 1.13 CAMPUS POLICY

- A. Smoking is not allowed by construction personnel.
- B. Food and canned or bottled drinks are prohibited in the areas of interior consruction work. Contractor shall provde designated areas for water stations and consumption of food.
- C. Workers not complying with these requirements shall be subject to dismissal.

# 1.14 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition.
- E. Restore new permanent facilities used during construction to specified condition.

# **END OF SECTION**

# **SECTION 01600 - PRODUCT REQUIREMENTS**

# PART 1 GENERAL

### 1.01 SECTION INCLUDES

- A. General product requirements.
- B. Re-use of existing products.
- C. Transportation, handling, storage and protection.
- D. Product option requirements.
- E. Substitution limitations and procedures.
- F. Procedures for Owner-supplied products.
- G. Maintenance materials, including extra materials, spare parts, tools, and software.

#### **1.02 RELATED REQUIREMENTS**

A. Section 01400 - Quality Requirements: Product quality monitoring.

### 1.03 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

# 1.04 SUBMITTALS

- A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
  - 1. Submit within 15 days after date of Agreement.
  - 2. For products specified only by reference standards, list applicable reference standards.
- B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
  - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

### PART 2 PRODUCTS

#### 2.01 EXISTING PRODUCTS

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.
- B. Unforeseen historic items encountered remain the property of the Owner; notify Owner

promptly upon discovery; protect, remove, handle, and store as directed by Owner.

- C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.
- D. Reused Products: Reused products include materials and equipment previously used in this or other construction, salvaged and refurbished as specified.

# 2.02 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. Where all other criteria are met, Contractor shall give preference to products that:
  - 1. Are extracted, harvested, and/or manufactured closer to the location of the project.
  - 2. Have longer documented life span under normal use.
  - 3. Result in less construction waste.
- C. Provide interchangeable components of the same manufacture for components being replaced.
- D. Motors: Refer to Section 15065, NEMA MG 1 Type. Specific motor type is specified in individual specification sections.
- E. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Size terminal lugs to NFPA 70, include lugs for terminal box.
- F. Cord and Plug: Provide minimum 6 foot cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

### 2.03 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

# 2.04 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

# PART 3 EXECUTION

### 3.01 SUBSTITUTION PROCEDURES

- A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.
- B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.
- C. Document each request with complete data substantiating compliance of proposed

substitution with Contract Documents.

- D. A request for substitution constitutes a representation that the submitter:
  - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
  - 2. Will provide the same warranty for the substitution as for the specified product.
  - 3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
  - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
  - 5. Will reimburse Owner and GMK Associates for review or redesign services associated with re-approval by authorities.
- E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- F. Substitution Submittal Procedure:
  - 1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
  - 2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
  - 3. The GMK Associates will notify Contractor in writing of decision to accept or reject request.
- G. Substitution Request Form:
  - 1. SUBSTITUTIONS WILL BE CONSIDERED ONLY WHEN THE ATTACHED FORM IS COMPLETED AND INCLUDED WITH THE SUBMITTAL WITH ALL BACK-UP DATA.

# 3.02 OWNER-SUPPLIED PRODUCTS

- A. See Section 01100 Summary for identification of Owner-supplied products.
- B. Owner's Responsibilities:
  - 1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
  - 2. Arrange and pay for product delivery to site.
  - 3. On delivery, inspect products jointly with Contractor.
  - 4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
  - 5. Arrange for manufacturers' warranties, inspections, and service.
- C. Contractor's Responsibilities:
  - 1. Review Owner reviewed shop drawings, product data, and samples.
  - 2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
  - 3. Handle, store, install and finish products.
  - 4. Repair or replace items damaged after receipt.

# 3.03 TRANSPORTATION AND HANDLING

- A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- B. Transport and handle products in accordance with manufacturer's instructions.
- C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.
- F. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

### 3.04 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
- G. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- H. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

# **END OF SECTION**

#### SECTION 01601 - SUPPLEMENT A - SUBSTITUTION REQUEST FORM

TO:

Jerome K. Simons

GMK Associates, Inc.

1201 Main Street, Suite 2100

Columbia, South Carolina 29201

fax: 803.255.7243

We hereby submit for your consideration the following product instead of the specified item for the above project:

DRAWING NO NAME	DRAWING		
SPEC. SECT.	SPEC NAME	PARAGRAPH	SPECIFIED ITEM
		·	

Proposed Substitution:

Attached complete information on changes to Drawings and/or Specifications, which proposed substitution would require for its proper installation.

Submit with request necessary samples and substantiating data to prove equal quality and performance to that which is specified. Clearly mark manufacturer's literature to indicate equality in performance.

The undersigned certifies that the function, appearance and quality are of equal performance and assumes liability for equal performance, equal design and compatibility with adjacent materials.

Submitted By:

Signature

Title

Firm

Address

Telephone

Date

Signature shall be by person having authority to legally bind his firm to the above terms. Failure to provide legally binding signature will result in retraction of approval.

# OSE PROJECT # MH27-9835-PD-C PROJECT # 13031.01

# University of South Carolina Gibbes Green Historic Facilities Renovation Petigru College Sitework Columbia, South Carolina

For use by the Architect:	For use by the Owner:
Recommended Recommended as noted	Approved
Not Recommended Received too late	Not Approved
Insufficient data received	Approved as noted
By:	By:
Date:	Date:

Fill in Blanks Below:

- A. Does the substitution affect dimensions shown on Drawings: Yes\_\_\_No\_\_\_ If yes, clearly indicate changes.
- B. Will the undersigned pay for changes to the building design, including engineering and detailing costs caused by the requested substitution? Yes \_\_\_\_ No \_\_\_\_ If no, fully explain:\_\_\_\_\_
- C. What affect does substitution have on other Contracts or other trades?
- D. What affect does substitution have on construction schedule?
- E. Manufacturer's warranties of the proposed and specified items are: \_\_\_\_ Same \_\_\_\_ Different (If Different, Explain on Attachment)
- F. Reason for Request: \_\_\_\_\_
- G. Itemized comparison of specified item(s) with the proposed substitution; list significant variations:
- H. Accurate cost data comparing proposed substitution with product specified:
- I. Designation of maintenance services and sources:

(Attach additional sheets if required.)

# **END OF SECTION**

#### **SECTION 01700 - EXECUTION REQUIREMENTS**

# PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.
- C. Pre-installation meetings.
- D. Cutting and patching.
- E. Surveying for laying out the work.
- F. Cleaning and protection.
- G. Starting of systems and equipment.
- H. Demonstration and instruction of Owner personnel.
- I. Closeout procedures, except payment procedures.
- J. General requirements for maintenance service.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 01300 Administrative Requirements: Submittals procedures.
- B. Section 01400 Quality Requirements: Testing and inspection procedures.
- C. Section 01500 Temporary Facilities and Controls: Temporary interior partitions.
- D. Section 01780 Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.

#### 1.03 SUBMITTALS

- A. See Section 01300 Administrative Requirements, for submittal procedures.
- B. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
  - 1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences. Include design drawings and calculations for bracing and shoring.
  - 2. Identify demolition firm and submit qualifications.
  - 3. Include a summary of safety procedures.
- C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
  - 1. Structural integrity of any element of Project.
  - 2. Integrity of weather exposed or moisture resistant element.
  - 3. Efficiency, maintenance, or safety of any operational element.
  - 4. Visual qualities of sight exposed elements.
  - 5. Work of Owner or separate Contractor.
  - 6. Include in request:
    - a. Identification of Project.

- b. Location and description of affected work.
- c. Necessity for cutting or alteration.
- d. Description of proposed work and products to be used.
- e. Alternatives to cutting and patching.
- f. Effect on work of Owner or separate Contractor.
- g. Written permission of affected separate Contractor.
- h. Date and time work will be executed.
- D. Project Record Documents: Accurately record actual locations of capped and active utilities.

# 1.04 PROJECT CONDITIONS

- A. Use of explosives is not permitted.
- B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- C. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- D. Provide methods, means and facilities to prevent water intrusion into new construction and renovations. Eliminate standing water immediately. Remove wet materials and replace with new.
- E. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- F. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
  - 1. Provide dust-proof enclosures to prevent entry of dust generated outdoors.
  - 2. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.
  - 3. Clean interior spaces prior to the start of the finish painting and continue cleaning on an as-needed basis until painting is finished.
  - 4. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly-coated surfaces.
  - 5. Handle materials in a controlled manner with as little handling as possible; do not drop or throw materials from heights.
- G. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
  - 1. Minimize amount of bare soil exposed at one time.
  - 2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
  - 3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
  - 4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- H. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

- 1. Outdoors: Limit conduct of especially noisy exterior work to the hours of 8 am to 5 pm.
- I. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
- J. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.
- K. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

# 1.05 COORDINATION

- A. See Section 01100 for occupancy-related requirements.
- B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- C. Notify affected utility companies and comply with their requirements.
- D. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- E. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- G. Coordinate completion and clean-up of work of separate sections.
- H. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

# PART 2 PRODUCTS

### 2.01 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01600.

### PART 3 EXECUTION

# 3.01 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

### 3.02 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

### 3.03 PREINSTALLATION MEETINGS

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify GMK Associates four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
  - 1. Review conditions of examination, preparation and installation procedures.
  - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to GMK Associates, Owner, participants, and those affected by decisions made.

# 3.04 GENERAL INSTALLATION REQUIREMENTS

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Building shall be enclosed, ventilated and sealed from the exterior prior to installation of interior finish materials.
- C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

- D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- F. Make neat transitions between different surfaces, maintaining texture and appearance.

# 3.05 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
  - 1. Verify that construction and utility arrangements are as shown.
  - 2. Report discrepancies to GMK Associates before disturbing existing installation.
  - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
  - 1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01500 in locations indicated on drawings.
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
  - 1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
  - 2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.
- D. Remove existing work as indicated and as required to accomplish new work.
  - 1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
  - 2. Remove items indicated on drawings.
  - 3. Relocate items indicated on drawings.
  - 4. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
  - 5. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
- E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
  - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
  - 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
  - 3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
    - a. Disable existing systems only to make switchovers and connections; minimize

duration of outages.

- b. See Section 01100 for other limitations on outages and required notifications.
- c. Provide temporary connections as required to maintain existing systems in service.
- 4. Verify that abandoned services serve only abandoned facilities.
- 5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- F. Protect existing work to remain.
  - 1. Prevent movement of structure; provide shoring and bracing if necessary.
  - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
  - 3. Repair adjacent construction and finishes damaged during removal work.
- G. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
- H. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to GMK Associates.
- I. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
- J. Where a change of plane of 1/4 inch or more occurs in existing work, submit recommendation for providing a smooth transition for GMK Associates review and request instructions.
- K. Trim existing wood doors as necessary to clear new floor finish. Refinish trim as required.
- L. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- M. Refinish existing surfaces as indicated:
- N. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
- O. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
- P. Clean existing systems and equipment.
- Q. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- R. Do not begin new construction in alterations areas before demolition is complete.
- S. Comply with all other applicable requirements of this section.

### 3.06 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.

# EXECUTION REQUIREMENTS

- C. Perform whatever cutting and patching is necessary to:
  - 1. Complete the work.
  - 2. Fit products together to integrate with other work.
  - 3. Provide openings for penetration of mechanical, electrical, and other services.
  - 4. Match work that has been cut to adjacent work.
  - 5. Repair areas adjacent to cuts to required condition.
  - 6. Repair new work damaged by subsequent work.
  - 7. Remove samples of installed work for testing when requested.
  - 8. Remove and replace defective and non-conforming work.
- D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- G. Restore work with new products in accordance with requirements of Contract Documents.
- H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07840, to full thickness of the penetrated element.
- J. Patching:
  - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
  - 2. Match color, texture, and appearance.
  - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.
- K. Meet with management staff of the area of construction for required infection control practices in that department and comply with the Owner's policies.

### 3.07 PROGRESS CLEANING

- A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.
- B. Contractor shall assess the amount of air borne dust and debris for construction and apprise the Owner of the need to change the air filtration filters in the air handling system at an increased frequency.
- C. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- D. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

- E. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- F. Collect and remove waste materials, debris, and rubbish from site periodically and dispose off-site.
- G. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary drains.

# 3.08 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Prohibit traffic from landscaped areas.
- H. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

# 3.09 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify GMK Associates and owner seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- G. Submit a written report that equipment or system has been properly installed and is functioning correctly.

### 3.10 DEMONSTRATION AND INSTRUCTION

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing,

maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of owner personnel.
- E. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- G. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.

# 3.11 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.
- B. Testing, adjusting, and balancing HVAC systems: See Section 15950.

### 3.12 FINAL CLEANING

- A. Employ skilled workmen for final cleaning.
- B. Materials:
  - 1. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.
  - 2. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.
  - 3. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.
  - 4. Sweeping compounds used in cleaning operations shall leave no residue on concrete floor surfaces that may effect installation of finish flooring materials.
- C. Execute final cleaning prior to final project assessment.
  - 1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.
- D. Use cleaning materials that are nonhazardous.
- E. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- F. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- G. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior surfaces.
- H. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

- I. Dust cabinetwork and remove markings.
- J. Prior to final completion, or Owner occupancy, the Contractor shall conduct an inspection of sight-exposed interior surfaces, and all work areas, to verify that the entire Work is clean
- K. Tunnels and closed off spaces shall be cleaned of packing boxes, wood frame members and other waste materials used in the construction.
- L. The entire system of piping and equipment shall be cleaned internally. The Contractor installing those items shall open all dirt pockets and strainers, completely blowing down as required and clean strainer screens of all accumulated debris.
- M. Tanks, fixtures and pumps shall be drained and proved free of sludge and accumulated matter.
- N. Temporary labels, stickers, etc., shall be removed from fixtures and equipment. (Do not remove permanent name plates, equipment model numbers, ratings, etc.)
- O. Heating and air conditioning equipment, tanks, pumps and traps shall be thoroughly cleaned and new filters or filter media installed.
- P. Before being placed in service, domestic water distribution systems, including those for cold water, drinking water and the hot water system shall be chlorinated. The method to be used shall be at the option of the Contractor installing the systems, and one of the methods set forth in the AWWA Standard specifications, latest edition, including all amendments thereto. The treatment shall consist of a solution of not less than 50 parts per million of available chlorine. The chlorinating material shall be either liquid chlorine or sodium hypochloride. After sterilization the system shall be flushed with clear water until the chlorine residual is not greater than 0.2 per million.
- Q. Clean filters of operating equipment.
- R. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

# 3.13 CLOSEOUT PROCEDURES

- A. Contract requirements shall be met when construction activities have successfully produced, in this order, these three terminal activities:
  - 1. Substantial Completion.
  - 2. Final Completion.
  - 3. Final Payment.
- B. Make submittals that are required by governing or other authorities.
  - 1. Provide copies to GMK Associates and Owner.
- C. Substantial Completion:
  - 1. The date of Substantial Completion of the Work or designated portion thereof is the date certified by the Architect when construction is sufficiently complete, in accordance with the Contract Documents, so the Owner may occupy the Work or designated portion thereof for the use for which it is intended.
  - 2. When the Contractor considers the Work is substantially complete, he shall submit to the Architect:
    - a. A written notice that the Work, or designated portion thereof, is substantially
complete.

- b. A list of items to be completed or corrected, (herein after referred to as Punch List ).
- c. Request Substantial Completion Observation at a mutually agreeable date.
- 3. Within a reasonable time after receipt of such notice, the Architect, the Contractor, and at his option, the Owner, will make an observation to determine the status of completion.
- 4. Should the Architect determine that the Work is not substantially complete:
  - a. The Architect will promptly notify the Contractor in writing, giving the reasons thereof.
  - b. The Contractor shall remedy the deficiencies in the Work, and send a second written notice of substantial completion to the Architect.
  - c. The Architect will re-observe the Work and the cost of the Architect's time and reimbursable expenses will be charged to the Contractor.
- 5. When the Architect concurs that the Work is substantially complete, he will:
  - a. Prepare a Certificate of Substantial Completion on AIA Form G704, accompanied by the Contractor's Punch List of items to be completed or corrected, as verified and amended by the Architect. (Note: Contract responsibilities are not altered by inclusion or omission of required work from the Punch List.)
  - b. Submit the Certificate to the Owner and the Contractor for their written acceptance of the responsibilities assigned to them in the Certificate.
- 6. The Contractor shall complete or correct all items identified on the Punch List and required by the Contract requirements within time limits established by the Certificate.
- 7. Notify GMK Associates when work is considered ready for Substantial Completion.
- 8. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for GMK Associates's review.
- 9. Owner will occupy portions of the building as specified in Section 01100.
- 10. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to Owner-occupied areas.
- D. Final Completion:
  - 1. To attain final completion the Contractor shall complete activities pertaining to Substantial Completion, and complete work on punch list items. Only then shall he issue written request to the Architect for Final Observation.
  - 2. When the Contractor considers the Work is complete, he shall submit written certification that:
    - a. Contract Documents have been reviewed.
    - b. Work has been inspected for compliance with Contract Documents.
    - c. Work has been completed in accordance with Contract Documents.
    - d. Equipment and systems have been tested in the presence of the Owner's representative and are operational.
    - e. Work is completed and ready for final observation.
  - 3. The Architect, the Contractor and the Owner will make an observation to verify the status of completion with reasonable promptness after receipt of such certification.
  - 4. Should the Architect consider that the Work is incomplete or defective:
    - a. The Architect will promptly notify the Contractor in writing, listing the incomplete or defective work.

- b. The Contractor shall take immediate steps to remedy the stated deficiencies, and send a second written certification to the Architect that the Work is complete.
- c. The Architect will reinspect the Work.
- 5. When the Architect finds that the Work is acceptable under the Contract Documents, he shall request the Contractor to make closeout submittals.
- 6. Notify GMK Associates when work is considered finally complete.
- 7. Complete items of work determined by GMK Associates's final inspection.
- E. The Contractor's Closeout Submittals to the Architect:
  - 1. Evidence of compliance with requirements of governing authorities:
    - a. Certificate of Occupancy
    - b. Certificates of Inspection
    - c. Mechanical
    - d. Electrical
  - 2. Project Record Documents: To requirements of Section 01780.
  - 3. Operating and Maintenance Data, Instructions to the Owner's Personnel: To requirements of Section 01780.
  - 4. Warranties and Bonds: To requirements of individual sections.
  - 5. Spare Parts and Maintenance Materials: To requirements of individual sections.
  - 6. Evidence of Payment and Release of Liens: To requirements of General and Supplementary Conditions.
- F. Final Adjustment of Accounts:
  - 1. Submit a final statement of accounting to the Architect.
  - 2. Statement shall reflect all adjustments to the Contract Sum:
    - a. The original Contract Sum.
    - b. Additions and deductions resulting from:
      - 1) Previous Change Orders.
      - 2) Deductions for uncorrected Work.
      - 3) Deductions for reinspection payments.
      - 4) Other adjustments.
    - c. Total contract sum, as adjusted.
    - d. Previous payments
    - e. Sum remaining due.
  - 3. Architect will prepare a final Change Order, reflecting adjustments to the Contract Sum which were not previously made by Change Orders.
- G. Final Application for Payment:
  - 1. The Contractor shall submit the final Application and Certificate for Payment in accordance with procedures and requirements stated in the Conditions of the Contract.

# 3.14 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

# **END OF SECTION**

# SECTION 01780 - CLOSEOUT SUBMITTALS

# PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 01300 Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- B. Section 01700 Execution Requirements: Contract closeout procedures.
- C. Individual Product Sections: Specific requirements for operation and maintenance data.
- D. Individual Product Sections: Warranties required for specific products or Work.

#### 1.03 SUBMITTALS

- A. Project Record Documents: Submit documents to GMK Associates prior to claim for final Application for Payment.
- B. Operation and Maintenance Data:
  - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. GMK Associates will review draft and return one copy with comments.
  - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
  - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with GMK Associates comments. Revise content of all document sets as required prior to final submission.
  - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
  - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 15 days after acceptance.
  - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.
  - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.
  - 4. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties.

Submit a draft to the Owner through the Architect for approval prior to final execution.

- 5. Refer to individual Sections of Divisions-2 through -16 for specific content requirements, and particular requirements for submittal of special warranties.
- 6. Form of Submittal: At Final Completion compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
- 7. Bind warranties and bonds in two (or more) duplicate heavy-duty, commercial quality, durable 3-hole punch tab binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2" by 11" paper.
- 8. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the installer.
- 9. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS," the Project title or name, and the name of the Contractor.
- 10. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

# PART 2 PRODUCTS - NOT USED

# PART 3 EXECUTION

# 3.01 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
  - 1. Drawings.
  - 2. Specifications.
  - 3. Addenda.
  - 4. Change Orders and other modifications to the Contract.
  - 5. Reviewed shop drawings, product data, and samples.
  - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
  - 1. Manufacturer's name and product model and number.
  - 2. Product substitutions or alternates utilized.
  - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
  - 1. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.

- 2. Field changes of dimension and detail.
- 3. Details not on original Contract drawings.

# 3.02 OPERATION AND MAINTENANCE DATA

- A. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.
- E. Manuals:
  - 1. Purpose:
    - a. Operation and maintenance manuals will be used for training of, and use by, Owner's personnel in operation and maintenance of mechanical and electrical systems and equipment. A separate manual or chapter within a manual shall be prepared for each class of equipment or system.
    - b. For additional requirements refer to various specification sections.
- F. Instructions of Owner's Personnel
  - 1. Fully instruct Owner's designated operating and maintenance personnel in operating, adjustments and maintenance of all mechanical and electrical systems and equipment as required by respective and pertinent sections, after all final inspection, tests and repairs have been completed.
  - 2. Operating and maintenance manuals shall constitute the basis of instructions. Contents of manual shall be reviewed in full detail, explaining all aspects of operations and maintenance.
  - 3. Prepare and include additional data when need for such data becomes apparent during instruction and training and sessions.
  - 4. Training sessions shall be jointly arranged with Owner during Contractor's normal week and daily hours. The Owner shall have the responsibility of scheduling its shift work personnel accordingly.
  - 5. Owner and Contractor shall coordinate and cooperate to keep training sessions to a reasonable minimum.

# 3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
  - 1. Product data, with catalog number, size, composition, and color and texture designations.
  - 2. Information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

- C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Additional information as specified in individual product specification sections.
- E. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

# 3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
  - 1. Description of unit or system, and component parts.
  - 2. Identify function, normal operating characteristics, and limiting conditions.
  - 3. Include performance curves, with engineering data and tests.
  - 4. Complete nomenclature and model number of replaceable parts.
- B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- C. Include color coded wiring diagrams as installed.
- D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- E. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- F. Provide servicing and lubrication schedule, and list of lubricants required.
- G. Include manufacturer's printed operation and maintenance instructions.
- H. Include sequence of operation by controls manufacturer.
- I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- J. Provide control diagrams by controls manufacturer as installed.
- K. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
- L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- M. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- N. Include test and balancing reports.
- O. Safety instructions.
- P. Additional Requirements: As specified in individual product specification sections.

# 3.05 OPERATION AND MAINTENANCE MANUALS

- A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- B. Prepare data in the form of an instructional manual.
- C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder on the front and the spine with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Provide heavy duty paper tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.
- F. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.
- G. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- H. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.
- I. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
  - 1. Part 1: Directory, listing names, addresses, and telephone numbers of GMK Associates, Contractor, Subcontractors, and major equipment suppliers.
  - 2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
    - a. Significant design criteria.
    - b. List of equipment.
    - c. Parts list for each component.
    - d. Operating instructions.
    - e. Maintenance instructions for equipment and systems.
    - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
  - 3. Part 3: Project documents and certificates, including the following:
    - a. Shop drawings and product data.
    - b. Air and water balance reports.
    - c. Certificates.
- J. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.
- K. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of GMK Associates, Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

# 3.06 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors,

suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.

- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.
- F. Cover: Identify each binder on the front and the spine with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.
- G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
- H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- I. See all provisions under "3.5 WARRANTY:" in General Conditions.
- J. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
- K. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, guarantee the corrected work with a new warranty equal to the original.
- L. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- M. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, right and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
- N. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- O. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments

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are willing to do so.

# **END OF SECTION**

# DIVISION 2

Applicable Portions Of The Conditions Of The Contract And Division 1 General Requirements Apply To The Work Of This Division.	S I T E
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# SECTION 02231 - TREE PROTECTION AND MAINTENANCE

#### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to "USC Supplementary General Conditions for Construction Projects" in this manual for additional requirements on tree protection.

#### 1.02 DESCRIPTION OF WORK

- A. The work covered by this Section consists of furnishing all labor, equipment and materials and performing all operations necessary for tree protection and maintenance as shown on the Drawing and/or described by these Specifications. The work includes: preparation and excavation of trenches, pruning, barricading, removal, etc.
- B. Landscape Architect is to flag all trees to be removed before proceeding with clearing.

# 1.03 QUALITY ASSURANCE:

A. Subcontract work to a single firm(s) specializing in tree care/arboriculture.

# 1.04 TREE PROTECTION BARRIER

- A. A tree protection barrier, as shown in the plans, shall be constructed around the existing trees to remain. Each barrier shall be constructed immediately after the demolition and hand removal of pavement within ten feet of the tree and BEFORE any additional demolition- or construction-related activities occur.
- B. The established protected perimeter around the tree shall be based on one foot in radius per one inch of tree diameter as measured 4.5 feet above grade (e.g. a seven-inch diameter tree will have a protected area with a seven-foot radius and 14-foot diameter around the tree) unless shown otherwise on the plans.
- C. No materials, equipment, trailers, spoils, waste or washout water may be deposited, stored or parked within tree protection areas. All underground utilities, drains, and irrigation lines shall be routed outside the tree protection zone. If lines must traverse the tree protection zone, they shall be tunneled or bored under the tree.
- D. Any herbicides placed under paving materials or in planting beds must be safe for use around trees and labeled for that use. Any pesticides used on site must be tree-safe and not easily transported by water.

# TREE PROTECTION AND MAINTENANCE

# 1.05 OBSERVATION

A. Any demolition, grading, or construction work that is expected to encounter tree roots shall be monitored by the Landscape Architect or a consulting arborist.

# PART 2 - TREE MAINTENANCE

# 2.01 PRUNING

- A. Pre-construction tree pruning shall be performed to clean the crown of dead, diseased, crossing and/or weak wood, and to provide adequate clearance for equipment and construction. All pruning shall be performed by a qualified arborist certified by the International Society of Arboriculture, and shall be in accordance with the International Society of Arboriculture's Tree Pruning Guidelines (1995) and/or the ANSI A300 Pruning Standard (1995). In most cases no more than 20 percent of the live foliage should be removed from the tree. Brush can be chipped and spread under the tree for mulch to help protect against soil compaction, to ameliorate soil temperatures, and to conserve soil moisture.
- B. All trees within the project area shall be pruned to:
  - 1. clear the crown of diseased, crossing, weak and dead wood to a minimum of 1.5 inches in diameter;
  - 2. remove stubs, cutting outside the wound-wood tissue that has formed around the branch;
  - 3. reduce end-weight on heavy, horizontal branches by selectively removing small diameter branches no greater than 2-3 inches, near the ends of the scaffolds.
- C. Where temporary clearance is needed for access, branches shall be tied back to hold them out of the clearance zone.
- D. Interior branches shall not be stripped out (i.e. no "lion-tailing").
- E. Pruning cuts larger than 4 inches in diameter, except for dead wood, shall be avoided unless absolutely necessary.
- F. Pruning cuts that expose heartwood shall be avoided whenever possible.
- G. No more than 20% of live foliage shall be removed within the tree.
- H. While in the tree, the arborist shall perform an aerial inspection to identify defects that require treatment. Any additional work needed shall be reported to the Owner.

# 2.02 FERTILIZATION

A. No fertilizer should be applied to trees in the project area prior to construction.

# PART 3 - EXECUTION

# 3.01 DEMOLITION NEAR TREES

- A. Concrete and other pavements within a ten-foot radius of tree trunks shall be broken up with a jackhammer and removed by hand to prevent root and root crown injuries. Attempts to lift large sections of concrete near the tree would likely result in lifting of roots and abrasion injuries and shall be avoided.
- B. Pavements outside the ten-foot radius can be lifted in large sections provided they are not dragged or pushed into the tree trunk or major roots. Care must be taken to prevent demolition equipment such as loaders from striking the tree canopy or trunk.
- C. When removing/loading demolition debris, loaders shall not scoop materials from below the existing grade, thereby avoiding inadvertent digging and damage in the root area.
- D. Once pavements have been demolished and removed, no equipment shall be permitted to park or idle under the canopy of the trees, thereby avoiding mechanical damage to surface roots and heat injury from exhaust to tree canopies.
- E. The removal of electric conduits and water standpipes that have grown into the trunks and root systems could damage trees. Pipes and conduit shall be cut off close to the tree; do not remove portions underneath the bark or wood. Do not remove bark growing around the pipe, conduit or other attachments.
- F. Any overhead poles or other infrastructure removed near trees shall not be pushed or allowed to fall into the

# 3.02 TREE REMOVAL AND DEMOLITION ACTIVITIES

- A. The demolition contractor shall meet with the Landscape Architect at the site prior to beginning work to review all work procedures, access, haul routes, and tree protection measures.
- B. The limits of all tree protection measures shall be staked in the field.
- C. Trees to be removed that have branches extending into the canopy of trees to remain must be removed by a qualified arborist and not by demolition or construction contractors. The qualified arborist shall remove the tree in a manner that causes no damage to the trees and under-story to remain.
- D. Any brush clearing required with the tree protection zones shall be accomplished with hand-operated equipment.
- E. Trees to be removed shall be felled so as to fall away from tree protection zones and to avoid pulling and breaking of roots of trees to remain. If roots are entwined, the landscape architect may require first severing the major woody root mass before extracting the trees. This may be accomplished by cutting

# TREE PROTECTION AND MAINTENANCE

through the roots by hand, with a vibrating knife, rock saw, narrow trencher with sharp blades, or other approved root-pruning equipment.

- F. Trees to be removed from within a tree protection zone shall be removed by a qualified arborist. The trees shall be cut near ground level and the stump ground out.
- G. All downed brush and trees shall be removed from the tree protection zone either by hand or with equipment sitting outside the tree protection zone. Extraction shall occur by lifting the material out, not by skidding it across the ground.
- H. Brush shall be chipped and placed in the tree protection zone to a depth of 6 inches.
- I. Structures and underground features to be removed with tree protection zones shall use the smallest equipment possible and operate from outside the tree protection zone. The Landscape Architect shall be on site during all operations within the tree protections zone to monitor activity.
- J. All trees shall be pruned in accordance with the guidelines in this Section.
- K. Any damage to trees due to demolition activities shall be reported to the Owner within 6 hours so that remedial action may be taken. Timeliness is critical to tree health.
- L. If temporary haul or access roads must pass over the root area of trees to be retained, a roadbed of 6" of mulch shall be created to protect the soil from compaction. The roadbed shall be replenished as necessary to maintain a 6" depth.

# 3.03 METHODS OF EXCAVATION NEAR ROOTS

- A. Air Spade. Soil excavation near tree roots and/or to determine location of tree roots in the areas outlined below shall be conducted with a Model 2000 Air Spade equipped with a 225 scfm (6.2m<sup>3</sup>/min.) nozzle. Further specifications for this spade and ordering information are available upon request.
- B. Compressor. The Air Spade and nozzle combination listed above requires a 250 scfm or greater air compressor. Air compressors with less pressure will overheat during use and cause poor tool performance.
- C. Sewer Vacuum. A sewer vacuum can be used to remove the soil dislodged by the Air Spade if it cannot be easily blown clear of the hole or trench.
- D. Interval Exploratory or Test Trenches shall be dug with the Air Spade to determine the location of roots before any digging within the established protected perimeter area around the tree based on a radius equal to one foot per one inch of tree diameter as measured 4.5 feet above grade.
- E. Test trenches shall be eight-inches (8") deep and four to six inches (4"-6") wide.

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# 3.04 ROOT CONFLICTS

- A. Within excavation areas, roots should first be pruned to sever them cleanly. Only those roots that will be affected should be pruned. Root pruning is most efficiently accomplished with equipment specifically designed for that purpose. Large circular saws used to cut concrete, and rock saws are also effective. The saws must cut through the woody roots to the depth of the required excavation. Root pruning equipment designed primarily for curb and sidewalk repair may only cut 8-12 inches deep.
- B. Stake the edge of the excavation.
- C. Cut with root pruning equipment 6-12 inches outside the staked line toward the tree. If root-pruning equipment cannot be used, dig a trench along the staked line. Equipment such as backhoe can be used until roots larger than one inch (1") in diameter are encountered. The roots shall be exposed by hand excavation or Air Spade.
- D. When a root is encountered, expose it by removing soil by hand and cut it cleanly with a saw at the outside edge of the trench (toward the tree). Cut to a lateral root when possible. Roots smaller than two inches in diameter that must be severed shall be cut with a hand-pruning saw.
- E. Paints and wound treatments shall not be used on any cut surfaces.
- F. Replace soil in the trench. Use of sandy/loam soils is encouraged.
- G. When roots have been excavated, but not cut, they shall not remain uncovered for more than two days.
- H. Roots that have necessarily been pruned shall be recovered with soil within one hour.

# 3.05 AVOIDING TREE TRUNK AND BRANCH DAMAGE

- A. Mechanical. Care shall be taken not to contact the canopy when operating large equipment or vehicles in the proximity of any protected trees.
- B. Heat. Equipment and trucks shall not be operated or left idling under the canopy of any protected trees, so that no damage occurs from radiant heat or exhaust. Paving equipment is particularly damaging and shall not be operated under the tree canopies any longer than is required to pave the area.

# PART 4 - INSTALLATION OF UTILITIES NEAR TREES

# 4.01 GENERAL

A. For the installation of utility lines the contractor shall consult with the Landscape Architect prior to trenching to establish an acceptable method for excavation. The method of excavation shall be approved by the Landscape Architect and shall be one of the methods described in this section. Boring under tree roots shall be an acceptable method for the installation of utilities in order to avoid cutting roots. Bores shall be at a minimum depth of thirty inches (30").

# TREE PROTECTION AND MAINTENANCE

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- B. Buried Wiring and Plumbing Near Trees. Wiring for the street lights or traffic lights, communication conduits, or plumbing for irrigation which is in conflict with roots two inches or greater in diameter, or is closer than the established protected perimeter area around a tree (see Section 1.1 above) shall be installed in a trench dug by an air spade and the conduit and/or plumbing fitted around the tree roots.
- C. Sewer Service Lines. Where sewer lines are identified to run in areas with roots two inches or greater in diameter, or are closer than the established protected perimeter area around a tree, the Landscape Architect shall be consulted before digging begins to discuss possible alternatives to avoid damaging tree roots.
- D. Water Service Lines. When possible, water service lines shall be placed in the same trenches that are used for sewer services. If a separate trench is needed and the trench is located in an area with roots two inches or greater in diameter or is closer than the established protected perimeter area around a tree (see Section 1.1 above), digging shall be done with an Air Spade and the pipes installed beneath the tree roots.

# PART 4 – TREE PLANTING & STABILIZATION

# 4.01 METHODS

- A. Reducing root ball depth. In the event that the depth of a root ball must be reduced to accommodate planting over duct banks or other infrastructure, the Landscape Architect shall be present to supervise.
- B. Stake trees as necessary with traditional guying methods, but ensure that wires are not used around tree trunks. Provide rubber hosing at wire or use polypropylene webbing. See plans for details.

# END OF SECTION

#### SECTION 02520 - PRECAST CONCRETE

#### PART 1 – GENERAL

#### 1.01 RELATED DOCUMENTS

A. Drawings and general conditions of the Contract, including supplementary conditions and Division 1 Specification Sections, apply to this Section.

#### 1.02 SUMMARY

A. Perform all work required to complete, as indicated by the Contract Documents and furnish all supplementary items necessary for the proper installation of Precast Concrete.

#### 1.03 SYSTEM DESCRIPTION SUMMARY

- A. System shall consist of precast concrete installed on Latex thinset mortar setting bed.
- B. The installation shall be absolutely rigid and even large slabs shall not be displaced.
- C. Precast to match existing precast at Russell House / Greene St.

#### 1.04 REFERENCES

- A. American Society for Testing and Materials (ASTM)
  - 1. ASTM C 33: Specification for Concrete Aggregates
  - 2. ASTM C 150: Specification for Portland Cement
  - 3. ASTM C 67: Method of Sampling and Testing Brick and Structural Clay Tile
  - 4. ASTM C 140: Specification for Concrete
- B. T.C.A. Tile Council of America
  - 1. Installation Method Cement Mortar Bonded F102 95.
- C. A.N.S.I. American National Standards Institute
  - 1. A-118.4 Latex Portland Cement Mortar
  - 2. A-118.6 Grout Latex

#### 1.05 SUBMITTALS

- A. Submit the following in accordance with the Supplementary General Conditions:
  - 1. Manufacturer's Literature: Material descriptive literature, installation. Instructions and panel color selection chart with mortar colors
  - 2. Test Reports: Three (3) copies, showing compliance with specified ASTM requirements.
  - 3. Shop drawings: Detail fabrication and installation of precast concrete units. Indicate locations, dimensions, shapes, and cross-sections of each unit. Indicate joints, reveals, and extent and location of each surface finish.

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- a. Indicate locations, tolerances, and details of anchorage devices to be embedded in or attached to structure or other construction.
- b. Indicate location of each precast unit by same identification mark placed on panel.
- c. Indicate relationship of precast concrete units to adjacent materials.
- d. Design modifications: If design modifications are proposed to meet field conditions, submit Shop Drawings. Do not adversely affect the appearance, durability, or strength of units when modifying details or materials, and maintain the general design concept.
- 4. Samples: Three (3) sample pieces of each manufacturer, type, size and color selected or specified.

# 1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
  - 1. All products covered under this Section shall be produced by a single Manufacturer unless otherwise specified.
  - 2. Manufacturer shall submit evidence of having not less that fifteen (15) years successful production of this product.
  - 3. The precast manufacturer shall demonstrate, either by proven field performance of the laboratory freeze-thaw test, that the precast units have adequate durability if they are to be subjected to a freeze-thaw environment.
    - a. Satisfactory field performance is indicated when units similar in composition and made with the same manufacturing process as those to be supplied to the purchase do not exhibit objectionable deterioration after at least 3 years.
    - b. The precast units used as the basis for proven field performance shall have been exposed to the same general type of environment, and temperature range as is contemplated for the units supplied to the purchaser.
- B. Subcontractor Qualifications:
  - 1. Subcontractor shall submit evidence of skill and not less than five (5) years specialized experience with this product.
- C. Pre-Installation Conference: Conduct conference at Project site.
- D. Mock-up Installation:
  - 1. Prior to the start of precast concrete work construct mock-ups of each type, size and pattern area for the Owner and Landscape Architect to review. The mock-ups will be at the project site at a location mutually agreed to by the Owner and Contractor.
  - 2. Construct the mock-up with all setting beds, joints and edge details as shown on the drawings.
  - 3. After review of the mock-ups, they should be retained and used as a standard of quality for the precast concrete work. At completion of the work, remove the mock-up installations and related materials from the project site. If the mock-ups are incorporated in the actual construction, record their actual location and sizes on the actual built record drawings for the project.

# 1.07 PROJECT/SITE CONDITIONS

A. Environmental Requirements: Do no work during freezing weather or on wet or frozen sub-base.

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- B. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace precast work damaged by frost or freezing.
- C. Weather Limitations for Mortar and Grout: Comply with the following requirements:
  - 1. Cold-Weather Requirements: Protect precast work against freezing when atmospheric temperature is 40 deg F (4 deg C) and falling. Heat materials to provide mortar and grout temperatures between 40 and 120 deg F (4 and 49 deg C). Provide the following protection for completed portions of work for 24 hours after installation when the mean daily air temperature is as indicated: below 40 deg F (4 deg C), cover with weather-resistant membrane; below 25 deg F (minus 4 deg C), cover with insulating blankets; below 20 deg F (minus 7 deg C), provide enclosure and temporary heat to maintain temperature above 32 deg F (0 deg C).
  - 2. Hot-Weather Requirements: Protect precast work when temperature and humidity conditions produce excessive evaporation of setting beds and grout. Provide artificial shade and windbreaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 deg F (38 deg C) and higher.
    - a. When ambient temperature exceeds 90 deg F (32 deg C) with a wind velocity greater than 8 mph (13 km/h), set panels within 1 minute of spreading setting-bed mortar.

# 1.08 SEQUENCING AND SCHEDULING

A. Coordinate sequencing and scheduling of work with other supporting, adjacent, contiguous or otherwise related material trades.

# 1.09 COORDINATION

A. Precast manufactured pieces shall be incorporated with unit masonry. Coordinate placement and setting with General Contractor and mason.

# PART 2 – PRODUCTS

# 2.01 MATERIALS

- A. Precast Concrete Panels
  - 1. Name: Precast Concrete
  - 2. Size, Finish and Color shall match that of like pieces at the existing Strom Thurmond Fitness and Wellness Center on the University of South Carolina Campus.
  - 3. Reference Standard:
    - 1. Cementitious Materials: Materials shall conform to the following applicable ASTM Specifications
      - 1.) Portland Cement: ASTM C 150 for Portland Cement
    - 2. Aggregates shall conform to these ASTM specifications, except that grading requirements shall not necessarily apply:
      - 1.) Normal Weight: ASTM C 33 for Concrete Aggregates
    - 3. Other constituents: Coloring pigments, integral water repellents, etc., shall be previously established as suitable for use in concrete and either shall conform to ASTM Standards where appli-

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cable, or shall be shown by test or experience not to be detrimental to the durability of the concrete.

- B. Performance Requirements:
  - 1. Compressive Strength: At the time of delivery to the work site, the average compressive strength shall not be less that 7,000 psi with no individual unit less than 6,500 psi per ASTM C 140.
  - 2. Absorption: The average shall not be greater than 6 % per ASTM C140.
  - 3. Flexural Strength: Not less than 600 psi per ASTM 293.
  - 4. Load carrying capacity: Panel units shall have a tested center load capacity of 1,750 lbs. WT CL96
  - 5. Latex Mortar Mix: ANSI A-118.4
  - 6. Water: Clean and free of deleterious acids, alkalies or organic materials
  - 7. Grout: ANSI A-118.6, Grout Latex
  - 8. Sealant: As specified in Section 07920 Sealants and Caulking
  - 9. Back-up: As specified in Section 07920 Sealants and Caulking
  - 10. Bond Breaker: As specified in Section 07920 Sealants and Caulking

# 2.02 MIXING

- A. Latex Portland Cement Mortar setting bed: As recommended by the manufacturer.
- B. Grouting Mix: Latex as recommended by manufacturer. Color as selected by Landscape Architect.
- C. Rework mixes from time to time to maintain proper consistency, as recommended by manufacturer but do not add ingredients. Discard mortar that has reached its initial set.

#### 2.03 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615 /A 615M, Grade 60 (grade 420), deformed.
- B. Steel Welded Wire Fabric: ASTM A 185, plain, cold drawn.

#### PART 3 – EXECUTION

#### 3.01 INSPECTION

- A. Examine all surfaces to receive the parts of the work specified herein. Notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected. Installation of precast concrete panels and associated construction constitutes acceptance of the adjacent and underlying construction.
- C. Installation of Mortar bed as per TCA F102-95. All materials used follows instructions of manufacturer for use in mortar method.
- D. Install pre-cast concrete panels level, plumb, square and true.
- E. Grouting shall be in strict accordance with grout manufacturers directions and instructions. Latex or acrylic additives shall be of the same manufacturer of the grout.

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- F. All control and expansion joints shall be installed as per TCA EJ 171-94. All joint materials used shall follow manufacturers directions and instructions. Mortar and expansion joints shall be 3/8" wide.
- G. Field cut pre-cast in accordance with manufacturers recommendations for methods, equipment and precautions.

# 3.02 CLEANING and PROTECTION

- A. Remove and replace precast pieces which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment to eliminate evidence of replacement.
- B. Remove mortar stains and all other types of soiling from exposed panel surfaces, wash and scrub clean.
- C. Provide final protection and maintain conditions in a manner acceptable to installer, which ensures panel work is free of damage or deterioration at time of substantial completion.

# END OF SECTION 02520

#### SECTION 02800 - LANDSCAPE WORK

#### PART 1 - GENERAL

#### 1.01 DESCRIPTION OF WORK:

- A. Work included: Work under this Section includes installation of all trees, shrubs, ground cover, annuals and related work required for completion of the project as shown on the Drawings and specified herein.
  - 1. Included hereunder are the furnishing of all equipment, materials and labor necessary to furnish and/or install soil treatment, planting and mulching of trees, shrubs and vines, protection, maintenance, guarantee and replacement of plants and all work related to the above as specified.

# 1.02 QUALITY ASSURANCE:

A. Contract landscape work to a single firm specializing in landscape work.

#### 1.03 SOURCE QUALITY CONTROL:

- A. General: Ship landscape materials with certificates of inspection required by governing authorities. Comply with regulations applicable to landscape materials.
- B. Do not make substitutions. If specified landscape material is not obtainable, submit proof of nonavailability to Landscape Architect, together with proposal for use of equivalent material.
- C. Analysis and Standards: Package standard products with manufacturer's certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.

# PART 2 - PRODUCTS

# 2.01 TOPSOIL

A. Topsoil will be placed (spread) and rough graded by the General Contractor. (See Grading Specifications.) Landscape Contractor will be responsible for fine grading of areas to be planted and sodded. Areas to receive sod and/or plantings shall receive 4" minimum topsoil.

# 2.02 SOIL AMENDMENTS:

A. The Landscape Contractor shall furnish the Landscape Architect soil analysis and reports as performed by the Agricultural Extension Service or commercial testing laboratory for all area to receive planting.

The Landscape Contractor shall incorporate necessary additives in proper quantities as recommended in the soil analysis, or as necessary to bring the soils up to acceptable standards. The Landscape Contractor shall include in his bid and shall pay for all tests required.

- B. Commercial fertilizer shall be complete slow release fertilizer as specified by soil analysis and shall conform to the applicable state fertilizer laws. Fertilizer shall be uniform in composition, dry and free-flowing and shall be delivered to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis. Any fertilizer which becomes caked or otherwise damaged making it unsuitable for use will not be accepted.
- C. Fertilizer Tablets or Packets. Fertilizer planting tablets or packets shall contain prolonged-release nitrogen, derived from Urea-formaldehyde. Tablets or packets shall be at least a strength of 16-8-5. The amount of available nitrogen, phosphorus or potash may be increased slightly to meet the standard manufactured products available. This fertilizer shall conform to the applicable state fertilizer laws and shall be delivered to the site in the original unopened containers, each bearing the manufacturer's guaranteed analysis.
- D. Herbicide shall be an approved commercial grade pre-emergent herbicide used in soil preparation. The particular type of herbicide shall be certified safe for the plants specified in the Plant List or for the plants around which the herbicide shall be used.
- E. Lime shall be ground limestone (Dolomite) containing not less than eighty-five (85) percent of total carbonates and shall be ground to a fineness that fifty (50) percent will pass through a 100-mesh sieve and ninety (90) percent will pass through a 20-mesh sieve. Courser material shall be acceptable provided that specified rates of application are increased proportionally on the basis of quantities passing the 100-mesh sieve.
- F. Peat shall be a domestic product consisting of partially decomposed vegetable matter of natural occurrence. It shall be brown, clean, and low in content of mineral and woody materials, mildly acid and granulated or shredded.
- G. Ammonium nitrate shall be a commercially available agricultural chemical and shall be furnished under the manufacturer's guaranteed statement of analysis giving percentage of active ingredients.
- H. Water. The Owner shall supply, at no expense, an adequate supply of water to meet the needs of this Contract. The contractor shall furnish all necessary hose, equipment, attachments and accessories for the adequate irrigation of planted areas as may be required to complete the work as specified.

# 2.03 STAKING:

- A. Material for Staking and Guying:
  - 1. Material for staking and guying must be 2 1/2" x 2 1/2" x 8' long solid oak stake.

- 2. Wire for fastening trees to stakes shall be No. 10 gauge pliable, galvanized iron. All wires to be placed with brightly colored uniform flagging for easy sighting.
- 3. Hose to encase wire used for fastening trees to stakes shall be new or used two-ply reinforced rubber garden hose, black or green in color. Only one color shall be used throughout the project.

# 2.04 MULCH:

- A. Shredded and double hammered Hardwood Mulch shall be fresh, clean, and free from sticks and debris.
- B. Samples of materials as listed below shall be submitted for inspection, on the site or as otherwise determined by the Landscape Architect. Upon approval of samples by the Landscape Architect, delivery of materials may begin.

MATERIALS SAMPLE

Shredded and Double Hammered Hardwood Mulch1 GallonPlants1 of each

Typical samples shall be furnished from each separate source of supply. Approved samples shall be stored on the site and protected until furnishing of materials is complete. Plant samples may be planted in permanent positions, but labeled as samples.

# 2.05 PLANT MATERIALS (See Plant List):

- A. Nomenclature. The names of plants required under this Contract conform to those given in Standardized Plant Names, 1942 Edition, prepared by the American Joint Committee on Horticultural Nomenclature. Names of varieties not included therein conform generally with names accepted in the nursery trade.
- B. Quantities. Provide quantities necessary to complete the planting as shown on the drawings. Contractor must check quantities and differences shall be brought to the attention of the Landscape Architect.
- C. Quality and Size. Plants shall have a habit of growth that is normal for the species and shall be sound, healthy, vigorous and free from insect pests, plant diseases and injuries. All plants shall equal or exceed the measurements specified in the Plant List which are minimum acceptable sizes. They shall be measured before pruning with branches in normal position. Any necessary pruning shall be done at the time of planting. Requirements for the measurement, branching, grading, quality, balling and burlapping of plants in the Plant List generally follow or exceed the Code of Standards currently

recommended by the American Association of Nurserymen, Inc. in the American Standard for Nursery Stock.

- D. Substitutions will be permitted after Award of Contract only upon submission of proof in writing that a plant is not obtainable and authorization by the Landscape Architect for use of the nearest equivalent obtainable size or variety of plant having the same essential characteristics. Should this substitution result in the use of a smaller or less valuable plant, a change order will be issued with an equitable adjustment in contract price.
- E. Type of Protection to Roots:
  - Balled and Burlapped Plants. Plants shall be balled and burlapped unless otherwise noted on the Drawings. They shall be dug with firm, natural balls of earth of sufficient diameter and depth to encompass the fibrous and feeding root system necessary for full recovery of the plant and of minimum sizes shown on the Plant List. Balls shall be firmly wrapped with untreated burlap or similar material and bound with twine, cord or wire mesh. Where necessary to prevent breaking or cracking of the ball during the process of planting, the ball may be secured to a platform.
  - 2. Container-grown plants designated in the Plant List shall have been grown in a container such as pots, cans, tubs or boxes and have sufficient roots to hold earth together intact after removal without being root bound. Container size shall be in proportion to plant size and in accordance with AAN Standards. The Landscape Architect shall have the option to reject container-grown material if the growing media is too porous to hold adequate water for the plant's survival without watering more than once a week.
- F. Protection after Delivery. The balls of plants which cannot be planted immediately upon delivery shall be covered with moist soil or mulch or provided with other protection from drying winds and sun. All plants shall be watered as necessary until planted.

# PART 3 - EXECUTION

# 3.01 PLANTING METHODS:

- A. Time of Planting. Planting operations shall be conducted under favorable weather conditions preferably during the period from October 1 to April 1. The Landscape Contractor has the option and assumes full responsibility for planting during unseasonable conditions. Trees should be dug and heeled in or in container and placed in a well watered holding area provided by the nursery or Landscape Contractor until the time of planting. Landscape Contractor to be responsible for the welfare of the tree until project is completed, when the owner will assume responsibility.
- B. Plants to Remain. The Landscape Contractor shall take all necessary precautions to preserve and protect all existing plants that are to remain on the site. This shall include, but is not limited to, hand excavation of planting pits in close proximity to existing shrubs or within the spread of branches of

larger trees, watering of existing materials adjacent to plant pits, trimming or pruning to permit installation of new plants or to repair damaged existing plants.

- C. Obstructions Below Ground or Overhead:
  - 1. It is not contemplated that planting shall be done where the depth of soil over underground construction, obstructions or rock, is insufficient to accommodate the roots or where pockets in rock or impervious soil will require drainage. Where such conditions are encountered in excavation of planting areas and where the stone, boulders or other obstructions cannot be broken and removed by hand methods in the course of digging plant pits of the usual size and where trees to be planted are found to be under overhead wires, other locations for the planting may be designated by the Landscape Architect.
  - 2. Removal of rock or other underground obstruction, relocation of construction and provisions of drainage for planting areas shall be done only as directed by the Landscape Architect.
  - 3. Should the Landscape Contractor encounter unsatisfactory surface or subsurface drainage conditions, soil depth, latent soils, hard pan, steam or other utility lines or any other conditions that will jeopardize the health and vigor of the plantings, he must advise the Landscape Architect in writing of the conditions prior to installing the plants. Otherwise, the Landscape Contractor warrants that the planting areas are suitable for proper growth and development of the plants to be installed.
- D. New Plantings:
  - Layout. New planting shall be located where shown on the Drawings except where obstructions below ground or overhead are encountered or where changes have been made in the construction. Necessary adjustments shall be made only after approval by the Landscape Architect. No planting, with the exception of ground cover, espalier plants and hedge, shall be placed closer than 2' to pavement or structures. The Landscape Contractor shall be responsible for staking and layout of plantings on this project. The Landscape Architect shall be advised when stakes are in place and ready for inspection on various planting areas. All layout work shall be inspected and approved by the Landscape Architect prior to opening any plant pits.
  - 2. Planting Pits. Reasonable care shall be exercised to have pits dug and soil prepared prior to moving plants to their respective locations for planting to insure that they will not be unnecessarily exposed to drying elements or to physical damage. However, no open holes shall be left overnight or unmarked or unattended.
    - a. Circular pits with vertical sides shall be excavated for all plants in beds or trenches. See Planting Plan for more detailed information regarding preparation of planting areas. Diameter of pits for trees and shrubs shall be at least 2'greater than the diameter of the ball or spread of roots. The depth of pits for trees, shrubs and vines shall be enough to accommodate the ball or roots when the plant is set to finished grade allowing for 6" of compacted topsoil or prepared soil in the bottom of the pit.
    - b. Before planting any area, fill a representative sample of the excavated planting pits and beds with water to a depth 6" or more as required to verify if the subsoil is permeable enough to percolate satisfactorily and drain adequately after plants are installed. Advise the Landscape

Architect in writing if any problems are anticipated regarding excessive ground water or unsuitable percolation.

- E. Soil Preparation for Planting Trees and Shrubs:
  - 1. Soil used in planting shall be existing soil and/or re-spread topsoil. The prepared soil mix in tree pits as herein before specified shall be thoroughly mixed with one part compost to three parts of existing soil.
  - 2. Fertilizer tablets or packets shall be placed in each tree or shrub plant pit at a depth of 6" to 8" when the plant is set in place. The exact quantity and distribution of tablets or packets shall be in strict accordance with the manufacturer's recommendation for the sizes of material specified.
  - 3. Excess excavated soil shall be disposed of off site by the Landscape Contractor unless specific permission is obtained from the owner to dispose of excess material on the site.
- F. Soil Preparation for Planting Ground Cover and Annuals:
  - 1. Loosen subgrade of lawn areas to a minimum depth of 6". Remove stones over 1 1/2" in any dimension, sticks, roots, rubbish, and other extraneous matter. Limit preparation to areas which will be planted promptly after preparation.
  - 2. Soil used in planting shall be existing soil and topsoil as herein before specified and shall be thoroughly mixed with one part compost to three parts of existing soil.
  - 3. Add specified soil amendments as per soil analysis and mix thoroughly into upper 4" of topsoil.
  - 4. Excess excavated soil shall be disposed of off site by the Landscape Contractor unless specific permission is obtained from the Owner to dispose of excess material on the site.
- G. Setting Plants. Unless otherwise specified, all plants shall be planted in pits, centered and set on 6" of compacted soil or prepared soil to such a depth that the finished grade level at the plant after settlement will be the same as that at which the plant was grown. Prior to setting container-grown plants, make four to five cuts 1/2" 1" deep, top to bottom on root-bound mass to loosen roots. Plants shall be planted upright and faced to give the best appearance or relationship to adjacent structures. No burlap shall be pulled out from under balls. Plant forms, wires and surplus binding from top and sides of the balls shall be removed. All broken or frayed roots shall be cut off cleanly. Prepared soil shall be placed and compacted carefully to avoid injury to roots and to fill all voids. When the hole is nearly filled, add water as necessary and allow it to soak away. Fill the holes to finished grade. After the ground settles, additional soil shall be filled in, to the level of the finished grade.
- H. Guying and Staking. Trees shall be supported immediately after planting. All trees shall be staked as detailed and shown on the Plans. Wires shall be encased in hose to prevent direct contact with the bark of the tree and shall be placed around the trunk in a single loop. Wires shall be tightened and kept taut by the use of turnbuckles. Stakes shall be equally spaced about each tree and shall be driven vertically into the ground to a depth of about 2' in such a manner as not to injure the ball or roots. Trees shall be fastened to each stake at a height where substantial branching will hold encased wire in place. Wire shall be doubled and twisted taut. Stakes shall be uniform in length and placed according to the type, size and location of the tree.

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- I. Herbicide Treatment. All tree saucers, shrub and ground cover beds shall be treated after plants have been installed with an approved pre-emergent herbicide recommended by the manufacturer. Plants installed during the fall planting season shall be treated with the approved herbicide during the first week of April of the following year. Plants installed in the spring shall be treated with the approved herbicide immediately after installation. Herbicide shall be cleared by the manufacturer as safe for use around the plants itemized in the Plant List.
- J. Shredded Hardwood Mulching. Tree and shrub beds shall be mulched with 2" of shredded hardwood mulch. This mulch shall cover the entire bed area and shall have a neat and well-defined edge between lawn area and shrub bed. Trees in lawn areas with individual saucers shall be mulched with 2" of shredded hardwood mulch.
- K. Pruning and Repair. All pruning and repair work must be completed within a ten-day period after planting. The amount of pruning included under the work of this Section shall be limited to the minimum necessary to remove dead or injured twigs and branches and to compensate for the loss of roots as a result of transplanting operations.
  - 1. Trees and some shrubs will be pruned back after planting to maintain a balance between the reduced root system and the branches. Care will be taken in this work to insure that the plants preserve their natural form.
  - 2. The natural form of newly planted trees and shrubs will be preserved in pruning by the removal of branches and/or part of branches at different lengths in accord with standard horticulture practices and as directed by the Landscape Architect. Pruning will always be done with a clean cut in living wood without bruising or tearing of bark and without leaving any stubs which would prevent the wound from healing over. Horizontal cuts may cause rot and will be avoided.

# 3.02 CLEAN-UP:

- A. Clean-up. Any soil, bark, peat or similar material which has been brought onto paved areas within or outside the construction area by hauling operations or otherwise shall be removed promptly, keeping these areas clean at all times. Upon completion of the planting, all excess soil, stones and debris which have not been cleaned up shall be removed from the site or disposed of as directed by the Landscape Architect. All planting areas shall be prepared for final inspection.
- B. Other Work. The Landscape Contractor shall be responsible for the repair of any damage caused by his activities or those of his subcontractors within or outside the construction area such as the storage of topsoil or other materials, operation of equipment and other usage. Such repair operations shall include any regrading, sodding or other work necessary to restore damaged work or areas to an acceptable condition.

# 3.03 MAINTENANCE:

- A. Maintenance shall begin immediately following the last operation of installation for each portion for each plant and shall continue until installation of planting is complete and the planting is formally accepted. Maintenance shall include mowing, watering, weeding, cultivating, mulching, tightening and repairing of guys, removal of dead material, resetting plants to proper grades or upright positions, restoration of the planting saucer and other necessary operations. Any damage resulting from planting operations shall be repaired promptly.
- B. The Owner shall be responsible for all required maintenance after the planting is formally accepted (final acceptance).
- C. Maintenance Instructions Landscape Work. The Landscape Contractor shall submit to the Owner three (3) copies of typewritten instructions recommending the monthly procedures to be established by Owner for the maintenance of landscape work during the one-year guarantee period. Submit prior to the final inspection for acceptance.

# 3.04 INSPECTION FOR ACCEPTANCE:

- A. Inspection of the work of this Section to determine completion of the Landscape Contractor's work, exclusive of the possible guarantee replacement of plants, shall be made by the Landscape Architect upon receipt of written notice requesting such inspection submitted by the Landscape Contractor at least ten (10) days prior to the anticipated date of inspection.
- B. Acceptance. After inspection, the Landscape Contractor will be notified in writing by the Landscape Architect of acceptance of all work of this Section, exclusive of the possible replacement of plants subject to guarantee or the Landscape Contractor will be notified in writing if there are any deficiencies from the requirements for completion of the work. Replacements, maintenance and repair work remaining to be done shall be subject to re-inspection before acceptance.

# 3.05 PLANT GUARANTEE AND REPLACEMENT:

- A. Guarantee. This guarantee shall be provided to the owner by the contractor responsible for planting and irrigation. Plants shall be guaranteed for the duration of one (1) full year after the formal acceptance of the planting by the Owner and shall be alive and in satisfactory growth at the end of the guarantee period. The Owner shall be responsible for all maintenance necessary to keep the plants alive and healthy between the time the plantings are accepted and the end of the guarantee period. The basic needs of the plants during this period are for adequate water and protection from insects and other similar pests. Plants severely damaged by vandals are not subject to replacement by this Landscape Contractor.
- B. Should the Landscape Contractor find the plant material is not receiving the proper maintenance at any time prior to the end of the guarantee period, he should advise the Landscape Architect and the Owner immediately in writing so corrective measures may be initiated.

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- C. Replacement. At the end of the guarantee period, inspection will be made by the Owner and the Landscape Architect upon written notice requesting such inspection submitted by the Landscape Contractor at least ten (10) days prior to the anticipated date. Any plant installed under this Contract that is dead or not satisfactory in growth as determined by the Landscape Architect shall be removed from the site. These, and any plants missing due to the Landscape Contractor's negligence, shall be replaced as soon as conditions permit but during the normal planting season.
  - 1. Any plant that has die-back or otherwise loses 30% or more of its branches, excluding branches removed by trimming and pruning, as existing and living prior to removal from the nursery field shall be rejected. In case of any question, the Landscape Contractor may elect to allow such plant to remain through another complete growing season at which time the rejected plant, if found to be dead or in an unhealthy or badly impaired condition, shall be replaced.
  - 2. The Landscape Contractor shall be responsible for removing dead or diseased plants from the site during the guarantee period upon notification by the Owner or Landscape Architect. Dead plants may be removed by the Owner during the guarantee period provided they keep a photographic record of all plants removed. Photographs should show plant to such a degree that is clearly evident the plant is dead. Replacements shall be made only at the end of the guarantee period as described herein.
  - 3. The Landscape Architect shall inspect replaced plants when all replacements have been made. Any plant that is not alive and in a healthy vigorous condition shall be replaced again by the Landscape Contractor.
- D. Materials and Operations. All replacements shall be plants of the same kind and size as specified in the Plant List. They shall be furnished and planted as specified under "New Planting", the cost of which shall be borne by the Landscape Contractor.
- E. Replaced plants are not subject to a full one (1) year guarantee, but replacements must be alive and vigorous when inspected after planting and must leaf out fully in spring, if replacements are made while the plant is dormant.

# END OF SECTION

#### SECTION 02810- UNDERGROUND IRRIGATION SYSTEM

#### PART 1 - GENERAL

#### 1.01 DESCRIPTION OF WORK:

A. The work covered by this Section consists of furnishing all labor, equipment and materials and performing all operations necessary for installing an automatic irrigation system as shown on the Drawing and/or described by these Specifications. The work includes: preparation and excavation of trenches, installation of irrigation system (including: plastic pipe, fittings and connectors, sprinkler heads, automatic control valves and valve boxes, drip accessories, electric control cable, wiring to controller and required submittals).

#### 1.02 QUALITY ASSURANCE:

- A. Subcontract work to a single firm specializing in irrigation systems.
- B. Manufacturer Qualifications. Provide underground sprinkler system as a complete unit produced by a single acceptable manufacturer including heads, valves, piping circuits, controls and accessories.

#### 1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's catalog cuts, equipment data sheets, or shop drawings for the following products:
  - 1. Sprinkler heads
  - 2. Swing Joints
  - 3. Valves: electric and manual
  - 4. Controller and controller accessories
  - 5. Valve boxes
  - 6. Pipe and pipe fittings
  - 7. Control wire and splice connectors
  - 8. Drip components
  - 9. Solvent, primer and Teflon tape
- B. Submit a written proposal including a breakdown of components to be used in the system and a complete description of the scope of work. Include all information of plumbing and/or electrical permits and fees. Also include with the written proposal:
  - 1. A letter(s) from the manufacturer(s) of all major components of the system (sprinklers, electric valves, controllers, and drip components) that a local authorized service center exists as described in Section 1.4, C. The name and address of that service center shall be included in the letter. The same letter(s) shall also include the name of the local authorized manufacturer's representative.

# UNDERGROUND IRRIGATION SYSTEM

PART 2 - PRODUCTS

#### 2.01 SPRINKLER SYSTEM:

- A. Manufacturer. Irrigation system products shall be by the following manufacturers:
  - Rainbird Sprinkler Mfg. Corp.1-800-247-3782 www.rainbird.com
  - Hunter Industries
  - Or approved equals

#### 2.02 GRAVEL:

A. Material for gravel sump shall be pea gravel or approved equal.

#### 2.03 PLASTIC PIPE AND FITTINGS:

- A. The plastic pipe shall be rigid unplasticized PVC class 200 or class 160 (SDR 26), unless otherwise noted on drawings, extruded from virgin parent material. The pipe shall be homogeneous throughout and free from visible cracks, holes, foreign materials, blisters, deleterious wrinkles and dents. All plastic pipe shall be manufactured by CertainTeed, Johns-Mansville or approved equal.
- B. All plastic pipe fittings shall be schedule 40 PVC and shall be manufactured by the same manufacturer as the plastic pipe.

#### 2.04 SHRUB AND LAWN SPRINKLER HEADS:

- A. All full and part circle sprinklers shall be of the fixed spray variety as is specified on the Drawing. These sprinklers shall be of the pop-up type with spring retraction. The body of the sprinkler shall be constructed of Cycolac Material and the sprinkler shall be easily serviced from the Manufacturer's specifications with regard to the diameter of throw and gallonage at a given pressure. Spacing of heads shall not exceed the manufacturer's maximum recommendation.
- B. Matched precipitation will be required on all full and part circle sprinklers operation on the same zone.

# 2.05 PVC SLEEVING:

A. Schedule 40 PVC pipe shall be as noted on the drawings. These sleeves are to be used for proposed irrigation lines. Irrigation sub-contractor shall coordinate installation with General Contractor.

#### 2.06 AUTOMATIC CONTROL VALVES:

A. The remote control valve shall be a normally closed 24 volt A.C. 50/60 cycle solenoid type. Valve pressure rating shall not be less than 150 PSI.

# UNDERGROUND IRRIGATION SYSTEM

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- B. The valve body and bonnet shall be constructed of heavy duty glass-filled nylon, diaphragm shall be on nylon reinforced nitrile rubber. Solenoid coil shall be encapsulated in molded epoxy.
- C. The valve body shall be activated by a low power, 2.0 watt 24 volt A.C. solenoid. The solenoid plunger shall have a filter to insure positive valve operation.
- D. The valve shall have a flow control stem with wheel handle for regulation or shutting off the flow of water and a bleed screw for manual operation without electrically energizing the solenoid coil.
- E. The valve construction shall be such as to provide for all internal parts to be removable from the top of the valve without disturbing the valve installation.

# 2.07 VALVE BOXES:

- A. All control valves shall be installed in a valve box in accordance with manufacturer's specifications.
- 2.08 CONTROL VALVE CABLE:
  - A. All wiring to be used for connecting the automatic remote control valve to the automatic controllers shall be Type "UF", 14-1 stranded or solid copper, single conduction wire with PVC insulation and bear UL approval for direct underground burial feeder cable. Wire connections to remote control electric valves and splices of wire in the field shall use Pen-Tite wire connectors or approved equal and scaling cement.

# 2.09 BACKFLOW PREVENTER:

A. Install size as indicated on drawings and as per local codes.

# 2.10 DRIP IRRIGATION ACCESSORIES:

- A. Filter. Provide filter at valve to each drip zone. Provide screen having equivalent of 140-mesh filtration capacity.
- B. Pressure Regulator. Incorporate regulator into each drip system if supply pressure exceeds 40 PSI.
- C. Closure Caps. Provide in accordance with manufacturer's recommendations.

# 2.11 AUTOMATIC CONTROLLER:

A. The controller shall be capable of operating 24 V.A.C. electric remote control valves. The controller shall have an active day light with timing accurate to 1 minute per month. (See plan for more specific information).

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- B. The wall mount type controller cabinet shall be of injection molded high impact plastic which shall resist corrosion and provide for an attractive appearance. The door shall be mated with the other cabinet parts and be made of the same material. The controller shall be wall mounted as shown on the irrigation plan. The controller shall have adequate lightning protection.
- C. Coordinate location of controller-associated weather station or sensor units with Landscape Architect.

# PART 3 - EXECUTION

# 3.01 LAYOUT OF LINES:

- A. The water lines will be laid at the locations shown on the plans. The Landscape Contractor shall stake out the location of each run of pipe and all sprinkler heads or valve locations for approval by Landscape Architect prior to digging trench.
- B. The lawn irrigation system shall be installed so that it will drain at all points.
- C. Install PVC pipe in dry weather when temperature is above 40° F in strict accordance with manufacturer's instructions. Allow joints to cure at least 24 hours at temperature above 40° F (4°C) before testing unless otherwise recommended by manufacturer.

# 3.02 EXCAVATION AND BACKFILL:

- A. Trenches for PVC pipe main lines shall be excavated to sufficient depth of 12" minimum and an unspecified width to permit proper handling and installation of pipe and fittings. Trenches for PVC pipe lateral sprinkler lines shall be excavated to sufficient depth of 12" minimum and an unspecified width to permit proper handling and installation of pipe and fittings.
- B. On sodded areas the Landscape Contractor will remove and replace the sod where possible from the trench area to the necessary width and depth required to facilitate his installation.
- C. The backfill shall be thoroughly compacted and brought to finish grade, with proper allowance for topsoil. Selected dirt or sand shall be used if soil conditions are rocky. In rocky areas the trenching depth shall be two inches (2") below normal trench depth to allow for this bedding. The pea gravel fill shall be used in filling the top 4" above the pipe. The remainder of the backfill shall contain no lumps or rocks larger than three inches (3"). The top six inches (6") of backfill shall be free of rocks over one inch (1") diameter, subsoil or trash.

# 3.03 PLASTIC PIPE AND FITTINGS:

A. All pipe fittings and valves, etc. shall be installed and joined in accordance with the manufacturer's recommendations. Interior of pipes shall be kept free from dirt and debris and when pipe laying is not in progress, open ends of pipe shall be closed by approved means.

# UNDERGROUND IRRIGATION SYSTEM

- B. Pipe shall be firmly supported throughout its entire length. Extreme care shall be exercised to prevent low points except at drains so that every section of pipe is placed with positive gravity drainage flow towards a drain valve.
- C. Sharp changes in alignment and grade shall be made with appropriate fittings. All elbows, tees and fittings shall be installed with a reaction block bearing against undisturbed soil to prevent breakage or separation of the joint.
- 3.04 AUTOMATIC CONTROL VALVES:
  - A. Automatic control valves shall be installed in accordance with the manufacturer's specifications.

#### 3.05 VALVE BOXES:

A. Valve boxes shall be installed on a suitable base of gravel for proper foundation box and easy leveling of box to proper grade and also to provide proper drainage of the box. All valve boxes shall be provided with the proper size extensions, wherever required, to bring the valve boxes level with the finished grade.

#### 3.06 ELECTRICAL INSTALLATION:

- A. The Contractor will be required to make connections to the building electrical system as is required for the proper operation of the automatic control system. The entire installation shall fully comply with all local and state laws and ordinances and with all the established codes applicable thereto.
- B. All control circuitry, whether electrical or hydraulic, passing through the wall of the building or beneath a sidewalk, road or drive shall be installed in a suitable sleeve; whereas in all other locations they shall be installed in the pipe trench and protected by the pipe whenever possible.
- C. The joining of all underground wires shall be by the use of wire nuts covered with Scotch Lok per installation instructions provided by manufacturer.

# 3.07 CONTROL VALVE CABLE:

- A. All control valve cables shall be installed by direct burial at a minimum depth of 12". Where practical the wire shall be installed in same trench as mainline pipe.
- B. Extreme care shall be exercised during backfilling of trench to avoid damage and displacement of mainline pipe.
- C. Control valve cable shall be fed through conduit from inside the building.
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D. Each control valve shall be connected to one station of the controller by a control wire. All of the valves shall be connected to a common ground.

#### 3.08 SPRINKLER HEADS:

A. Sprinkler heads shall be installed as shown on the drawings and in accordance with manufacturer's specifications. The height of each sprinkler head in relation to the finish grade shall be approved by the Landscape Architect.

#### 3.09 INSTALLATION OF DRIP IRRIGATION SYSTEM:

- A. Install main lines and valves. Before installing emitter laterals, perform pressure test then flush out sand, plastic shaving and other foreign matter.
- B. Emitter Hose. Bury emitter laterals under 3 inches of mulch. Solvent weld each connection in accordance with manufacturer's recommendation to standard weight Schedule 40 PVC fittings and bushings. Install hose in a serpentine manner. When cutting hose, use a shearing tool such as a pipe cutter, knife or shears. Use only manufacturer's recommended tool and procedure when punching hose for emitters.
- C. Emitter Heads. Connect emitter on a rigid PVC nipple to PVC drip lateral with a tee or elbow. Attach tubing to barbed fitting and daylight distribution tubing at rootball secured with stake. Add bug cap at end of secured distribution tubing. If necessary after installing emitters and before operating system, open end of drip lateral and flush lines clean. The number of emitters on a line shall not exceed manufacturer's recommendations for that hose or distribution tubing size and length.

#### 3.10 BACKFLOW PREVENTERS

A. Install backflow preventer in new connection between connection and control valves, as per local codes.

#### 3.11 FLUSHING:

A. After all new sprinkler piping and risers are in place and connected for a given section, and all necessary work has been completed and prior to installation of sprinkler heads, all control valves shall be opened and a full head of water shall be flushed through the system to remove any foreign material.

# 3.12 TESTING:

A. Tests shall be made on portions of the line as completed. Final testing, however, shall be made on the entire system. Trenches shall be partially backfilled to prevent displacement of pipes.

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- B. Pressure test shall be performed to a maximum hydrostatic pressure of 200 PSI based on the elevation of the lowest point in the system and corrected to the elevation of the test gauge. Duration of the pressure test shall be at least one hour.
- C. Leakage test shall be performed after satisfactory completion of the pressure test. The leakage test shall be conducted at a hydrostatic pressure of 130 PSI without showing a leakage in excess 7.5 gallons per hour. Extend the leakage test for a period of time necessary to allow inspection, but in no case shall the duration be less than two hours.
- D. Remove and replace any defective materials of installations discovered in testing and repeat the test until satisfactory to the Landscape Architect. This work shall be performed at the Landscape Contractor's expense.
- E. The tests shall be witnessed by the Landscape Architect.

# 3.13 RECORD DRAWINGS

A. After completion of the piping installation, the Landscape Contractor shall furnish a signed Record Drawing showing exact dimensions, depths and locations of all pipe, drains, controls, heads, etc. of sprinkler system. Record Drawing shall also be submitted in AutoCAD format (version 2007 or later) on a CD.

#### 3.14 MAINTENANCE AND OPERATING INSTRUCTIONS:

- A. Provide four (4) hours of instruction for Owner's Representative's personnel upon completion of check/test/start-up/adjust operations. Owner's Representative shall be notified at least one (1) week in advance of check/test/start-up/adjust operations.
- B. Upon completion of the irrigation system and in conjunction with application for final payment, submit one Maintenance and Operation Manual. Each Manual shall be a 3-ring binder with:
  - 1. One (1) hard copy and CD of CAD file of the "RECORD" drawing of the irrigation system, and
  - 2. One (1) complete set of the "APPROVED" Submittals required in paragraph 1.06 above.
  - 3. One (1) copy of the suggested "SYSTEM OPERATING SCHEDULE" which shall call out the controller program required in order to provide 1.0" of water per week to each planted zone area and 1.5" of water per week to each turf zone area.
  - 4. A typewritten description of the procedures to be followed for proper winterization of the entire system.
- C. Contractor shall be responsible for the first year's winterization and subsequent spring start-up procedures and shall perform these operations in the presence of the Owner's Representative's personnel.

# 3.15 CLEAN-UP:

# UNDERGROUND IRRIGATION SYSTEM

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A. Upon completion of the work and before acceptance and final payment will be made, the Landscape Contractor shall make any necessary repairs, adjustments and corrections to the work as required by the Drawings and Specifications. The Landscape Contractor shall remove from the site all machinery, equipment, surplus and discarded materials, rubbish, temporary structures and all other items not incorporated into the work. The site shall be left in a neat and presentable condition. Any damage to roads buildings, walks, vegetation, utilities or any other item of personal property which is the responsibility of the Landscape Contractor, through accident, negligence or normal usage, shall be satisfactorily repaired or replaced as a requirement for completion of this contract.

# 3.16 GUARANTEE:

A. For a period of one year from date of final acceptance of the work performed under this Contract, the Landscape Contractor shall promptly furnish, without cost to the Owner, any and all parts and labor which prove defective in material, workmanship, or proper functioning of system.

#### 3.17 REPLACEMENTS:

A. Landscape Irrigation System - During the last month of the guarantee period, the Landscape Architect and Landscape Contractor shall inspect the installation to determine the condition of the complete system. A list of defective materials or installations to be replaced shall be made by the Landscape Contractor within thirty days of receiving written notification. Replaced materials and installation shall be in accord with these Specifications, Drawings and/or schedules.

END OF SECTION

# **SECTION 024116 - STRUCTURE DEMOLITION**

# PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Demolition and removal of buildings and site improvements.
  - 2. Removing below-grade construction.
  - 3. Disconnecting, capping or sealing, and abandoning in-place or removing site utilities.
  - 4. Salvaging items for reuse by Owner.
- B. Related Sections:
  - 1. Section 311000 "Site Clearing" for site clearing and removal of above- and below-grade site improvements not part of building demolition.

#### 1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged.
- B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner. Include fasteners or brackets needed for reattachment elsewhere.

#### 1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
  - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

# STRUCTURE DEMOLITION

- 1.5 QUALITY ASSURANCE
  - A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
  - B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
  - C. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

# 1.6 PROJECT CONDITIONS

- A. Buildings to be demolished will be vacated and their use discontinued before start of the Work.
- B. Buildings immediately adjacent to demolition area will be occupied. Conduct building demolition so operations of occupied buildings will not be disrupted.
  - 1. Provide not less than 72 hour's notice of activities that will affect operations of adjacent occupied buildings.
  - 2. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings.
    - a. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from authorities having jurisdiction.
- C. Owner assumes no responsibility for buildings and structures to be demolished.
  - 1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
  - 1. Hazardous materials will be removed by Owner before start of the Work.
  - 2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Hazardous Materials: Hazardous materials are present in buildings and structures to be demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.

# 1. Hazardous material remediation is specified elsewhere in the Contract Documents.

- 2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
- 3. Owner will provide material safety data sheets for materials that are known to be present in buildings and structures to be demolished because of building operations or processes performed there.
- F. On-site storage or sale of removed items or materials is not permitted.

# 1.7 COORDINATION

A. Arrange demolition schedule so as not to interfere with Owner's on-site operations or operations of adjacent occupied buildings.

# PART 2 - PRODUCTS

# 2.1 SOIL MATERIALS

A. Satisfactory Soils: Comply with requirements in Section 312000 "Earth Moving."

# PART 3 - EXECUTION

# 3.1 DEMOLITION CONTRACTOR

# 3.2 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting demolition operations.
- B. Review Project Record Documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

# 3.3 PREPARATION

- A. Existing Utilities: Locate, identify, disconnect, and seal or cap off indicated utilities serving buildings and structures to be demolished.
  - 1. Owner will arrange to shut off indicated utilities when requested by Contractor.
  - 2. Arrange to shut off indicated utilities with utility companies.
  - 3. If removal, relocation, or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.
  - 4. Cut off pipe or conduit a minimum of 24 inches (610 mm) below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.
- B. Existing Utilities: See plumbing and electrical Sections for shutting off, disconnecting, removing, and sealing or capping utilities. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.
- C. Salvaged Items: Comply with the following:
  - 1. Clean salvaged items of dirt and demolition debris.
  - 2. Pack or crate items after cleaning. Identify contents of containers.
  - 3. Store items in a secure area until delivery to Owner.
  - 4. Transport items to storage area designated by Owner.
  - 5. Protect items from damage during transport and storage.

#### 3.4 **PROTECTION**

- A. Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations. Maintain exits from existing buildings.
- B. Existing Utilities: Maintain utility services to remain and protect from damage during demolition operations.
  - 1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.
  - 2. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and authorities having jurisdiction.
    - a. Provide at least 72 hour's notice to occupants of affected buildings if shutdown of service is required during changeover.
- C. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Section 015000 "Temporary Construction Facilities."

- 1. Protect adjacent buildings and facilities from damage due to demolition activities.
- 2. Protect existing site improvements, appurtenances, and landscaping to remain.
- 3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
- 4. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- 5. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
- 6. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
- 7. Erect and maintain dustproof partitions and temporary enclosures to limit dust, noise, and dirt migration to occupied portions of adjacent buildings.
- D. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

# 3.5 DEMOLITION, GENERAL

- A. General: Demolish indicated buildings and site improvements completely. Use methods required to complete the Work within limitations of governing regulations and as follows:
  - 1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
  - 2. Maintain fire watch during and for at least 2 hours after flame cutting operations.
  - 3. Maintain adequate ventilation when using cutting torches.
  - 4. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- B. Engineering Surveys: During demolition, perform surveys to detect hazards that may result from building demolition activities.
- C. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
  - 2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- D. Explosives: Use of explosives is not permitted.

# 3.6 SITE RESTORATION

STRUCTURE DEMOLITION

- A. Below-Grade Areas: Rough grade below-grade areas ready for further excavation or new construction.
- B. Below-Grade Areas: Completely fill below-grade areas and voids resulting from building demolition operations with satisfactory soil materials, recycled pulverized concrete, recycled pulverized masonry according to backfill requirements in Section 312000 "Earth Moving."
- C. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

# 3.7 REPAIRS

A. Promptly repair damage to adjacent buildings caused by demolition operations.

# 3.8 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and legally dispose of them in an EPA-approved landfill acceptable to authorities having jurisdiction.
  - 1. Do not allow demolished materials to accumulate on-site.
  - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Do not burn demolished materials.

#### 3.9 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began.
  - 1. Clean roadways of debris caused by debris transport.

# END OF SECTION 024116

# DIVISION 4

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Applicable Portions Of The Conditions Of The Contract And Division 1 General Requirements Apply To The Work Of This Division.	A S
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#### SECTION 04200 - UNIT MASONRY

#### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS:

- A. Drawings and general conditions of the Contract, including supplementary conditions and Division 1 Specification Sections, apply to this Section.
- 1.02 DESCRIPTION OF WORK:
  - A. Extent of each type of masonry work is included on drawings and schedule.1. Brick masonry.

#### 1.03 QUALITY ASSURANCE:

- A. Single Source Responsibility for Masonry Units: Obtain brick of uniform quality from one manufacturer.
- B. Single Source Responsibility for Mortar Materials: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.
- C. Sampler for Verification Purposes: Submit samples of brickwork made up of actual brick to be used. Sample should show representative mortar color, mortar joints and quality of workmanship to be adhered to through the project's completion.

#### PART 2 - PRODUCTS

#### 2.01 BRICK:

- A. Site Column Brick: Match existing columns at Russell House / Greene St.
- B. Brick paver: Pathway red modular by Pinehall, pedestrian (2 ¼"x4"x8"), vehicular (2 ¾"x4"x8")

#### 2.02 MORTAR:

- A. Mortar: Match mortar used at existing columns at the Russell House / Greene St.
- B. Portland Cement: ASTM C150, Type I, except Type III may be used to reduce protection requirements specified for laying masonry in cold weather. Provide cold cement required to produce the required mortar color.

#### UNIT MASONRY

- C. Masonry Cement: ASTM C71.
- D. Hydrated Lime: ASTM C207, Type S.
- E. Sand: ASTM C144 for mortar and C404 for grout.
- F. Water shall be clean and free of deleterious materials.

#### PART 3 - EXECUTION

#### 3.01 MORTAR:

A. Mortar: All masonry shall be thoroughly mixed in clean mortar boxes or an approved type of mechanical mixer with the dry materials being mixed to a uniform color before adding mixing water. The sand and cement shall be mixed in proportions to produce Type "S" mortar as recommended by the manufacturer of the cement used, but in no case shall the proportion of sand exceed 3 times the amount of cement used per batch.

#### 3.02 MASONRY:

- A. Masonry: All masonry work shall be laid by skilled masons, with all horizontal courses straight and level and all corners square and vertical surfaces straight and plumb. All masonry shall be laid in full beds of mortar with the head joints well filled.
- B. The bond shall be common running bond for brickwork and concrete masonry units. Joints shall be properly broken and bond maintained throughout the entire work. All masonry work shall be laid in a true workmanlike manner.
- C. Lay out bond in exposed work and adjust so that no course terminates at a corner or opening with less than 1/2 of a unit. Use masonry saw for cutting masonry units where required. Use lapped sections for reinforcing at all wall intersections.
- D. Cleaning Masonry Work: Clean all exposed masonry work after mortar has thoroughly set and cured. Directions of the manufacturer of the cleaning agent used shall be strictly adhered to.

END OF SECTION 04200

# DIVISION 5

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#### SECTION 05720 - ORNAMENTAL HANDRAILS AND RAILINGS

#### PART 1 – GENERAL

#### 1.01 RELATED DOCMUMENTS:

A. Drawings and general conditions of the Contract, including supplementary conditions and Division 1 Specification Sections, apply to this Section.

#### 1.02 DESCRIPTION OF WORK:

A. The work covered by this Section consists of furnishing all labor, equipment and materials and performing all operations necessary for installing ornamental handrails as shown on the Drawing and/or described by these Specifications. The Work includes: preparation and installation of railings and handrails, including handrails, posts, installation, and painting.

# 1.03 QUALITY ASSURANCE:

- A. Subcontract work to a single firm specializing in handrails.
- B. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
- C. Source Limitations: Obtain each type of railing through one source from a single manufacturer.

#### 1.04 PERFORMANCE REQUIREMENTS

- A. Cold-Formed Structural Steel: AISI SG-673, Part I, "Specification for the Design of Cold-Formed Steel Structural Members."
  - 1. Structural Performance of Handrails and Railings: Comply with requirements of ASTM E 985 for structural performance based on testing performed according to ASTM E 894 and ASTM E 935.
  - 2. Structural Performance of Handrails and Railings: Provide handrails and railings capable of withstanding structural loads required by ASCE 7 without exceeding allowable design working stress of materials for handrails, railings anchors, and connections.
  - 3. Structural Performance of Handrails and Railings: Provide handrails and railings capable of withstanding the following structural loads without exceeding allowable design working stress of materials for handrails, railings, posts, anchors, and connections:
    - a. Top Rail: Capable of withstanding the following loads applied as indicated:
      - 1) Concentrated load of 200 lbf (890 N) applied at any point and in any direction.
      - 2) Uniform load of 50 lbf/ft (730 N/m) applied in any direction.
      - 3) Concentrated and uniform loads above need not be assumed to act concurrently.
    - b. Thermal Movements: Provide handrails and railings that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of

components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1) Temperature Change (Range): 120 degrees F (67 degrees C), ambient; 180 degrees F (100 degrees C), material surfaces.

c. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

#### 1.05 SUBMITTALS

- A. Product Data: For manufacturer's product lines of handrails and railings assembled from standard components.
  - 1. Include Product Data for grout, anchoring cement, and paint products.
- B. Shop Drawings: Show fabrication and installation of handrails and railings. Include plans, elevations, sections, details, and attachments to other Work.
  - 1. For installed handrails and railings indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for products with factory-applied color finishes.
- D. Samples for Verification: For each type of exposed finish required, prepared on components indicated below and of same thickness and metal indicated for the Work. If finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
  - 1. 6-inch (150 mm) long sections of each different linear railing member, including handrails, posts, and balusters.
  - 2. Fittings and brackets.
  - 3. Welded connections.
  - 4. Brazed connections.
  - 5. Assembled Samples of Handrail and Railings, made from full-size components, including top rail, post handrail, and infill. Show method of finishing members at intersections. Samples need not be full height.
  - E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience, include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
    - 1. Product Test Reports: Indicating products comply with requirements, based on comprehensive testing of current products.

2. Indicating handrails and railings comply with ASTM E 985, based on comprehensive testing of current products.

(See 1.2 Quality Assurance)

#### 1.06 STORAGE

A. Store handrails and railings in a dry, well-ventilated, weather-tight place.

#### 1.07 PROJECT CONDITIONS

A. Field Measurements: Verify handrail and railing dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

#### 1.08 COORDINATION

A. Coordinate installation of anchorages for handrails and 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 masonry or stone. Deliver such items to Project site in time for installation.

#### 1.09 SCHEDULING

A. Schedule installation so handrails and railings are mounted only on completed walls. Do not support temporarily by any means that do not satisfy structural performance requirements.

#### PART 2 – PRODUCTS

#### 2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Blum: Julius Blum & Co., Inc.
  - 2. Braun: J.G. Braun Co.
  - 3. Livers Bronze Co., Inc.
  - 4. Wagner: R & B Wagner, Inc.

# 2.02 METALS

- A. General: Provide metal free from pitting, seam marks, roller marks, stains, discolorations, and other imperfections where exposed to view on finished units.
- B. Comply with the following requirements for each form required:

- 1. Steel Tubing: Cold-formed steel tubing, ASTM A 500, Grade A, unless another grade is indicated or required by structural loads.
- 2. Steel Rails and Bars: Hot-rolled, carbon steel complying with ASTM A 29/A 29M, Grade 1010.
- 3. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.
  - a. Provide cast brackets with flange tapped for concealed anchorage to threaded hanger bolt.
  - b. Provide formed or cast brackets with predrilled hole for exposed bolt anchorage.
  - c. Provide formed steel brackets with predrilled hole for bolted anchorage and with snapon cover that matches rail finish and conceals bracket base and bolt head.
  - d. Provide brackets with interlocking pieces that conceal anchorage. Locate setscrews on bottom of bracket.

# 2.03 FASTENERS

- A. Fasteners for Anchoring Handrails and Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring handrails and railings to other types of construction indicated and capable of withstanding design loads.
  - 1. For steel posts use plated fasteners complying with ASTM B 633, Class Fe/ZN 25 for electrodeposited zinc coating.
- B. Cast-in-Place Anchors: Cast-in-place anchors, fabricated from corrosion resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

# 2.04 PAINT

- A. Shop Primer for Ferrous Metal: Fast-curing, lead and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664; selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.
- B. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12 but containing no asbestos fibers, or cold-applied asphalt emulsion complying with ASTM D 1187.

### 2.05 GROUT AND ANCHORING CEMENT

A. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

#### 2.06 FABRICATION

- A. Assemble handrails in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- B. Form changes in direction of railing members by mitering at elbow bonds.
- C. Welded Connections: Fabricate handrails and railings for connecting members by welding. Cope components at perpendicular and skew connections to provide close fit, or use fittings designed for this purpose. Weld connections continuously to comply with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove flux immediately.
  - 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- D. Mechanical Connections: Fabricate handrails and railings by connecting members with railing manufacturer's standard concealed mechanical fasteners and fittings, unless otherwise indicated. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
  - 1. Fabricate splice joints for field connection using epoxy structural adhesive where this is manufacturer's standard splicing method.
- E. Provide inserts and other anchorage devices to connect handrails and railings to concrete. Fabricate anchorage devices capable of withstanding loads imposed by handrails. Coordinate anchorage devices with supporting structure.
- F. For railing posts set in concrete, provide preset sleeves of steel not less than 6 inches (150 mm) long with inside dimensions not less than ½ inch (12 mm) larger than outside dimensions of post, and steel plate forming bottom closure.
- G. Shear and punch metals cleanly and accurately. Remove burrs from exposed cut edges.
- H. Ease exposed edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Form bent metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.
- I. Cut, reinforce, drill, and tap components as indicated, to receive finish hardware, screws, and similar items.
- J. Provide weep holes or another means to drain entrapped water in hollow sections of railing members that are exposed to exterior or to moisture from condensation or other sources.

- K. Fabricate joints that will be exposed to weather in a watertight manner.
- L. Close exposed ends of railing members with prefabricated end fittings.

#### 2.07 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.

#### 2.08 STEEL FINISHES

- A. Fill vent and drain holes that will be exposed in finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
- B. Preparation for Shop Priming: Thoroughly clean handrails of grease, dirt, oil, flux, and other foreign matter, and treat with metallic-phosphate process.
- C. Apply shop primer to prepared surfaces of handrails, unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.
  - 1. Stripe paint edges, corners, crevices, bolts, and welds.

#### PART 3 – EXECUTION

- 3.01 INSTALLATION, GENERAL
  - A. Fit exposed connections together to form tight, hairline joints.
  - B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing handrails and railings. Set handrails and railings accurately in location, alignment, and elevation, measured from established lines and levels and free from rack.
    - 1. 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.
    - 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1 m).
  - C. Adjust handrails and railings before anchoring to ensure alignment at abutting joints. Space posts at interval indicated but not less than that required by structural loads.

D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing handrails and railings and for properly transferring loads to in-place construction.

#### 3.02 HANDRAIL CONNECTIONS

- A. Welded Connections: Use fully welded joints for permanently connecting handrail and railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in shop or in field.
- B. Expansion Joints: Install expansion joints at locations indicated but not further apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches (50 mm) beyond joint on either side; fasten internal sleeve securely to one side; locate joint within 6 inches (150 mm) of post.

#### 3.03 ANCHORING POSTS

- A. Form or core-drill holes not less than 6 inches (125 mm) deep and <sup>3</sup>/<sub>4</sub> inch (20 mm) greater than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with the following anchoring material, mixed and placed to comply with anchoring material manufacturer's written instructions:
  1. Nonshrink, nonmetallic grout or anchoring cement.
- B. Cover anchorage joint with a flange of same metal as post, attached to post as follows:
  - 1. Welded to post after placing anchoring material.
  - 2. By set screws.
- C. Leave anchorage joint, exposed wipe off surplus anchoring material, and leave 1/8-inch (3-mm) build-up sloped away from post.
- D. Anchor steel posts to steel with flanges, angle or floor type as required by conditions, welded to posts and bolted to metal supporting members. For steel railings, weld flanges to post and bolt to metal supporting members.

#### 3.04 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor will engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.
- B. Extent and Testing Methodology: Testing agency will randomly select completed handrail for testing that are representative of different railing designs and conditions in the completed Work. Handrails and Railings will be tested according to ASTM E 894 and STM E 935 for compliance with ASTM E 985.

- C. Remove and replace handrails where test results indicate that they do not comply with specified requirements, unless they can be repaired in a manner satisfactory to Landscape Architect and will comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

# 3.05 CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material.

# 3.06 PROTECTION

- A. Protect finishes of handrails and railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at the time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in field to shop; make required alterations and refinish entire unit, or provide new units.

# END OF SECTION

# DIVISION 16

Applicable Portions Of The Conditions Of The Contract And Division 1 General Requirements Apply To The Work Of This Division.	E L E C T
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#### **SECTION 16010 - GENERAL ELECTRICAL REQUIREMENTS**

# PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Work included in these specifications and included on the drawings shall include furnishing all labor, materials, supplies, and equipment to perform all work required including cutting, channeling, chasing, excavating and backfilling, demolition (if any) to install a complete and working electrical system(s) in accordance with these sections of the specifications and the accompanying drawings. This shall include all required preparation work, demolition, raceways, coordination, etc. required to install the electrical system.
- B. It is recognized that separate subcontracts may be instituted by the General Contractor or the Division 16 Contractor with other contractors and/or suppliers. It is the responsibility of the Division 16 Contractor to completely inform, coordinate and advise those subs as to all of the other requirements, conditions and information associated with providing and installing the total job.
- C. The electrical work shall include, but in no way be limited to the following:
  - 1. Raceways Systems
    - a. Power
    - b. Lighting
  - 2. Empty Raceways
  - 3. Electrical Distribution System
  - 4. Lighting Systems
    - a. Exterior
  - 5. Power Systems
    - a. Exterior
  - 6. Electrical Demolition

# 1.02 RELATED SECTIONS

#### 1.03 REFERENCES

- A. The Contractor is responsible for obtaining all required permits and complying with the current editions, or the editions referenced in the other individual sections of these specifications, of all applicable National (NEC, IBC, NFPA), State, County, and Municipal codes and regulations. This shall include, but not be limited to, the following:
  - 1. FM P7825 Approval Guide; Factory Mutual Research Corporation; current edition.
  - 2. NEMA MG 1 Motors and Generators; National Electrical Manufacturers Association.
  - 3. NFPA 70 National Electrical Code; National Fire Protection Association.
  - 4. NFPA 72 National Fire Alarm Code;
  - 5. Federal Occupational Safety and Health Act (OSHA)
  - 6. NFPA 101 (Life Safety Code);
  - 7. NFPA 20 (Fire Pump)
  - 8. ANSI/ASME A17.1 (Safety Code for Elevators and Escalators)
  - 9. Americans with Disabilities Act (ADA).
  - 10. International Building Code (IBC);
  - 11. International Fire Code;
  - 12. SSPC-Paint 15 Steel Joist Shop Paint; Society for Protective Coatings; 1999 (Ed.

2000).

- B. Unless noted otherwise, the contractor shall comply with the latest edition and update of any and all codes and standards.
- C. Compliance with Underwriters Laboratories: All products installed under the contract shall have the Underwriters Laboratories (UL) label where such marking is available. Products which are not UL labeled will not be acceptable if labeled products are available from another approved manufacturer.
- D. The above listed requirements are required of the electrical contractor by this contract whether these requirements are shown on the drawings, mentioned in the specifications or not.
- E. All work and equipment installed that does not comply with the codes and standards noted above shall be corrected and/or replaced (at engineer's option) at no cost to the Owner.
- F. The contractor(s) shall submit all items necessary to obtain all required permits to the appropriate Federal/State/County/City agencies, obtain all required permits, and pay for any and all required fees.

# 1.04 DEFINITIONS

- A. Concealed Embedded in masonry or installed within other building elements including but not necessarily limited to crawl spaces, spaces above ceilings, in walls, in chases, shafts . It shall also inlcude conduit installed in the ground beneath a floor slab. Not visible.
- B. Exposed Installed in such a manner that it can be seen. All exposed materials shall be installed in a neat manner. If in the engineer's opinion the installed materials are not installed in a neat manner, it shall be removed and reinstalled (at the Contractor's expense) to the satisfaction of the engineer, all at no increase cost to the Owner.
- C. Furnish When used in the Division 16 plans and/or specifications the word "furnish" shall mean to purchase a piece of equipment or material and to have said equipment/material transported to the project site (or other location if so directed). All items to be furnished shall include any and all mounting hardware, support, and accessory required for installation and proper operation. Unless otherwise noted, when a piece of equipment or material is to be furnished by the contractor, it shall also be installed.
- D. Provide When used in the Division 16 plans and/or specifications the word "provide" shall mean to furnish and install complete and ready for use and to put into operation. Include any and all options, accessories, and mounting/installation hardware required for a complete and operating system or element of the electrical system.
- E. Install When used in the Division 16 plans and/or specifications the word "install" shall mean to unload and transport the equipment/material to the installation point of the job site. Any and all mounting hardware (whether specified or called for by name / model number, or not) shall be included. Perform every operation necessary, including any and all final adjustments, etc. required for proper operation.
- F. Controlled When used in the Division 16 plans and/or specifications, the word "controlled" shall mean to govern delivery of operating voltage or power to equipment or systems by means of, but not limited to, feeders, disconnects, breakers, switches, starters,

etc..

# 1.05 COORDINATION OF WORK IN OTHER SECTIONS

- A. The Division 16000 contractor is responsible for including any and all work related to the electrical that is noted in any part of the specifications or any part of the drawings, including Divisions 1, 15 and any other sections.
- B. If any piece of equipment is shown on any part of the drawings ("A" (Architectural) drawings, "M" (Mechanical) drawings, "P" (Plumbing) drawings, or "E" (Electrical) drawings), it is the responsibility of the Division 16 Contractor to furnish and install electrical service as required to that equipment. Do a complete review of all contract documents and include electrical service for all such equipment whether or not it is also shown in Electrical documents. Electrical service shall comply with all requirements of the equipment shop drawings and all codes.
- C. The Division 16 Contractor will supply power to equipment at the voltage indicated on the Division 16 drawings. The Division 16 Contractor and all other contractors will be held responsible for coordinating the equipment voltages, control equipment, wiring, and locations and type of terminations/connections and/or disconnects required to comply with the National Electrical Code, International Building Code, all local codes, and the equipment manufacturer's requirements. If equipment is furnished to the project at a voltage other than that shown on the Division 16 drawings, the contractor supplying the equipment and all other subcontractors will be held responsible for making any necessary adjustments to correct the conflict, to the satisfaction of the Electrical Engineer.

# 1.06 INTERPRETATION OF THE DRAWINGS AND SPECIFICATIONS (CONTRACT DOCUMENTS):

- A. Refer to the section of the specifications which cover General Conditions, Division 1, and Instructions to bidders. These sections and their requirements are a part of this contract and are binding on this section of the work.
- B. Electrical Drawings are diagrammatic in nature except where specific dimensions, or specific details are shown on the electrical, mechanical, or architectural drawings. The Electrical Contractor shall refer to other drawings for exact locations of equipment, building dimensions, architectural details and conditions affecting the electrical work; however, field measurements take precedence over dimensioned drawings. The Electrical Contractor shall provide all labor and materials and all incidental elements; junction and pull boxes, filters, pull wires, connectors, support materials, fuses, disconnect switches, lamps, and labels, to install, connect, start-up and result in a complete and working system in accordance with the drawings and specifications. Unless noted otherwise on the plans or in these specifications, all final connections are the responsibility of the Division 16 Contractor.
- C. In order to show the electrical work required under this contract on the drawings, it is necessary to utilize symbols and schematic diagrams/details. These symbols and schematic diagrams/details do not have any dimensional significance nor do they delineate every item required for the intended installations. The work shall be installed in accordance with the intent diagrammatically expressed on the drawings, and in conformity with the dimensions indicated on the final architectural and structural working drawings and on equipment shop drawings. No interpretation shall be made from the limitations of symbols and diagrams

that any elements necessary for complete work are excluded.

- D. When the details of specific and/or general installation requirements show specific dimensioning and/or positioning requirements of the items to be installed, these dimensions shall be field verified and followed. It is the intent of these details to only establish the general feasibility of the work required. These details in no way delete, reduce, or substitute the requirement of field coordination for the indicated work.
- E. The contractor is responsible for coordinating the installation of all electrical work with the work of other contractors and/or trades. This contractor shall refer to the other drawings (demolition, site, civil, architectural, kitchen, structural, plumbing, mechanical, etc.) to assure that the installed electrical work is installed in a coordinated fashion. Conflicts on installation work due to the lack of proper coordination of this contractor shall result in the work being removed and coordinated and properly reinstalled at no increase cost to the Owner. Report to the Engineer any and all discrepancies that the contractor(s) find in the field between the electrical drawings and the other drawings.
- F. The installation of any and all equipment/systems is subject to clarification as indicated in the review comments of the Engineer on the shop drawings. The contractor shall be aware that if the equipment of an approved equal manufacturer is to be installed, the equipment, controls, functions, conduit routing, power requirements, etc. may be different. It is the responsibility of the electrical contractor to coordinate the installation requirements of the equipment to be installed with the electrical plans of the specified equipment/systems. If there are any additional equipment, power service, conduit, conductors, controls, etc. required to install the approved equal equipment, these additional requirements shall be furnished and installed at no additional cost to the Owner.
- G. The electrical drawings are such that the electrical service to equipment furnished and installed under other sections of the contract documents (examples, but not limited to: elevators, kitchen equipment, HVAC equipment, water heaters, fans, pumps, motors, etc) is coordinated for the specified equipment only. If the equipment installed under other divisions of the contract documents is not the specified equipment and is an approved equal to the specified equipment, it is possible that the equipment will require different electrical service/interface than that shown on the electrical plans for the specified equipment. In this case, it is the responsibility of the approved equal installing contractor / manufacturer to coordinate the electrical service/interface requirements with the electrical contractor. If the electrical service/interface requirements of the substituted equipment are greater than the specified equipment and result in an increased electrical cost, it is the responsibility of the furnishing/installing contractor to pay the electrical contractor for the increase in electrical cost.
- H. Submission of a proposal and ultimate acceptance of an agreement or contract for execution of this section of work will be construed as evidence that the Electrical Contractor and each interested Subcontractor and/or vendor has carefully read and accepts all conditions set forth in each Division under specification Divisions titled "Instructions To Bidders" and Division 1, "General Conditions", in so far as such conditions may affect both the bidding for and execution of this section of work.

# 1.07 ELECTRICAL SYSTEMS

A. All electrical systems shown on the plans or specified in the specifications shall have

equipment furnished and installed so that the system is a complete and functioning system that complies with the intent of the specifications, whether each and every element of each and every system is specified or not. Any and all equipment, options, and system elements necessary for proper operation shall be furnished and installed, whether specifically called for (specified by name or catalog number) or not.

B. The wiring, connections, and support elements shown on the plans or noted in the specifications is for a complete and workable system(s). Any deviations from the wiring shown due to a particular manufacturer's requirements shall be made at no cost to either the contract or to the Owner. Changes in electrical service to equipment due to substitutions of equipment by any contractors shall be at the cost of that contractor.

# 1.08 SPECIAL ELECTRICAL REQUIREMENTS

- A. Provide all wiring, connectors, fittings, connections, and all accessories for the complete installation of, and final connections to, equipment furnished under other divisions of the specifications and where indicated on the electrical drawings or otherwise specified.
- B. The Electrical Contractor shall coordinate with all other contractors the electrical service provided as shown on the electrical plans with respect to voltage, phase, and ampacity. This coordination shall take place before any equipment is ordered and is for the purpose of the contractor providing equipment that requires electrical connection ordering the correct equipment to match the electrical service provided. Any changes in the characteristics of the circuits that serve any electrically operated equipment shall be made at no additional cost to the Owner.
- C. Make all final connections to all equipment, provided under the electrical contract and equipment provided under other sections, except where noted on the plans to provide "rough-in only". Where connections are to be made by someone other than the Division 16 contractor, coordinate with the equipment supplier to determine the rough-in requirements. In the case where rough-in is installed now but equipment unknown or is to be installed in the future, install outlet box sized for the conductors installed, install conductors and leave 8" of pigtails for each conductor. Tape all conductors, leave a note in the box as to the panel the circuit is connected, and install a cover plate over the outlet box. In the panel that the circuit terminates, do not connect the circuit to a breaker, tag the circuit with information as to the location of the outlet box, and leave enough pigtail in the panel so that connection can be made to any breaker space in the panel.
- D. The Electrical Contractor is hereby alerted that certain features of control, other functions, or systems may be specified in this division by performance, and as such, all elements of wiring or other materials and devices for the complete installation may not be shown on the drawings. The Electrical Contractor shall provide for the final and complete installation of all features called for by drawings or specifications.
- E. Note that the Mechanical Division includes furnishing all motors for equipment furnished and installed by Division 15. In addition, unless otherwise shown on the electrical drawings, starters for Division 15 equipment shall also be provided by Division 15. The Division 16 work shall include installing all of the individually mounted, stand alone starters and the power wiring from the electrical system through ALL motor starters to the final connection to the motors. Where motors are served through a Motor Control Center (MCC), motor starters are a part of the motor control center and are furnished and installed through the

Electrical Division (Division 16). Where motors are served through a Motor Control Center (MCC), the Division 16 Contractor is responsible for coordinating with the Division 15 Contractor the size, type, horsepower, speed, number of speeds, windings, voltage, and recommended heater size for all motors. From this coordination the Division 16 Contractor shall furnish and install in the Motor Control Center the starters as required to serve the motors on the project. The only exception for this requirement of the Division 16 scope furnishing and installing starters shall be where the Division 15 equipment has a control panel that includes the starter and/or disconnect. Coordinate with Division 15.

- F. Where equipment is prewired, the power wiring shall extend to the power terminals of the pre-wired equipment. Control wiring for the mechanical equipment and temperature control wiring is covered under Division 15 and is not a part of Division 16 unless specifically noted.
- G. All safety disconnect switches shall be provided under Division 16 except where the Division 15 equipment is equipped with factory installed disconnects. Where the switch designation calls for the switch to be fused, the electrical contractor shall furnish and install fuses that are sized in accordance to the equipment nameplate of the equipment served.
- H. In order to comply with the seismic codes, all recessed light fixtures shall be supported with four (4) hanger wires which shall be tied to the structure.

# 1.09 DIMENSIONS ON DRAWINGS, IN FIELD, VERIFICATION

- A. The contractor shall be responsible for visiting the site in order to become familiar with existing conditions and coordinating the required work as needed. No increase in contract cost will be considered due to the contractor not being aware of existing conditions.
- B. Do not scale drawings. Confirm all dimensions in the field. Coordinate all installations with shop drawings and other contractors work. Where discrepancies are found on the contract documents, the contractor shall include in the project cost any and all materials, items and labor required to make any and all changes required to install the work correctly. Where discrepancies are found on the project the contractor shall stop work in that area and contact the engineer.

# 1.10 SUBMITTALS

- A. Unless otherwise noted, Submittals (formerly/also referred to as "shop drawings") shall be made in accordance with requirements as stated in Division 1. Submittals shall be submitted to the Engineer on all equipment within thirty (30) days of contract award. If submittals are not received within the thirty day time limit the specified equipment shall be used (no exceptions).
- B. The Contractor shall not purchase any materials or equipment prior to the receipt of approved submittals from the Engineer. Any commitment to purchase or contract to purchase equipment or materials made between the Contractor and an equipment supplier and/or manufacturer before the receipt of approved submittals from the Engineer shall be at the risk of the Contractor. If submittals are not approved, any restocking charge or cancellation charge by a manufacturer and/or supplier shall be the responsibility of the Contractor and not reflect as an increase cost to the Owner
- C. Submittals shall contain all the necessary information required to prove that the equipment

will fit and function correctly. Submittals shall be bound together and submitted as a complete package for each section. The Contractor shall review each submittal to confirm that the submittal meets the Contractor's requirements before the submittal is made to the Engineer.

- D. For some equipment/systems (examples: fire alarm, nurse call, security, CCTV, cable TV, etc.), the drawings only show the system elements and do not show the interconnection of these elements on a riser diagram. For equipment/systems such as these, the manufacturer shall include with the submittals a wiring/conduit riser diagram for the system.
- E. It is not unreasonable to expect a 14 to 21 day (or possibly longer) submittal turnaround from the Engineer. Therefore it is imperative that the Contractor comply with the 30 day requirement outlined in paragraph A. If the project is a "Fast Track" type project, it may be necessary to have submittals reviewed in a very short time period. In such cases, the contractor shall note on the cover sheet of the submittal the date in which submittals must be returned. Every effort will be made to comply with this date, but close coordination between Contractor and Engineer shall be required.
- F. The engineer reserves the right to refuse any equipment that in his opinion will not function as well as the specified equipment. The opinion of the engineer shall be final and shall bind all parties. The Engineer has the right to require the contractor to use the specified equipment if the second shop drawing submittal is not approved.
- G. Submittal review is only for verifying gbeneral conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Provide equipment and/or devices for which the electrical service requirements matches that shown on the contract documents for the equipment and/or device in question. It is the responsibility of the contractor to submit a separate formal request to change voltages or other aspects of the electrical service for a given piece of equipment or device if a change is desired. It is not incumbent on the engineer to recognize changes in electrical service contained in the shop drawing submittal. The contractor is also responsible for dimensions to be confirmed and correlated at the job site; for information that pertains solely to the fabrication processes or to techniques of construction; and for coordination of the work of all trades.
- H. The Contractor shall review the submittals and make note of all dimensions of the equipment and shall make the necessary adjustments in equipment locations as required to install the equipment. THE CONTRACTOR SHALL NOT INSTALL ANY EQUIPMENT OR PROVIDE ELECTRICAL ROUGH-INS BEFORE APPROVED SUBMITTALS ARE RETURNED BY THE ENGINEER AND DIMENSIONS ARE APPROVED.
- I. Approval to substitute material, equipment, devices, processes, or any item as an "as/an equal" to the specified item does not relieve the Contractor of the full responsibility to make the substituted material, fit, function or appear as required in the Drawings and Specifications. Contractor shall assume full responsibility for the satisfactory adaptability of a substituted item to those items specified or shown on the drawings.
- J. Required submittals are listed with each section of the electrical specifications.

# 1.11 RECORD DRAWINGS

A. The electrical contractor shall keep a set of construction drawings during the length of the

project on which he shall note any and all changes from the original drawings. Of special importance is noting the actual location of all service entrances into the building and where conduit stub outs have been insalled. This record set of drawings shall be updated daily. The drawings shall be neat, orderly and marked in a way to be clearly interpreted. The record drawings shall be turned over to the Architect to update drawing files for a final set of drawings for the owners record.

- B. When the submitted information has been deemed satisfactory and all information has been transferred by the architect to the drawing files, they shall be labeled as "RECORD DRAWINGS" and copies turned over to the owner. Only then will final approval and payment be approved.
- C. After the "RECORD DRAWINGS" have been approved by the Engineer, the contractor shall have one set of prints made from the "Record Drawings" and shall wall mount a 4" PVC tube with screw on cap in the main electrical room and place the set of prints in this tube.

# 1.12 CHANGE ORDERS

- A. Change orders will not be issued for relocating electrical equipment or rerouting conduit and wiring. This section of the electrical specifications require that relocating of electrical equipment or rerouting of conduit/wiring be done at no additional cost to the Owner.
- B. When change orders are required for electrical work, the unit material and unit labor method shall be used. Unit values for material shall be contractors' net cost from distributor. Unit values for labor hours shall not be greater than those listed in the latest addition of Means mechanical/electrical cost data. Sales tax is to be added to materials and workman's compensation insurance is to be added to labor. Overhead and profit markup is to be added to the materials and labor subtotal per the instructions in Division 1..
- C. To calculate a credit for deleted work, the identical method of calculations shall be used for deleted work that is used for new work. No money will be allowed for lost scheduling time or estimation time. The Engineer agrees to expedite change orders as rapidly as possible to avoid construction delay. The contractor may be required to estimate a number of alternatives for change orders in order to arrive at the lowest cost for change orders.
- D. There shall be no additional cost for the contractor to estimate multiple alternatives for consideration.

#### 1.13 QUALITY ASSURANCE

- A. The contractor performing the electrical work shall employ craftsmen who are thoroughly experienced and trained in the installation of electrical systems and general installation coordination. All work shall be done in the highest level of standards for the trade. Any work installed at a level that is less than the highest level of standards for the trade shall be removed and reinstalled in the manner described above at NO additional cost to the Owner.
- B. All equipment shall be installed in compliance with the manufacturer's published installation recommendations and requirements, with any and all required accessories and mounting hardware, and/or as approved by the Engineer. The manufacturer's published installation requirements and recommendations shall become a part of the Owner's Manual (See Paragraph 1.15)

### 1.14 OPERATING AND MAINTENANCE MANUALS:

- A. The Manuals generally include all project submittals updated to reflect actually installed conditions; operating instructions; maintenance schedules; training material; warranty and bonds; and contact information for sales, warranty and service of equipment. Refer to Division 1 of the specifications for complete requirements.
- B. Provide manuals for each product or system.

# 1.15 DELIVERY, STORAGE, AND PROTECTION

- A. Where equipment is purchased by the electrical contractor to be installed in conformance with the contract documents, the contractor shall follow the following procedure as it relates to delivery, storage, and installation:
  - 1. Coordinate any and all information with any and all contractors who are to do work to accommodate the division 16 equipment/work.
  - 2. Coordinate delivery of equipment.
  - 3. Unload the equipment from delivery trucks.
  - 4. Inspect equipment for damage. Report damage immediately and arrangef ro the equipment to be repaired or replaced. No claims for time extensions or additional work related to the damage will be accepted if not made within ten days of the delivery of the equipment.
  - 5. Inspect the equipment to assure correct make, model number, voltage, etc.
  - 6. Provide for safe handling and field storage up to the time of permanent placement in the project.
  - 7. Provide for any and all field assembly and internal connection as may be necessary for proper operation.
  - 8. Install in place including any and all required mounting supports, connectors, fittings, connections, and accessories required for complete system operation.
- B. Where equipment is purchased by the Owner and is to be installed by the Division 16 contractor, the Division 16 contractor shall follow the following procedure as it relates to delivery, storage, and installation:
  - 1. Coordinate equipment shop drawings with any and all contractors who are to do work to accommodate the Division 16 equipment /work.
  - 2. Coordinate delivery of equipment.
  - 3. Unload the equipment from delivery trucks.
  - 4. Inspect equipment for damage. Report damage immediately and arrange for the equipment to be repaired or replaced. No claims for time extensions or additional work related to the damage will be accepted if not made within ten days of the delivery of the equipment.
  - 5. Inspect the equipment to assure correct make, model number, voltage, etc.
  - 6. Provide for safe handling and field storage up to the time of permanent placement in the project.
  - 7. Provide for any and all field assembly and internal connection as may be necessary for proper operation.
  - 8. Install in place including any and all required mounting supports, connectors, fittings, connections, controls, and accessories required for complete system operation.

1.16 NOTIFICATION OF EQUIPMENT TO BE USED BY THE ELECTRICAL CONTRACTOR

A. The electrical bidder with the lowest bid shall provide a list to engineer within seventy-two (72) hours of bid award as to the manufacturer of equipment or devices that he intends to use on the project. If notification is not received within the time limit, only the specified equipment shall be used. (NO EXCEPTIONS). Notification shall be by standard mail, E-mail or fax.

# 1.17 MANUFACTURER'S FIELD SERVICES:

- A. Provide manufacturers field services where required under the specific sections of the Project Manual using authorized and trained manufactures representatives of the equipment or systems in question. The field services shall include the following as a minimum:
  - 1. Inspect the installation to verify that the installation meets or exceeds all manufacturer's requirements and recommendations for proper operation.
  - 2. Start/energize the equipment and verify that the equipment/system is operating and functioning as required by these specifications and the manufacturer's requirements.
  - 3. Provide written certification that field services have been performed and that equipment/system is operating and functioning as required by these specifications and the manufacturer's requirements. Submit the certification as part of the closeout documents.
- B. Refer to specific sections of the Project Manual and provide all field service requirements listed in addition to these general requirements.

# 1.18 WARRANTY

- A. All work, equipment, and materials shall be new and without defects or blemishes, and guaranteed to be free from defects for a period of one (1) year after the final date of project acceptance as defined by the Architect (NOT THE DATE OF INSTALLATION OR START-UP). All installation and installation materials shall also be guaranteed for the one (1) year period. This shall cover such items as equipment pads, supports, leaks from around equipment installation, etc and is intended to cover everything installed or provided under this division of the contract.
- B. Manufactured pieces of equipment shall have their guarantee also backed by the equipment manufacturer.
- C. During the guarantee period there shall be no charge to the Owner for items and work done under the guarantee clause (Service calls). This shall apply to replacement equipment, equipment shipping charges, mileage, labor, all taxes, etc.
- D. Refer to the other sections of the Project Manual for warranty requirements that may exceed these general requirements and follow those requirements for the equipment, devices, materials or systems in question.

# PART 2 PRODUCTS

#### 2.01 GENERAL:

A. All products shall be of new manufacturer (unless the plans and/or other sections of this specification call for existing or other identified products to be used), age of less than one year, and the latest model of a manufacturer. A new product shall not be used if the manufacturer has introduced a product as a replacement. All materials and apparatus for the work shall be furnished, delivered, erected, connected and finished in every detail, and shall

be so selected and arranged as to fit into the building spaces in compliance with all code requirements.

- B. All equipment that is provided by the contractor, subcontractors, or specialty subcontractor (fire alarm, sound, CCTV, signal system, etc) to be installed at the project site, shall be purchased, installed and maintained by the local (to the project site) authorized, licensed, factory distributor/installer/supplier. The contractor shall include with the submittals, verification in writing from the manufacturer, that the supplier and/or distributor is a factory authorized and licensed by the manufacturer to provide, install, and maintain (throughout the entire length of the warrantee period) the equipment. THERE SHALL BE NO EXCEPTIONS TO THIS REQUIREMENT.
- C. By providing equipment to the project, a manufacturer guarantees to provide replacement parts for the equipment for a period of ten (10) years, even if the item provided goes out of manufacture.
- D. Manufacturer's catalog numbers listed are not necessarily complete and are for general identification only. It is the responsibility of the Contractor to provide complete catalog numbers and to provide all accessories for installation as implied by the accompanying description of the equipment, material or device, the demonstrated use on the drawings, and the specifications contained herein. Products provided shall be a standard product which has a history of successful installation and operation for a minimum period of two years. Prototype or custom made equipment is not acceptable unless so specified herein.
- E. Manufacturer's instructions shall be obtained by the Contractor and used for the installation of all equipment and devices where such manufacturer's instructions are available.
- F. Where a substituted product is used instead of the specified product, the contractor will assume any and all responsibility for the product to fit, function and perform as well as the specified product. The opinion of the engineer will be binding and shall govern all parties as to a substituted product performing as well as the specified product.
- G. Completeness: Provide all boxes, off-sets, bends, raceways, devices, raceway supports, installation brackets and supports, flexible connections, wiring connectors, labels and terminals for the complete installation and operation of all products. Each unit of product shall be assembled and installed and all surfaces shall be clean and free of dents, scratches, and abrasions or marred areas.

#### 2.02 UNDERGROUND WARNING MARKING TAPE:

- A. For all underground power and signal circuits (outside the building), installed in raceway or direct buried, furnish and install a warning tape to mark the location of below grade installations to anyone digging in the area. The warning tape shall be six (6) inches wide, yellow in color, with the words "CAUTION UNDERGROUND ELECTRICAL CIRCUITS" printed on the tape.
- B. Install this tape twelve (12) inches below grade, directly over the underground circuits.

# PART 3 EXECUTION

#### 3.01 GENERAL

A. Before any work is started, the electrical contractor shall coordinate the work of other

contractors that will affect the work of the electrical contractor. The electrical contractor shall inspect the work of all other trades to determine if the other work is ready for the electrical contractor to start his work.

- B. Any and all electrical installations shall be coordinated with other trades, contractors and the Owner.
- C. The contractor shall make himself familiar with existing conditions, site information, etc. so that conflicts are avoided.
- D. All work shall be installed per all applicable code, rules, regulations, shop drawings and manufacturer's installation recommendations.
- E. The electrical contractor shall be responsible for returning to original, pre-construction condition, any paved areas, sidewalks, planting, walls, and other areas disturbed during electrical installation work.
- F. The electrical equipment shall be installed as close as possible to the location as shown on the plans. If during the installation, it is required to install equipment in locations other than the one shown on the plans, the contractor shall make a sketch of the proposed changes, submit it to the Engineer, and after the Engineer has given approval, then proceed with the installation.
- G. Working spaces and clearances shall not be less than the required minimums in the National Electric Code (NEC).

# 3.02 EXAMINATION

- A. The Electrical Contractor is responsible for visiting and examining the site to determine those portions of the site or present buildings affected by this work so as to become familiar with existing conditions and difficulties that will attend the execution of the work, before submitting proposals.
- B. Submission of a proposal will be considered as evidence that such examination has been made and later claims for labor, equipment, or materials because of difficulties encountered, which could have been foreseen had such examination been made, will not be recognized.

# 3.03 ADDITIONS RENOVATIONS AND REMODELING

- A. All electrical work shall be coordinated and phased so as to assure electrical service to any other buildings or parts of buildings that require use during construction.
- B. All existing electrical system elements shall be protected from damage during any and all additions, renovations, and remodeling.
- C. All new electrical equipment and installations shall be installed and connected to existing work or existing electrical system elements in a neat and careful manner. Any existing electrical work or system elements that are disturbed or damaged shall be replaced or repaired to the pre-construction condition at no additional cost to the Owner.

# 3.04 LOCATIONS OF EQUIPMENT REQUIRING ELECTRICAL SERVICE AND CONNECTIONS:

A. Coordinate the exact installed location of equipment that requires electrical connections that is furnished and installed by other contractors. The electrical drawings try to show the

correct location of all of these items, but it is the responsibility of the electrical contractor to coordinate with all other contractors to determine the exact installed location of all equipment furnished and installed by other contractors and wired by the electrical contractor. Such coordination shall include, but not limited to exact location, location of electrical connection, type of connection required, and electrical characteristics.

### 3.05 OPENINGS, CUTTING AND PATCHING:

- A. Contractor shall arrange for openings in the building structure or components to allow for installation of electrical work or transport of electrical equipment as the project progresses.
- B. Any cut portion of the building, wall, sidewalk, paved drives, ceiling, floors, roofs, etc., install any raceway or apparatus or transport equipment, shall be restored in a manner such that the end product complies with the specification for that type of work. Where existing work is cut, restore to the original (pre-construction) condition. The electrical contractor shall be responsible for returning to original, pre-construction condition, any of the above noted areas or other areas disturbed during electrical installation work.
- C. Structural, load bearing, or supporting device shall not be cut without approval in writing from the Architect.

# 3.06 TRENCHING, EXCAVATING, BACKFILLING, AND RESURFACING:

- A. The Electrical Contractor shall review the work to be done on the site with respect to the required trenching, excavating, backfilling, and resurfacing. He shall also review and coordinate the work to be done in the same areas by all other contractors. The Electrical Contractor shall review and become familiar with pre-construction conditions and grades and the post-construction grades. Walk the proposed paths of trenches to determine any obstructions or interferences that would effect underground work.
- B. The Electrical Contractor shall furnish and install the electrical systems as shown on the plans and shall perform the work as required to install these systems. All depths of work to be installed underground are referenced to the finished grades, not the pre-construction grades. Coordinate all existing and finished grades.
- C. Excavate only to the depth as required to install the work shown. If rock is encountered, excavate to a depth of 6" below the required depth. Pitch all electrical conduits away from the building.
- D. All backfill work shall be compacted. Compaction shall be after every 12" of backfill depth. Compact to a degree equal to 80% of the pre-construction earth.

# 3.07 EXAMINATION OF EXISTING CONDITIONS:

- A. The Electrical Contractor is responsible for visiting and examining the site to determine those portions of the site or present buildings affected by this work so as to become familiar with existing conditions and difficulties that will attend the execution of the work, before submitting proposals.
- B. Submission of a proposal will be considered as evidence that such examination has been made and later claims for labor, equipment, or materials because of difficulties encountered, which could have been foreseen had such examination been made, will not be recognized.

3.08 LOCATIONS OF OUTLET BOXES FOR EQUIPMENT AND GENERAL WIRING:

- A. All outlets for lighting, power, and equipment, not specifically dimensioned are located diagrammatically on the drawings.
- B. Lighting fixtures shall be located in accordance with reflected ceiling plans or tile pattern outlines. If neither is indicated, lighting fixtures shall be symmetrical within the space in which they are located. The Contractor shall be responsible for coordinating with the architectural and mechanical plans and to the shop drawing of the equipment to be installed for the exact location of the outlets required for equipment installation.
- C. Lighting fixture and convenience outlets shall be located so that they will be symmetrical with architectural details.
- D. Equipment outlets shall be located so as to serve the equipment directly. It is the Contractor's responsibility to coordinate outlet location with equipment so that all outlets are accessible and disconnect switches have clearance for operation.
- E. Where outlets are shown to be installed over casework or counters, the Contractor shall be responsible for coordinating the outlet box installation with the architectural details so that the bottom of the box is installed 6" above the counter/casework. Where a back splash is to be installed on the counter/casework, install the bottom of the box 4" above the top of the back splash.
- F. If so directed by the Architect / Engineer / Owner, any outlet box may be moved 10 feet in any direction without any additional cost to the Owner.

# 3.09 EQUIPMENT HOUSEKEEPING PADS:

A. Provide a 4" high concrete pad for floor mounted electrical equipment such as switchboards, motor control centers, transformers, and floor mounted cabinets. Pads shall extend 4" beyond the size of the equipment. Round off all corners. Anchor bolt each corner of the equipment to the pad. Secure the equipment to the pad with locknuts.

# 3.10 PAINTING:

A. Exposed conduit, ungalvanized troughs, metal frames and support racks and wooden surfaces provided under this section shall be painted. Paint color shall match and be the same paint as the room finish paint unless noted elsewhere on the plans or in the specifications. Clean surfaces completely of all oil, wax, rust and old paint prior to repainting. Paint shall be applied to backup boards before switches, troughs, and devices are installed. Paint shall include a primer and two coats of finished paint. Touch-up scratched, or marred surfaces of lighting fixtures and equipment with paint obtained from the equipment manufacturer especially for that purpose.

#### 3.11 ELECTRICAL SYSTEM TESTING:

- A. At the time of the final inspection, or at such times as parts of the system may be completed, all electrical systems shall be tested for compliance with the specifications. The Contractor shall provide all personnel and equipment; current, voltage and resistance measuring instruments, ladders and lights to assist the Engineer in conducting the tests. Authorized representatives of the manufacturer shall be present to demonstrate compliance with specifications of their specific system.
- B. The Contractor shall remove equipment covers as directed for inspection of internal wiring.
Accessible ceiling shall be removed as directed for inspection of equipment above the ceilings. After inspection and correction of any problems found, the Contractor shall replace all cover plates, access plates and removable ceiling.

C. The life safety system shall be demonstrated to function in accordance with the specifications. Each device shall be tested for proper operation.

# 3.12 CLEANING:

- A. At completion of the work the Contractor shall clean all exposed elements of the electrical system so that all markings deteriorating the original finish appearance are removed. All lighting fixtures, lenses, and reflectors shall be cleaned inside and out and all lamps shall be left clear of dust, dirt, and grime.
- B. The Contractor shall specifically examine the interiors of panelboard cans, equipment cabinets, lighting fixtures, junction boxes, and like components where conduit and wire connections have been made, and all resulting wire ends, insulation cuttings, knock-out plugs, metal filings and any other trash shall be removed so that interiors and exteriors are left free of all debris.

# 3.13 FIELD QUALITY CONTROL

# **END OF SECTION**

## SECTION 16060 - GROUNDING AND BONDING

## PART 1 GENERAL

## 1.01 SECTION INCLUDES

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.
- D. Grounding and bonding components.
- E. Provide all components necessary to complete the grounding system(s) consisting of:
  - 1. Existing metal underground water pipe.
  - 2. Metal underground water pipe.
  - 3. Rod electrodes.

#### 1.02 SYSTEM DESCRIPTION

- A. Furnish all labor, materials, services, equipment and appliances required in conjunction with a grounding system as indicated in the Contract Documents.
- B. Ground the electrical service system neutral at service entrance equipment to metallic water service and to supplementary grounding electrodes.
- C. Ground each separately-derived system neutral to separate grounding electrode.
- D. Bond together system neutrals, service equipment enclosures, exposed non-current carrying metal parts of electrical equipment, metal raceway systems, grounding conductor in raceways and cables, receptacle ground connectors, and plumbing systems.

# 1.03 RELATED REQUIREMENTS

- A. Section 16123 Building Wire and Cable: Additional requirements for conductors for grounding and bonding, including conductor color coding.
- B. Section 16075 Electrical Identification: Identification products and requirements.
- C. Section 16520 Exterior Luminaires: Additional grounding and bonding requirements for pole-mounted luminaires.

# 1.04 REFERENCE STANDARDS

- A. IEEE 81 Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System; 1983.
- B. NECA 1 Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.
- C. NEMA GR 1 Grounding Rod Electrodes and Grounding Rod Electrode Couplings; National Electrical Manufacturers Association; 2007.
- D. NETA STD ATS Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association; 2009.
- E. NETA STD ATS Acceptance Testing Specifications for Electrical Power Distribution

Equipment and Systems; International Electrical Testing Association; 2007.

F. NFPA 70 - National Electrical Code; National Fire Protection Association; 2005.

# 1.05 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Since this is an existing building, the existing service grounding is existing. Check all service grounding and modify and add connections necessary to make grounding fully compliant with these specifications and applicable codes.
  - 2. Verify exact locations of underground metal water service pipe entrances to building.
  - 3. Coordinate the work with other trades to provide steel reinforcement complying with specified requirements for concrete-encased electrode.
  - 4. Notify GMK Associates of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

#### 1.06 PERFORMANCE REQUIREMENTS

A. Grounding System Resistance: 5 ohms.

#### 1.07 SUBMITTALS

- A. See Section 01300 Administrative Requirements for submittals procedures.
- B. Product Data: Provide for grounding electrodes and connections.
- C. Indicate layout of ground ring, location of system grounding electrode connections, and routing of grounding electrode conductor.
- D. Test Reports: Indicate overall resistance to ground and resistance of each electrode.
- E. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Quality Assurance. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- F. Project Record Documents: Record actual locations of grounding electrode system components and connections.
- G. Project Record Documents: Record actual locations of components and grounding electrodes.
- H. Certificate of Compliance: Indicate approval of installation by authority having jurisdiction.

## 1.08 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- 1.09 DELIVERY, STORAGE, AND HANDLING
  - A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.
  - B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

# 1.10 TEST:

- A. Prior to final inspection, each ground rod installation for primary grounding systems shall be tested for ground resistance. The test shall be made by the "fall of potential" measuring method. Should site conditions not allow the "fall of potential" method to be used, then the most accurate method for the conditions encountered shall be used. The meters used shall be specially designed for the ground resistance measurement. The Contractor shall submit three copies of a written report of the grounding test for approval. The test report shall indicate method of test used, placement of auxiliary electrodes with respect to the system being tested, date readings were recorded, and resistance measurements taken.
- B. Install additional ground rods and conductors or other methods or corrections until resistance meets the peformance requirements.

# 1.11 RECORD DRAWINGS:

A. Show on the "RECORD DRAWINGS" the location of the ground field, location of step down transformer grounds, and the columns that are grounded. Provide dimensions from building landmarks such as faces of columns and corners of buildings.

## PART 2 PRODUCTS

# 2.01 GROUNDING AND BONDING REQUIREMENTS

- A. Existing Work: Where existing grounding and bonding system components are indicated to be reused, they may be reused only where they are free from corrosion, integrity and continuity are verified, and where acceptable to the authority having jurisdiction.
- B. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- C. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- D. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- E. Grounding System Resistance:
  - 1. Achieve specified grounding system resistance under normally dry conditions unless otherwise approved by GMK Associates. Precipitation within the previous 48 hours does not constitute normally dry conditions.
  - 2. Grounding Electrode System: Not greater than 5 ohms to ground, when tested according to IEEE 81 using "fall-of-potential" method.
  - 3. Between Grounding Electrode System and Major Electrical Equipment Frames, System Neutral, and Derived Neutral Points: Not greater than 0.5 ohms, when tested according to IEEE 81 using "point-to-point" methods.
- F. Grounding Electrode System:
  - 1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
    - a. Provide continuous grounding electrode conductors without splice or joint.
    - b. Install grounding electrode conductors in raceway where exposed to physical

damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.

- 2. Ground Rod Electrode(s):
  - a. Space electrodes not less than 10 feet from each other and any other ground electrode.
  - b. Where location is not indicated, locate electrode(s) at least 5 feet outside building perimeter foundation as near as possible to electrical service entrance; where possible, locate in softscape (uncovered) area.
- 3. Provide additional ground electrode(s) as required to achieve specified grounding electrode system resistance.
- G. Service-Supplied System Grounding:
  - 1. For each service disconnect, provide grounding electrode conductor to connect neutral (grounded) service conductor to grounding electrode system. Unless otherwise indicated, make connection at neutral (grounded) bus in service disconnect enclosure.
  - 2. For each service disconnect, provide main bonding jumper to connect neutral (grounded) bus to equipment ground bus where not factory-installed. Do not make any other connections between neutral (grounded) conductors and ground on load side of service disconnect.
- H. Separately Derived System Grounding:
  - 1. Separately derived systems include, but are not limited to:
    - a. Transformers (except autotransformers such as buck-boost transformers).
    - b. Generators, when neutral is switched in the transfer switch.
  - 2. Provide grounding electrode conductor to connect derived system grounded conductor to nearest effectively grounded metal building frame. Unless otherwise indicated, make connection at neutral (grounded) bus in source enclosure.
  - 3. Provide bonding jumper to connect derived system grounded conductor to nearest metal building frame and nearest metal water piping in the area served by the derived system, where not already used as a grounding electrode for the derived system. Make connection at same location as grounding electrode conductor connection.
  - 4. Provide system bonding jumper to connect system grounded conductor to equipment ground bus. Make connection at same location as grounding electrode conductor connection. Do not make any other connections between neutral (grounded) conductors and ground on load side of separately derived system disconnect.
  - 5. Where the source and first disconnecting means are in separate enclosures, provide supply-side bonding jumper between source and first disconnecting means.
- I. Bonding and Equipment Grounding:
  - 1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
  - 2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
  - 3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
  - 4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit

equipment grounding conductor and to outlet box with bonding jumper.

- 5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
- 6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.

# 2.02 GROUNDING AND BONDING COMPONENTS

- A. General Requirements:
  - 1. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.
  - 2. Provide products listed and labeled as complying with UL 467 where applicable.
- B. Conductors for Grounding and Bonding, in addition to requirements of Section 16123:
  - 1. Use insulated copper conductors unless otherwise indicated.
    - a. Exceptions:
      - 1) Use bare copper conductors where installed underground in direct contact with earth.
      - 2) Use bare copper conductors where directly encased in concrete (not in raceway).
  - 2. Factory Pre-fabricated Bonding Jumpers: Furnished with factory-installed ferrules; size braided cables to provide equivalent gauge of specified conductors.
- C. Connectors for Grounding and Bonding:
  - 1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
  - 2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
  - 3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.
- D. Ground Rod Electrodes:
  - 1. Comply with NEMA GR 1.
  - 2. Material: Copper-bonded (copper-clad) steel.
  - 3. Size: 3/4 inch diameter by 10 feet length, unless otherwise indicated.

## 2.03 MANUFACTURERS

- A. Cooper Power Systems: www.cooperpower.com.
- B. Framatome Connectors International: www.fciconnect.com.
- C. Lightning Master Corporation: www.lightningmaster.com.
- D. Substitutions: See Section 01600 Product Requirements.

# 2.04 ELECTRODES

- A. Rod Electrodes: Copper.
  - 1. Diameter: 3/4 inch.
  - 2. Length: 10 feet.

3. Material: Copper-encased steel

# 2.05 CONNECTORS AND ACCESSORIES

- A. Mechanical Connectors: Bronze.
- B. Exothermic Connections:
- C. Wire: Stranded copper.
- D. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.
- E. Grounding Well:
  - 1. Well Pipe: 8 inch by 24 inch long clay tile pipe with belled end.
  - 2. Well Cover: Cast iron with legend "GROUND" embossed on cover.

# PART 3 EXECUTION

## 3.01 EXAMINATION

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that field measurements are as shown on the drawings.
- C. Verify that conditions are satisfactory for installation prior to starting work.
- D. Verify existing conditions prior to beginning work.
- E. Verify that final backfill and compaction has been completed before driving rod electrodes.

## 3.02 GENERAL INSTALLATION REQUIREMENTS

- A. Install products in accordance with manufacturer's instructions.
- B. Install grounding and bonding system components in a neat and workmanlike manner in accordance with NECA 1.
- C. Ground Rod Electrodes: Unless otherwise indicated, install ground rod electrodes vertically. Where encountered rock prohibits vertical installation, install at 45 degree angle or bury horizontally in trench at least 30 inches (750 mm) deep in accordance with NFPA 70 or provide ground plates.
  - 1. Outdoor Installations: Unless otherwise indicated, install with top of rod 6 inches below finished grade.
  - 2. Indoor Installations: Unless otherwise indicated, install with 4 inches of top of rod exposed.
- D. Make grounding and bonding connections using specified connectors.
  - 1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
  - 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
  - 3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
  - 4. Mechanical Connectors: Secure connections according to manufacturer's

recommended torque settings.

- 5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- E. Identify grounding and bonding system components in accordance with Section 16075.
- F. Ground electrical work in accordance with NEC Article 250, local codes as specified herein, and as shown on the drawings.
- G. Provide a separate, insulated equipment grounding conductor in feeder and branch circuits. Terminate each end on a grounding lug, bus, or bushing.
- H. Connect grounding electrode conductors to metal water pipe using a suitable ground clamp. Make connections to flanged piping at street side of flange. Provide bonding jumper around water meter.
- I. Supplementary Grounding Electrode: Use driven ground rod on exterior of building.
- J. Install ground cables continuous between connections. Splices will not be allowed except where indicated on the drawings. Connections made by the CADWELD(R) Process are not considered splices. Where ground cables pass through floor slabs, building walls, etc., and are not in metallic enclosures, provide the sleeves of approved nonmetallic material.
- K. Install equipment grounding conductors in raceway with feeder conductors.
- L. Ground interior lighting fixtures with grounding conductor to rigid metal raceways serving them. Flexible metal conduit shall have a ground wire installed with the power conductors.
- M. Where connections are made to motors or equipment with flexible metal conduit, grounding conductor shall be stranded copper conductor within the conduit, bonded to the equipment and to the rigid metal raceway system. Size conductor in accordance with NEC Table 250-122 or as shown on the plans.
- N. At each convenience outlet, install a grounding clip attached to the outlet box and leave a sufficient length of #12 wire with green colored insulation to connect to the grounding terminal of the receptacle. Grounding clip shall be equal to Steel City Type G. This requirement may be deleted if automatic grounding clip receptacle meeting NEC Article 250-146.D, is used.
- O. Install ground electrodes at locations indicated. Install additional rod electrodes as required to achieve specified resistance to ground.
- P. Install 4 AWG bare copper wire in foundation footing where indicated.
- Q. Provide bonding to meet requirements described in Quality Assurance.
- R. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

# 3.03 FIELD QUALITY CONTROL

- A. Provide field inspection in accordance with Section 01400. Inspect grounding and bonding system conductors and connections for tightness and proper installation
- B. Inspect and test in accordance with NETA STD ATS except Section 4.

C. Perform inspections and tests listed in NETA STD ATS, Section 7.13.

# 3.04 COORDINATION

A. Coordinate the work under this section with the work under other divisions of the specifications.

# **END OF SECTION**

## SECTION 16075 - ELECTRICAL IDENTIFICATION

#### PART 1 GENERAL

## 1.01 SECTION INCLUDES

- A. Electrical identification requirements.
- B. Nameplates and labels.
- C. Wire and cable markers.
- D. Warning signs and labels.
- E. Field-painted identification of conduit.

#### 1.02 RELATED REQUIREMENTS

A. Section 16123 - Building Wire and Cable: Color coding for power conductors and cables 600 V and less.

#### 1.03 REFERENCE STANDARDS

- A. ANSI Z535.2 American National Standard for Environmental and Facility Safety Signs; 2007.
- B. ANSI Z535.4 American National Standard for Product Safety Signs and Labels; 2007.
- C. ASTM D 709 Standard Specification for Laminated Thermosetting Materials; 2001 (Reapproved 2007).
- D. NFPA 70 National Electrical Code; National Fire Protection Association; 2005..
- E. NFPA 70E Standard for Electrical Safety in the Workplace; 2009.

#### 1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.
- B. Sequencing:
  - 1. Do not conceal items to be identified, in locations such as above suspended ceilings, until identification products have been installed.
  - 2. Do not install identification products until final surface finishes and painting are complete.

## 1.05 SUBMITTALS

- A. See Section 01300 Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.
- C. Shop Drawings: Provide schedule of items to be identified indicating proposed designations, materials, legends, and formats.
- D. Manufacturer's Instructions: Indicate application conditions and limitations of use

stipulated by product testing agency specified under Quality Assurance. Include instructions for storage, handling, protection, examination, preparation and installation of product.

# 1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

# 1.07 FIELD CONDITIONS

- A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.
- B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and shown.

# 1.08 EXTRA MATERIALS

A. See Section 01600 - Product Requirements for additional requirements.

# PART 2 PRODUCTS

# 2.01 IDENTIFICATION APPLICATIONS

- A. Existing Work: Unless specifically excluded, identify existing elements to remain that are not already identified in accordance with specified requirements.
- B. Identification for Equipment:
  - . Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
    - a. Switchboards:
      - 1) Identify voltage and phase.
      - 2) Identify power source and circuit number. Include location when not within sight of equipment.
      - 3) Use identification nameplate to identify main overcurrent protective device.
      - 4) Use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
    - b. Panelboards:
      - 1) Identify voltage and phase.
      - 2) Identify power source and circuit number. Include location when not within sight of equipment.
      - 3) Identify main overcurrent protective device. Use identification label for panelboards with a door. For power distribution panelboards without a door, use identification nameplate.
      - 4) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
      - 5) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
    - c. Enclosed switches, circuit breakers, and motor controllers:
      - 1) Identify voltage and phase.
      - 2) Identify power source and circuit number. Include location when not within sight of equipment.

- 3) Identify load(s) served. Include location when not within sight of equipment.
- d. Transfer Switches:
  - 1) Identify voltage and phase.
  - 2) Identify power source and circuit number for both normal power source and standby power source. Include location when not within sight of equipment.
  - 3) Identify load(s) served. Include location when not within sight of equipment.
- 2. Service Equipment:
  - a. Use identification nameplate to identify each service disconnecting means.
- 3. Emergency System Equipment:
  - a. Use identification nameplate or voltage marker to identify emergency system equipment in accordance with NFPA 70.
  - b. Use identification nameplate at each piece of service equipment to identify type and location of on-site emergency power sources.
- 4. Use identification nameplate to identify disconnect location for equipment with remote disconnecting means.
- 5. Use identification label or handwritten text using indelible marker on inside of door at each fused switch to identify required NEMA fuse class and size.
- 6. Use identification label to identify overcurrent protective devices for branch circuits serving fire alarm circuits. Identify with text "FIRE ALARM CIRCUIT".
- 7. Arc Flash Hazard Warning Labels: Use warning labels to identify arc flash hazards for electrical equipment, such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers that are likely to require examination, adjustment, servicing, or maintenance while energized.
  - a. Minimum Size: 3.5 by 5 inches.
  - b. Legend: Include orange header that reads "WARNING", followed by the word message "Arc Flash and Shock Hazard; Appropriate PPE Required; Do not operate controls or open covers without appropriate personal protection equipment; Failure to comply may result in injury or death; Refer to NFPA 70E for minimum PPE requirements" or approved equivalent.
- 8. Use warning signs to identify electrical hazards for entrances to all rooms and other guarded locations that contain exposed live parts operating at 600 V nominal or less with the word message "DANGER; Electrical hazard; Authorized personnel only" or approved equivalent.
- 9. Use warning labels, identification nameplates, or identification labels to identify electrical hazards for equipment where multiple power sources are present with the word message "DANGER; Hazardous voltage; Multiple power sources may be present; Disconnect all electric power including remote disconnects before servicing" or approved equivalent.
- C. Identification for Conductors and Cables:
  - 1. Color Coding for Power Conductors 600 V and Less: Comply with Section 16123.
  - 2. Use wire and cable markers to identify circuit number or other designation indicated for power, control, and instrumentation conductors and cables at the following locations:
    - a. At each source and load connection.
    - b. Within boxes when more than one circuit is present.
    - c. Within equipment enclosures when conductors and cables enter or leave the enclosure.

- D. Identification for Raceways:
  - 1. Use voltage markers to identify highest voltage present for accessible conduits at maximum intervals of 20 feet.
  - 2. Use voltage markers or color-coded bands to identify systems other than normal power system for accessible conduits at maximum intervals of 20 feet.
    - a. Color-Coded Bands: Use field-painting or vinyl color coding electrical tape to mark bands 3 inches wide.
      - 1) Color Code:
        - (a) Emergency Power System: Red.
        - (b) Fire Alarm System: Red.
      - 2) Field-Painting: Comply with Section 09900.
      - 3) Vinyl Color Coding Electrical Tape: Comply with Section 16123.
  - 3. Use identification labels, handwritten text using indelible marker, or plastic marker tags to identify circuits enclosed for accessible conduits at wall penetrations, at floor penetrations, at roof penetrations, and at equipment terminations when source is not within sight.
  - 4. Use identification labels, handwritten text using indelible marker, or plastic marker tags to identify spare conduits at each end. Identify purpose and termination location.
- E. Identification for Boxes:
  - 1. Use voltage markers or color coded boxes to identify systems other than normal power system.
    - a. Color-Coded Boxes: Field-painted in accordance with Section 09900 per the same color code used for raceways.
  - 2. Use identification labels or handwritten text using indelible marker to identify circuits enclosed.
- F. Identification for Devices:
  - 1. Wiring Device and Wallplate Finishes: Comply with Section 16140.
  - 2. Use identification label to identify fire alarm system devices.
  - 3. Use identification label or engraved wallplate to identify serving branch circuit for all receptacles.
  - 4. Use identification label or engraved wallplate to identify load controlled for wall-mounted control devices controlling loads that are not visible from the control location and for multiple wall-mounted control devices installed at one location.
  - 5. Use identification label to identify receptacles protected by upstream GFI protection, where permitted.
- G. Buried Electrical Lines: Underground warning tapes.
- H. Communication Cabinets: Nameplates.
- I. Conduit: Paint.
- J. Control Device Station: Labels.
- K. Electrical Distribution and Control Equipment Enclosures: Nameplates
  - 1. Identification Nameplates
  - 2. Warning labels for Arc Flash Hazards
- L. Junction Box Load Connections: Wire markers.

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- M. Outlet Box Load Connections: Wire markers, cover plate.
- N. Panel Gutter Load Connections: Wire markers.
- O. Pull Box Load Connections: Wire markers.

# 2.02 MANUFACTURERS

- A. Brady Corporation: www.bradycorp.com.
- B. Seton Identification Products: www.seton.com/aec.
- C. HellermannTyton: www.hellermanntyton.com.
- D. Substitutions: See Section 01600 Product Requirements.

# 2.03 NAMEPLATES AND LABELS

- A. Identification Nameplates:
  - 1. Materials:
    - a. Indoor Clean, Dry Locations: Use plastic nameplates.
  - 2. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch; engraved text.
- B. Identification Labels:
  - 1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
  - 2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.
- C. Format for Equipment Identification:
  - 1. Minimum Size: 1 inch by 2.5 inches.
  - 2. Legend:
    - a. System designation where applicable:
      - 1) Emergency Power System: Identify with text "EMERGENCY".
      - 2) Fire Alarm System: Identify with text "FIRE ALARM".
    - b. Equipment designation or other approved description.
  - 3. Text: All capitalized unless otherwise indicated.
  - 4. Minimum Text Height:
    - a. System Designation: 1 inch.
    - b. Equipment Designation: 1/2 inch.
  - 5. Color:
    - a. Normal Power System: White text on black background.
    - b. Emergency Power System: White text on red background.
    - c. Fire Alarm System: White text on red background.
- D. Format for General Information and Operating Instructions:
  - 1. Minimum Size: 1 inch by 2.5 inches.
  - 2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
  - 3. Text: All capitalized unless otherwise indicated.
  - 4. Minimum Text Height: 1/4 inch.

- 5. Color: Black text on white background unless otherwise indicated.
- E. Format for Caution and Warning Messages:
  - 1. Minimum Size: 2 inches by 4 inches.
  - 2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
  - 3. Text: All capitalized unless otherwise indicated.
  - 4. Minimum Text Height: 1/2 inch.
  - 5. Color: Black text on yellow background unless otherwise indicated.
- F. Format for Receptacle Identification:
  - 1. Minimum Size: 3/8 inch by 1.5 inches.
  - 2. Legend: Power source and circuit number or other designation indicated.
  - 3. Text: All capitalized unless otherwise indicated.
  - 4. Minimum Text Height: 3/16 inch.
  - 5. Color: Black text on clear background.
- G. Format for Control Device Identification:
  - 1. Minimum Size: 3/8 inch by 1.5 inches.
  - 2. Legend: Load controlled or other designation indicated.
  - 3. Text: All capitalized unless otherwise indicated.
  - 4. Minimum Text Height: 3/16 inch.
  - 5. Color: Black text on clear background.
- H. Format for Fire Alarm Device Identification:
  - 1. Minimum Size: 3/8 inch by 1.5 inches.
  - 2. Legend: Designation indicated and device zone or address.
  - 3. Text: All capitalized unless otherwise indicated.
  - 4. Minimum Text Height: 3/16 inch.
  - 5. Color: Red text on white background.
- I. Nameplates: Engraved three-layer laminated plastic, white letters on colored background.
- J. Locations:
  - 1. Panelboards, switchboards, starters and other power distribution equipment including starters and variable or adjustable frequency drives furnished under Division 15.
  - 2. Lighting Contactors
  - 3. Individual Breakers of Distribution Panelboards and Switchboards
  - 4. Each starter or switch in Motor Control Centers
  - 5. Communication cabinets.
  - 6. Nurse call, intercom, clock and other special system equipment cabinets.
- K. Letter Size:
  - 1. Use 1/8 inch letters for identifying individual equipment, loads, individual wall switches, receptacles, control station and other wiring devices.
  - 2. Use 1/4 inch letters for identifying grouped equipment and loads except as further noted.
  - 3. Use 1/2 inch letters for identifying panelboards, switchboard and motor control centers.
- L. Color: Submit to owner for approval and modify where instructed.
  - 1. Black Normal Power Equipment

- 2. Red Emergency Power Equipment
- 3. Bright Red Fire Alarm.
- 4. Orange Arc Flash Warning Labels

## 2.04 WIRE MARKERS

- A. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.
- B. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.
- C. Legend: Power source and circuit number or other designation indicated.
- D. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.
- E. Minimum Text Height: 1/8 inch.
- F. Color: Black text on white background unless otherwise indicated.
- G. Description: Vinyl cloth type self-adhesive wire markers.
- H. Description: Cloth type wire markers.
- I. Locations: Each conductor at panelboard gutters, pull boxes, outlet boxes, and junction boxes each load connection.
- J. Legend:
  - 1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.
  - 2. Control Circuits: Control wire number indicated on schematic and interconnection diagrams on drawings.

## 2.05 WIRE PHASE MARKING

- A. Description: Plastic colored tape or integrally pigmented colored wire.
- B. Locations: Each conductor at panelboard gutters, pull boxes, Starters, and outlet boxes and each load or supply connection where a feeder terminates.
- C. Legend
  - 1. Feeders and Branch Circuits: Color code for the respective voltage system as described in Section 16123 Building Wire and Cables.

## 2.06 UNDERGROUND WARNING TAPE

- A. Materials: Use non-detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.
- B. Non-detectable Type Tape: 6 inches wide, with minimum thickness of 4 mil.
- C. Legend: Type of service, continuously repeated over full length of tape.

# 2.07 WARNING SIGNS AND LABELS

A. Warning Signs:

- 1. Materials:
  - a. Indoor Dry, Clean Locations: Use factory pre-printed rigid plastic or self-adhesive vinyl signs.
  - b. Outdoor Locations: Use factory pre-printed rigid aluminum signs.
- 2. Rigid Signs: Provide four mounting holes at corners for mechanical fasteners.
- 3. Minimum Size: 7 by 10 inches unless otherwise indicated.
- B. Warning Labels:
  - 1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester, or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
    - a. Provide polyester overlaminate to protect handwritten text.
  - 2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
  - 3. Minimum Size: 2 by 4 inches unless otherwise indicated.
- C. Description: 3 inch wide polyethylene tape, detectable type colored red with suitable warning legend describing buried electrical lines.
- D. Description: 6 inch wide plastic tape, detectable type colored yellow with suitable warning legend describing buried electrical lines.

# PART 3 EXECUTION

## 3.01 PREPARATION

- A. Clean surfaces to receive adhesive products according to manufacturer's instructions.
- B. Degrease and clean surfaces to receive nameplates and labels.

## 3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
  - 1. Surface-Mounted Equipment: Enclosure front.
  - 2. Flush-Mounted Equipment: Inside of equipment door.
  - 3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
  - 4. Elevated Equipment: Legible from the floor or working platform.
  - 5. Branch Devices: Adjacent to device.
  - 6. Interior Components: Legible from the point of access.
  - 7. Conduits: Legible from the floor.
  - 8. Boxes: Outside face of cover.
  - 9. Conductors and Cables: Legible from the point of access.
  - 10. Devices: Outside face of cover.
- C. Install identification products centered, level, and parallel with lines of item being identified.
- D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing, or epoxy cement.
- E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or

wrinkles and edges properly sealed.

- F. Install underground warning tape above buried lines with one tape per trench at 3 inches below finished grade.
- G. Secure rigid signs using stainless steel screws.
- H. Mark all handwritten text, where permitted, to be neat and legible.

# 3.03 FIELD QUALITY CONTROL

- A. See Section 01400 Quality Requirements, for additional requirements.
- B. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.
- C. Install nameplates and labels parallel to equipment lines.
- D. Secure nameplates to equipment front using screws or adhesive.
- E. Secure nameplates to inside surface of door on panelboard that is recessed in finished locations.
- F. Install identifying markers, tags, tape and labels on all wiring and equipment.
  - 1. Where two or more feeders enter or leave a device or enclosure, the cable shall be tagged to indicate destination of cable run. Each common wire, common circuit or common loop of a system, fire alarm, public address system, intercom system, sound system, or TV system, shall be identified.
  - 2. Device plates for local toggle switches, toggle switches, type motor starters, pilot lights, and the like, whose function is not readily apparent shall be labeled suitably describing the equipment controlled. These labels shall be engraved, black laminated plastic labels, with 1/8 inch white letters. For equipment connected to the emergency power system, the labels shall be red laminated plastic with white letters.
  - 3. The main label for each switchboard and panelboard shall include the following information:
    - a. Name: "SWITCHBOARD SWB", "PANEL MDP", "PANEL DP1", "PANEL L6B", etc.
    - b. Branch: Normal, Critical, Life Safety or Equipment for Hospitals or simply Normal and Emergency for a system with a single emergency branch.
    - c. Voltage: 120/208 Volts, 277/480 volts or other specific to the equipment
    - d. Source: Switchboard or panelboard from which it is fed.
  - 4. Feeder Devices and Starters: Install a label on Individual feeder devices or starters in switchboards, motor control centers and distribution panelboards without panelboard directories. Do not use paper inserts or other labels provided with the devices. The label shall identify the load served.
  - 5. Motor Disconnects, Starters and Motor Drives: Install labels for all disconnects, starters and motor drives, including those provided as part of equipment or individually under Division 15 and all other divisions of the contract. The labels shall include the following:
    - a. Equipment Fed: "AHU-1", "PUMP P-1"
    - b. Source: Switchboard or panelboard from which disconnect is fed including the circuit number.

- c. Voltage and Phase: 208 Volt 3PH, 208 Volt 1PH
- d. Motor Horsepower: 40 HP
- 6. Equipment Disconnects: Non-motor equipment disconnects shall be labeled same as Motor Disconnects with the exception the Horsepower field may be eliminated.
- G. Identify conduit using field painting under provisions of Section 09900.
  - 1. Paint colored band on each conduit longer than 6 feet.
  - 2. Paint bands 20 feet on center.
  - 3. Colors:
    - a. 480 Volt System: No Color.
    - b. 208 Volt System: No Color.
    - c. Fire Alarm System: Red.
    - d. Telephone System: Green.
    - e. Data System: Brown.
- H. Arc Flash Warning Labels:
  - 1. Install Arc Flash warning labels on all equipment identified in NEC 110.16 to warn qualified persons of a potential electrical arc flash hazards while examining, adjusting, servicing or maintaining the referenced equipment.

# **END OF SECTION**

## SECTION 16097 - ELECTRICAL DEMOLITION

#### PART 1 GENERAL

## 1.01 SECTION INCLUDES

A. Electrical demolition.

#### **1.02 RELATED REQUIREMENTS**

A. Section 01700 - Execution Requirements: Additional requirements for alterations work.

#### PART 2 PRODUCTS

#### 2.01 MATERIALS AND EQUIPMENT

A. Materials and equipment for patching and extending work: As specified in individual sections.

#### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. All demolition work shall be preformed with due care and diligence so as to prevent the unnecessary destruction and/or damage to sytems that shall remain in operation at the conclusion of the project. Determine the exact location of all existing equipment, devices and wiring before commencing work.
- B. Preserve all portions of the existing electrical systems which shall remain.
- C. Verify field measurements and circuiting arrangements are as shown on Drawings.
- D. Conduit and wiring are not shown on the demolition plan but shall be considered fully a part of the work.
- E. Existing conduit and wiring may be re-used where they are of the type specified, meet the requirements for the new work as defined by the Contract Documents and remain in good condition.
- F. Existing circuitry without a seperate grounding conductor shall not be re-used.
- G. Report discrepancies to GMK Associates before disturbing existing installation.
- H. Beginning of demolition means installer accepts existing conditions and agrees to be fully responsible for any and all damages caused by a failure to exactly locate and preserve any and all existing portions of the electrical system.

## 3.02 PREPARATION

- A. Coordinate utility service outages with utility company.
- B. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

## 3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

A. Remove, relocate, and extend existing installations to accommodate new construction.

Maintain the continuity of service and grounding to the existing circuits and other system elements contained within the area of constuction that serve other areas of the facility and conceal them above ceilings and other building elements in the new construction.

- B. Remove abandoned wiring to source of supply or to the point on a shared circuit from where the equipment of device is served.
- C. Replace existing devices shown to remain in operation and and their associated coverplates which have been damaged.
- D. Provide all cutting and patching to repair any damage caused by construction activities including adjacent construction and finishes damaged during demolition and extension work.
- E. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.
- F. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.

# 3.04 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment that remain or that are to be reused.
- B. Luminaires: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts and broken electrical parts.
- C. All equipment, devices and materials removed during demolition work and not indicated to be reused or turned over to the owner, shall become the responsibility of the Contractor for disposal.

# **END OF SECTION**

## SECTION 16123 - BUILDING WIRE AND CABLE

# PART 1 GENERAL

## 1.01 SECTION INCLUDES

- A. Underground feeder and branch-circuit cable.
- B. Wire and cable for 600 volts and less.
- C. Wiring connectors and connections.
- D. Electrical tape.
- E. Heat shrink tubing.
- F. Oxide inhibiting compound.
- G. Wire pulling lubricant.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 16060 Grounding and Bonding: Additional requirements for grounding conductors and grounding connectors.
- B. Section 02315 Excavation.
- C. Section 02316 Fill and Backfill: Bedding and backfilling.
- D. Section 16075 Electrical Identification.

#### 1.03 REFERENCE STANDARDS

- A. ASTM B3 Standard Specification for Soft or Annealed Copper Wire; 2001 (Reapproved 2007).
- B. ASTM B 8 Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2004.
- C. ASTM B33 Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010.
- D. ASTM B787/B787M Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2009).
- E. ASTM D3005 Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2010.
- F. ASTM D4388 Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes; 2008.
- G. FS A-A-59544 Cable and Wire, Electrical (Power, Fixed Installation); Federal Specification; Revision A, 2008.
- H. NECA 1 Standard for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; 2006.
- I. NEMA WC 70 Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; National Electrical Manufacturers Association; 2009 (ANSI/NEMA WC 70/ICEA

S-95-658).

- J. NETA STD ATS Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association; 2009.
- K. NFPA 70 National Electrical Code; National Fire Protection Association; 2005..
- L. UL 83 Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.
- M. UL 486A-486B Wire Connectors; Current Edition, Including All Revisions.
- N. UL 486C Splicing Wire Connectors; Current Edition, Including All Revisions.
- O. UL 486D Sealed Wire Connector Systems; Current Edition, Including All Revisions.
- P. UL 510 Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.

# 1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
  - 2. Coordinate the installation of direct burial cable with other trades to avoid conflicts with piping or other potential conflicts.
  - 3. Notify GMK Associates of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. NEMA WC 3 Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
- C. NEMA WC 5 Thermoplastic-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

# 1.05 SUBMITTALS

- A. See Section 01300 Administrative Requirements, for submittal procedures and Section 16010.
- B. Project Record Documents: Record actual installed circuiting arrangements. Record actual routing for underground circuits.
- C. Project Record Documents: Record actual locations of components and circuits.

## 1.06 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

## 1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

#### 1.08 FIELD CONDITIONS

- A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F, unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify GMK Associates and obtain direction before proceeding with work.
- B. Products: Furnish products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

#### PART 2 PRODUCTS

## 2.01 WIRING REQUIREMENTS

- A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.
- B. Underground Installations: Use only building wire in raceway.
- C. Conductor sizes are based on copper unless indicated as aluminum or "AL".

#### 2.02 WIRE MANUFACTURERS

- A. Cerro Wire Inc: www.cerrowire.com.
- B. Industrial Wire & Cable, Inc: www.iewc.com.
- C. Southwire Company: www.southwire.com.
- D. Substitutions: See Section 01600 Product Requirements.

#### 2.03 ALL CONDUCTORS AND CABLES

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose indicated.
- C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- D. Comply with NEMA WC 70.
- E. Comply with FS A-A-59544 where applicable.
- F. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- G. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- H. Conductors for Grounding and Bonding: Also comply with Section 16060.
- I. Conductor Material:
  - 1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
  - 2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.

- 3. Tinned Copper Conductors: Comply with ASTM B33.
- J. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- K. Conductor Color Coding:
  - 1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
  - 2. Color Coding Method: Integrally colored insulation.
    - a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.
  - 3. Color Code:
    - a. 208Y/120 V, 3 Phase, 4 Wire System:
      - 1) Phase A: Black.
      - 2) Phase B: Red.
      - 3) Phase C: Blue.
      - 4) Neutral/Grounded: White.
    - b. Equipment Ground, All Systems: Green.

## 2.04 WIRING CONNECTORS

- A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.
- B. Wiring Connectors for Splices and Taps:
  - 1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
  - 2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.
- C. Wiring Connectors for Terminations:
  - 1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
  - 2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
  - 3. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
  - 4. Provide motor pigtail connectors for connecting motor leads in order to facilitate disconnection.
  - 5. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.
  - 6. Stranded Conductors Size 10 AWG and Smaller: Use crimped terminals for connections to terminal screws.
  - 7. Conductors for Control Circuits: Use crimped terminals for all connections.
- D. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.

- E. Mechanical Connectors: Provide bolted type or set-screw type.
- F. Compression Connectors: Provide circumferential type or hex type crimp configuration.
- G. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.

## 2.05 WIRING ACCESSORIES

## A. Electrical Tape:

- 1. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F.
- 2. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.
- 3. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil; suitable for continuous temperature environment up to 194 degrees F and short-term 266 degrees F overload service.
- 4. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil; suitable for continuous temperature environment up to 176 degrees F.
- 5. Varnished Cambric Electrical Tape: Cotton cambric fabric tape, with or without adhesive, oil-primed and coated with high-grade insulating varnish; minimum thickness of 7 mil; suitable for continuous temperature environment up to 221 degrees F.
- 6. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil.
- B. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.

## PART 3 EXECUTION

## 3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that conditions are satisfactory for installation prior to starting work.

#### 3.02 PREPARATION

A. Completely and thoroughly swab raceway before installing wire.

#### 3.03 INSTALLATION

- A. Circuiting Requirements:
  - 1. Unless dimensioned, circuit routing indicated is diagrammatic.
  - 2. When circuit destination is indicated and routing is not shown, determine exact routing required.
  - 3. Arrange circuiting to minimize splices.
  - 4. Include circuit lengths required to install connected devices within 10 ft of location shown.

- B. Install products in accordance with manufacturer's instructions.
- C. Install conductors and cable in a neat and workmanlike manner in accordance with NECA 1.
- D. Install underground feeder and branch-circuit cable (Type UF-B) in accordance with NECA 121.
- E. Installation in Raceway:
  - 1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
  - 2. Pull all conductors and cables together into raceway at same time.
  - 3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
  - 4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
- F. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
  - 1. Installation in Vertical Raceways: Provide supports where vertical rise exceeds permissible limits.
- G. Terminate cables using suitable fittings.
- H. Install conductors with a minimum of 12 inches of slack at each outlet.
- I. Where conductors are installed in enclosures for future termination by others, provide a minimum of 5 feet of slack.
- J. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
- K. Make wiring connections using specified wiring connectors.
  - 1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
  - 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
  - 3. Do not remove conductor strands to facilitate insertion into connector.
  - 4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
  - 5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
  - 6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- L. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
  - 1. Dry Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
    - a. For taped connections, first apply adequate amount of rubber splicing electrical

tape or electrical filler tape, followed by outer covering of vinyl insulating electrical tape.

- b. For taped connections likely to require re-entering, including motor leads, first apply varnished cambric electrical tape, followed by adequate amount of rubber splicing electrical tape, followed by outer covering of vinyl insulating electrical tape.
- 2. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
  - a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
  - b. For taped connections, follow same procedure as for dry locations but apply outer covering of moisture sealing electrical tape.
- 3. Wet Locations: Use heat shrink tubing.
- M. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.
- N. Color Code Legend: Provide identification label identifying color code for ungrounded conductors at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.
- O. Provide wire and cable markers in accordance with Section 16075 identifying circuit number or other designation indicated at the following locations:
  - 1. At each source and load connection.
  - 2. Within boxes when more than one circuit is present.
  - 3. Within equipment enclosures when conductors and cables enter or leave the enclosure.
- P. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.
- Q. Install wire and cable securely, in a neat and workmanlike manner, as specified in NECA 1.
- R. Route wire and cable as required to meet project conditions.
  - 1. Wire and cable routing indicated is approximate unless dimensioned.
  - 2. Where wire and cable destination is indicated and routing is not shown, determine exact routing and lengths required.
  - 3. Include wire and cable of lengths required to install connected devices within 10 ft of location shown.
- S. Where a circuit home run or a feeder is shown on the plans without any conductor or raceway identification, it shall be a minimum of 2 # 12, 1 # 12 Ground, <sup>1</sup>/<sub>2</sub>" Conduit unless additional information is available as follows:
  - 1. Where an overcurrent device is shown for the circuit in panelboards or otherwise noted, size the conductor and raceway to match the overcurrent device rating. If the feeder or homerun is shown connected to a transformer, electric motor mechanical equipment or other equipment for which load information is available on the plans or in the project manual, provide conductors and raceways sized to the load capacity of the equipment. Verify final sizes with the Engineeer in such cases.

- T. Use no wire smaller than 12 AWG for power and lighting circuits, and no smaller than 14 AWG for control wiring.
- U. Use wiring methods indicated.
- V. Pull all conductors into raceway at same time.
- W. Use suitable wire pulling lubricant for building wire 4 AWG and larger.
- X. Protect exposed cable from damage.
- Y. Use suitable cable fittings and connectors.
- Z. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- AA. Throughouly clean conductor surfaces before installing lugs and connectors.
- AB. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise. Splice or tap only in accessible junction boxes or other electrical enclosures.
- AC. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.
- AD. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
- AE. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
- AF. Use a power distribution block as manufactured by Ilsco (sized for the size and number of conductors, and splice type) for splices and taps, 6 AWG and larger. Power distribution block shall be installed in a junction box, sized per NEC.
- AG. Apply electrical tape to the ends of spare conductors and otherwise secure conductors to prevent accidental contact with persons or enclosures.
- AH. Identify and color code wire and cable under provisions of Section 16075. Identify each conductor with its circuit number or other designation indicated.

## 3.04 FIELD QUALITY CONTROL

- A. Perform field inspection and testing in accordance with Section 01400.
- B. Inspect wire and cable for physical damage and proper connection.
- C. Torque test conductor connections and terminations to manufacturer's recommended values.
- D. Perform continuity test on all power and equipment branch circuit conductors. Verify proper phasing connections.
- E. Feeder Resistance Testing:
  - 1. All current carrying phase conductors and neutrals shall be tested as installed, and before connections are made, for insulation resistance and accidental grounds. This shall be done with a 500-volt megger. The procedures listed below shall be followed:
  - 2. Minimum readings shall be one million (1,000,000) or more ohms for #6 AWG wire

and smaller, 250,000 ohms or more for #4 AWG wire or larger, between conductors and between conductor and the grounding conductor.

- 3. After all fixtures, devices, and equipment are installed and all connections completed to each panel, the contractor shall disconnect the neutral feeder conductor from the neutral bar and take a megger reading between the neutral bar and the grounded enclosure. If this reading is less than 250,000 ohms, the contractor shall disconnect the branch circuit neutral wires from this neutral bar. He shall then test each one separately to the panel until source of the low reading is found. The contractor shall correct troubles, reconnect, and retest until at least 250,000 ohms from the neutral bar to the grounded panel can be achieved with only the neutral feeder disconnected.
- 4. Document test by tabulating the readings with time of day, date, temperature and all pertinent test information. Submit documenation to the engieer prior to the final inpsection and as a prerequesite for final acceptance of the project.
- 5. At final inspection, the contractor shall furnish a megger and show the engineers and State Construction Office representatives that the panels comply with the above.
- F. Inspect and test in accordance with NETA STD ATS, except Section 4.
- G. Perform inspections and tests listed in NETA STD ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required.
- H. Correct deficiencies and replace damaged or defective conductors and cables.
- I. Perform inspections and tests listed in NETA STD ATS, Section 7.3.2.

# **END OF SECTION**

# **SECTION 16131 - CONDUIT**

#### PART 1 GENERAL

## 1.01 SECTION INCLUDES

- A. Galvanized steel rigid metal conduit (RMC).
- B. Rigid polyvinyl chloride (PVC) conduit.
- C. Conduit fittings.
- D. Conduit, fittings and conduit bodies.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 03300 Cast-in-Place Concrete: Concrete encasement of conduits.
- B. Section 16060 Grounding and Bonding.
- C. Section 16075 Electrical Identification.
- D. Section 16138 Boxes.
- E. Section 16075 Electrical Identification: Identification products and requirements.
- F. Section 02316 Fill and Backfill: Bedding and backfilling.
- G. Section 02582 Underground Electrical Ducts and Manholes.

#### 1.03 RELATED WORK

- A. Cutting and Patching.
- B. Trenching: Excavation and backfill for conduit and utilities on site.
- C. Cast-In-Place Concrete: Protective envelope for underground conduit installations.
- D. Sheet Metal Flashing and Trim.

#### 1.04 DESCRIPTION OF WORK

A. Unless otherwise noted on the drawings or specified elsewhere in Division 16, route all conductors in conduit. The electrical plans indicate the general location of circuiting, electrical devices, and/or outlet boxes. If approved by the Engineer, conduit runs may be modified at the time of construction to adapt to the construction conditions, but in no case shall a circuit be combined with another circuit or modified.

## 1.05 VOICE/DATA SYSTEM RACEWAYS

- A. Furnish a complete system of raceways, outlet boxes, backboards, grounds, etc., to accommodate the Owner furnished voice/data system wiring and outlets.
- B. Outlet boxes shall be minimum 4" x 4" x 2-1/8" with single gang opening.

## 1.06 FIRE ALARM SYSTEM RACEWAYS

A. Wiring is not shown on the plans for the fire alarm system but shall be considered typical for the system around which the design is based. Provide raceways to fully accomodate system wiring, devices and equipment based on floor plan layouts and specifications. Open cabling

is not permitted for fire alarm systems unless approved by the engineer.

## 1.07 ADDITIONAL EMPTY RACEWAY SYSTEMS

- A. Provide a system of raceways, pull boxes, outlet boxes, grounds and related raceway work to support installation of wiring, devices and equipment for the following systems: Sound Reinforcement System and Security System
- B. The power requirements for the listed systems shall be provided by the Division 16 Contractor.

#### 1.08 REFERENCE STANDARDS

- A. ANSI C80.1 American National Standard for Electrical Rigid Steel Conduit (ERSC); 2005.
- B. ANSI C80.3 American National Standard for Steel Electrical Metallic Tubing (EMT); 2005.
- C. NECA 1 Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.
- D. NECA 101 Standard for Installing Steel Conduits (Rigid, IMC, EMT); National Electrical Contractors Association; 2006.
- E. NECA 111 Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); National Electrical Contractors Association; 2003.
- F. NEMA FB 1 Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association; 2007.
- G. NEMA TC 2 Electrical Polyvinyl Chloride (PVC) Conduit; National Electrical Manufacturers Association; 2003.
- H. NEMA TC 3 Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; National Electrical Manufacturers Association; 2004.
- I. NFPA 70 National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. UL 1 Flexible Metal Conduit; Current Edition, Including All Revisions.
- K. UL 6 Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.
- L. UL 360 Liquid-Tight Flexible Steel Conduit; Current Edition, Including All Revisions.
- M. UL 514B Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.
- N. UL 651 Schedule 40 and 80 Rigid PVC Conduit and Fittings; Current Edition, Including All Revisions.
- O. UL 797 Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.

#### 1.09 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Coordinate minimum sizes of conduits with the actual conductors to be installed,

including adjustments for conductor sizes increased for voltage drop.

- 2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
- 3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.
- 4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.
- 5. Notify GMK Associates of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. Sequencing:
  - 1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

# 1.10 SUBMITTALS

- A. See Section 01300 Administrative Requirements for submittals procedures.
- B. Project Record Documents: Record actual routing for conduits installed underground, conduits embedded within concrete slabs, and conduits 2 inch (53 mm) trade size and larger.

## 1.11 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

## 1.12 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.
- B. Accept conduit on site. Inspect for damage.
- C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- D. Protect PVC conduit from sunlight.

# PART 2 PRODUCTS

## 2.01 CONDUIT APPLICATIONS

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use EMT or GRS as applicable to the conditions.

## C. Underground:

- 1. Under Slab on Grade: Use galvanized steel rigid metal conduit or rigid PVC conduit.
- 2. Exterior, Direct-Buried: Use galvanized steel rigid metal conduit or rigid PVC conduit.
- 3. Exterior, Embedded Within Concrete: Use galvanized steel rigid metal conduit or rigid PVC conduit.
- 4. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid

metal conduit where emerging from underground.

- 5. Where rigid polyvinyl (PVC) conduit larger than 2 inch (53 mm) trade size is provided, use galvanized steel rigid metal conduit elbows for bends.
- 6. Where steel conduit is installed in direct contact with earth where soil has a resistivity of less than 2000 ohm-centimeters or is characterized as severely corrosive based on soils report or local experience, use corrosion protection tape to provide supplementary corrosion protection or use PVC-coated galvanized steel rigid metal conduit.
- 7. Where steel conduit emerges from concrete into soil, use corrosion protection tape to provide supplementary corrosion protection for a minimum of 4 inches on either side of where conduit emerges or use PVC-coated galvanized steel rigid metal conduit.
- D. Embedded Within Concrete:
  - 1. Within Slab on Grade (within structural slabs only where approved by Structural Engineer): Use galvanized steel rigid metal conduit, PVC-coated galvanized steel rigid metal conduit, or rigid PVC conduit.
  - 2. Within Slab Above Ground: Not permitted.
  - 3. Within Concrete Walls Above Ground: Use galvanized steel rigid metal conduit, PVC-coated galvanized steel rigid metal conduit, or rigid PVC conduit.
  - 4. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from concrete.
  - 5. Where electrical metallic tubing (EMT) emerges from concrete into salt air, use corrosion protection tape to provide supplementary corrosion protection for a minimum of 4 inches on either side of where conduit emerges.
- E. Concealed Within Masonry Walls: Use galvanized steel rigid metal conduit or electrical metallic tubing (EMT).
- F. Concealed Within Hollow Stud Walls: Use galvanized steel rigid metal conduit or electrical metallic tubing (EMT).
- G. Concealed Above Accessible Ceilings: Use galvanized steel rigid metal conduit or electrical metallic tubing (EMT).
- H. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit.
- I. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit or electrical metallic tubing (EMT).
- J. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit.
  1. Locations subject to physical damage include, but are not limited to:
  - a. Where exposed below 8 feet, except within electrical and communication rooms or closets.
  - b. Where exposed below 20 feet in warehouse areas.
- K. Exposed, Exterior: Use galvanized steel rigid metal conduit or PVC-coated galvanized steel rigid metal conduit.
- L. Concealed, Exterior, Not Embedded in Concrete or in Contact With Earth: Use galvanized steel rigid metal conduit.
- M. Corrosive Locations Above Ground: Use PVC-coated galvanized steel rigid metal conduit or aluminum rigid metal conduit.

- 1. Corrosive locations include, but are not limited to: a. Cooling towers.
- N. Hazardous (Classified) Locations: Use galvanized steel rigid metal conduit or PVC-coated galvanized steel rigid metal conduit.
- O. Connections to Luminaires Above Accessible Ceilings: Use flexible metal conduit.1. Maximum Length: 6 feet.
- P. Connections to Vibrating Equipment:
  - 1. Dry Locations: Use flexible metal conduit.
  - 2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.
  - 3. Maximum Length: 6 feet unless otherwise indicated.
  - 4. Vibrating equipment includes, but is not limited to:
    - a. Transformers.
    - b. Motors.
- Q. Fished in Existing Walls, Where Necessary: Use flexible metal conduit.

# 2.02 CONDUIT REQUIREMENTS

- A. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling a mandrel through them.
- B. Electrical Service Conduits: Also comply with Section 16210.
- C. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.
- D. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.
- E. Minimum Conduit Size, Unless Otherwise Indicated:
  - 1. Branch Circuits: 1/2 inch (16 mm) trade size.
  - 2. Branch Circuit Homeruns: 3/4 inch (21 mm) trade size.
  - 3. Control Circuits: 1/2 inch (16 mm) trade size.
  - 4. Flexible Connections to Luminaires: 3/8 inch (12 mm) trade size.
  - 5. Underground, Interior: 3/4 inch (21 mm) trade size.
  - 6. Underground, Exterior: 1 inch (27 mm) trade size.
  - 7. The outside diameter of any conduit buried in concrete shall not exceed 1/3 the thickness of the structural slab, wall or beam in which it is placed. Locate conduit in the middle of the member.
- F. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

## 2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- B. Fittings:
  - 1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and

labeled as complying with UL 514B.

- 2. Material: Use steel or malleable iron.
  - a. Do not use die cast zinc fittings.
- 3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

# 2.04 FLEXIBLE METAL CONDUIT (FMC)

- A. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.
- B. Fittings:
  - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  - Material: Use steel or malleable iron.
     a. Do not use die cast zinc fittings.
- C. Description: Interlocked steel construction.
- D. Fittings: NEMA FB 1. Fittings shall be two-screw, double clamp malleable iron, hot dipped galvanized.

# 2.05 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

- A. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
- B. Fittings:
  - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  - 2. Material: Use steel or malleable iron.
    - a. Do not use die cast zinc fittings.
- C. Description: Interlocked steel construction with PVC jacket.
- D. Fittings: NEMA FB 1.
  - 1. Fittings shall be of the type that uses a threaded grounding cone, a steel, nylon or plastic compression ring, insulated throat, and a gland for tightening. Fittings shall be made of steel, have insulated throats and have a male thread and locknut or male bushing with a ring seal. Each connector shall provide a low resistance ground connection between the flexible conduit and the outlet box, conduit or other equipment to which it is connected.

# 2.06 ELECTRICAL METALLIC TUBING (EMT)

- A. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- B. Fittings:
  - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  - Material: Use steel or malleable iron.
     a. Do not use die cast zinc fittings.
  - 3. Connectors and Couplings: Use compression (gland) or set-screw type.
- a. Do not use indenter type connectors and couplings.
- 4. Damp or Wet Locations (where permitted): Use fittings listed for use in wet locations.
- 5. Embedded Within Concrete (where permitted): Use fittings listed as concrete-tight. Fittings that require taping to be concrete-tight are acceptable.
- C. EMT connections shall be made tight to boxes and cabinets using insulated throat ferrous metal fittings specifically designed for use with EMT conduit. Use insulating insert at all joints to prevent any abrasion of wires during installation.
- D. For EMT installation encased in concrete, join EMT with moisture proof type fittings so as to be completely sealed against intrusion of moisture.

# 2.07 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

- A. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.
- B. Fittings:
  - 1. Manufacturer: Same as manufacturer of conduit to be connected.
  - 2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.
- C. Description: NEMA TC 2; Schedule 40 PVC.
- D. Fittings and Conduit Bodies: NEMA TC 3.

#### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that field measurements are as shown on drawings.
- B. Verify that mounting surfaces are ready to receive conduits.
- C. Verify that conditions are satisfactory for installation prior to starting work.
- D. Verify routing and termination locations of conduit prior to rough-in.

# 3.02 PLANNING

- A. Conduit routing is shown on drawings in approximate locations unless dimensioned. Route as required to complete wiring system.
- B. Most conduit is shown on the plans as concealed above grade. However it may be necessary to route some of these conduits either partially or entirely underground because of wall construction, open ceiling areas, other types of building construction or for other practical considerations. Plan conduit routing early in construction to allow for the conditions. Consult with the engineer about changes in conduit routing.
- C. For open ceiling areas in finished areas examine building sections, structural drawings, elevations and other details to determine how to route conduit to be partially concealed or less obtrusive. Route conduit in channels, corners, tops of beams and other elements to present a neat and less visible appearance. Extend counduit underground to natural building chases (walls, column wraps, air duct chases) that will conceal conduit when

possible even if conduit runs will be longer. Consult with the engineer about possible voltage drop concerns when conduit runs will exceed reasonable or specified distances.

D. Keep up with building construction so that access to areas where conduit should be installed in not blocked.

### 3.03 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install conduit in a neat and workmanlike manner in accordance with NECA 1.
- C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.
- D. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.
- E. Conduit Routing:
  - 1. Unless dimensioned, conduit routing indicated is diagrammatic.
  - 2. When conduit destination is indicated and routing is not shown, determine exact routing required.
  - 3. Conceal all conduits unless specifically indicated to be exposed.
  - 4. Conduits in the following areas may be exposed, unless otherwise indicated:
    - a. Electrical rooms.
    - b. Mechanical equipment rooms.
    - c. Within joists in areas with no ceiling.
  - 5. Unless otherwise approved, do not route conduits exposed:
    - a. Across floors.
    - b. Across roofs.
    - c. Across top of parapet walls.
    - d. Across building exterior surfaces.
  - 6. Conduits installed underground or embedded in concrete may be routed in the shortest possible manner unless otherwise indicated. Route all other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
  - 7. Arrange conduit to maintain adequate headroom, clearances, and access.
  - 8. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.
  - 9. Route conduits above water and drain piping where possible.
  - 10. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
  - 11. Maintain minimum clearance of 6 inches between conduits and piping for other systems.
  - 12. Maintain minimum clearance of 12 inches between conduits and hot surfaces. This includes, but is not limited to:
    - a. Heaters.
    - b. Hot water piping.
    - c. Flues.
    - d. Steam piping.
  - 13. Group parallel conduits in the same area together on a common rack.
  - 14. Construct racks using steel channel and provide 25% spare space for future conduits.

- F. Conduit Support:
  - 1. Secure and support conduits in accordance with NFPA 70 and Section 16070 using suitable supports and methods approved by the authority having jurisdiction.
  - 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
  - 3. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers and split hangers.
  - 4. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
  - 5. Although it is intended that conduit not be attached to ceiling support wires, drops to light fixtures and other ceiling mounted devices remote from the building structure may be acceptable. Endeavor to install the conduit for trhe main circuit run on or supported to walls, ceiling joists and made supports near the points where drops are to be made. Confer with engineer where any doubt exists.
- G. Connections and Terminations:
  - 1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
  - 2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
  - 3. Use suitable adapters where required to transition from one type of conduit to another.
  - 4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
  - 5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
  - 6. Where spare conduits stub up through concrete floors and are not terminated in a box or enclosure, provide threaded couplings equipped with threaded plugs set flush with finished floor.
  - 7. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
  - 8. Secure joints and connections to provide maximum mechanical strength and electrical continuity.
  - 9. When stub outs from wall or floor mounted outlet boxes are shown, noted or specified as part of an empty raceway system for sound, data, fire alarm and other low-voltage systems for which cable will be installed open in ceiling spaces, plenums, chases and other building elements it shall be understood that access for cable to the outlets, equipment cabinets and devices of the system must be provided through areas of inaccessible ceilings. Provide conduits between accessible ceiling areas or extend outlet box stubouts through inaccessible areas to a point where cable can be installed.

#### H. Penetrations:

- 1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
- 2. Make penetrations perpendicular to surfaces unless otherwise indicated.
- 3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
- 4. Conceal bends for conduit risers emerging above ground.

- 5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
- 6. Provide suitable modular seal where conduits penetrate exterior wall below grade.
- 7. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
  - a. For exterior non-membrane openings, furnish and install cast iron pipe sleeves for conduits passing through non-membrane waterproofed exterior walls, footings, roofs or beams. Sleeves through exterior walls below grade shall have continuously welded center flange buried in construction. Make conduit watertight in sleeve with oakum packing and caulked lead joints on both sides of wall.
  - b. For interior membrane openings, furnish and install cast iron sleeves passing through interior membrane water proofed floors with integral flashing flange and clamping ring. Adjust sleeves to floor construction with galvanized steel or wrought iron pipe nipples top and bottom, extending two inches above finished floor. Clamp sleeves to flashing with clamping device.
  - c. For exterior membrane openings, furnish and install cast iron sleeves passing through exterior membrane waterproofed walls, floors and roof with integral flashing flange and clamping ring, modified for the required thickness. Make conduit watertight in sleeve with oakum packing and caulked lead joint.
- 8. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty.
- 9. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07840.
- I. Underground Installation:
  - 1. Provide trenching and backfillingNone-N/A.
  - 2. Minimum Cover, Unless Otherwise Indicated or Required:
    - a. Underground, Exterior: 24 inches.
    - b. Under Slab on Grade: 12 inches to bottom of slab.
    - c. Install conduit with minimum grade of 4 inches per 100 feet.
    - d. Terminate conduit in end bell at manhole entries.
  - 3. Provide underground warning tape in accordance with Section 16075 along entire conduit length for service entrance where not concrete-encased.
- J. Embedment Within Structural Concrete Slabs (only where approved by Structural Engineer):
  - 1. Maximum Conduit Size: 1 inch (27 mm) unless otherwise approved.
  - 2. Install conduits within middle one third of slab thickness.
  - 3. Secure conduits to prevent floating or movement during pouring of concrete.
- K. Concrete Encasement: Where conduits not otherwise embedded within concrete are indicated to be concrete-encased, provide concrete in accordance with Section 03300 with minimum concrete cover of 3 inches on all sides unless otherwise indicated.
  - 1. Stagger conduit joints in concrete encasement 6 inches minimum vertically.
  - 2. Use suitable separators and chairs installed not greater than 4 feet on centers. Band conduit together with suitable banding devices. Securely anchor conduit to prevent movement during concrete placement.

- 3. Provide No. 4 steel reinforcing bars 6 inches on center in top of bank under paved areas.
- L. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
  - 1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
  - 2. Where conduits are subject to earth movement by settlement or frost.
- M. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
  - 1. Where conduits pass from outdoors into conditioned interior spaces.
  - 2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
- N. Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches at each end.
- O. Provide grounding and bonding in accordance with Section 16060.
- P. Identify conduits in accordance with Section 16075.
- Q. Use flexible metal conduit in short runs where the installation of non flexible conduit is not possible or recommended, for final connection to vibrating equipment and transformers, and from outlet boxes to recessed lighting fixtures. Slack shall be included as required. Furnish with ground conductor for line and load connections. Minimum size shall be 1/2" with the exception of 3/8" light fixture whips no more than 6' long.
- R. Liquid tight flexible conduit shall be used for connections to motors, and for final connection to all kitchen equipment. Furnish with ground conductor for line and load connections.
- S. If obstructions are encountered which prevent installation of the pull wire and/or conductors, the blocked section of raceway shall be removed and replaced. Any cutting or patching involved in such replacement will be included as a part of the electrical scope of work and included in the contract.
- T. Install a ground wire in all conduit sized where noted on the drawings and where not noted sized per the applicable requirements of the NEC.

#### 3.04 FIELD QUALITY CONTROL

- A. See Section 01400 Quality Requirements, for additional requirements.
- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Correct deficiencies and replace damaged or defective conduits.

#### 3.05 CLEANING

A. Clean interior of conduits to remove moisture and foreign matter.

#### 3.06 PROTECTION

CONDUIT

- A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.
- B. Use hydraulic one-shot conduit bender or factory elbows for bends in conduit larger than 1-1/2 inch size.
- C. Where rigid steel conduit does not terminate in a box or other device, and stubs up, install an insulated metallic bushing.
- D. Where called for on the plans, or if required by code, to provide a positive bonding and grounding of conduit to the enclosure or box, or for bonding and grounding of multiple or single rigid metal conduits, the conduit end shall be equipped with an insulated metallic grounding and bonding bushing.
- E. Where called for on the plans, or if required by code, to provide a grounding bonding jumper inside or outside of a raceway or an enclosure, use a grounding and bonding adapter locknut. Where the installation calls for the bonding jumper to be installed inside the conduit, use an insulated grounding and bonding bushing.
- F. Nylon pull cord shall be rated for minimum 200 pounds of pull force.

### 3.07 COMMUNICATIONS RACEWAYS:

- A. Special care shall be taken in installing raceways for voice and data applications. The requirements set forth in the applicable sections of EIA/TIA 569; NFPA Article 70, Chapter 8 (Communications) and NFPA Article 70, Section 770 (Fiber Optic Cable Assemblies) shall be referenced.
- B. No single run of conduit is allowed more than 180° of total bending radius. Install pull boxes in runs requiring more than 180° total bending radius.
- C. The maximum bending radius for conduit containing voice/data cabling is six times the diameter of the conduit for sizes 2" and smaller and ten times the diameter of the conduit for conduit sizes greater than 2".
- D. Conduit runs for installation of horizontal cable shall be no longer than 100 feet without a pull box.
- E. Install pull boxes in straight runs of conduit only.
- F. Minimum size conduits for data cable installation shall be minimum 1 inch.
- G. Size pull boxes in accordance with following table:

Conduit Size	e nduit	Width	Length	Depth	Increased
width per co	nuun				
.75"	4"	12"	3"	2"	
1"	4"	16"	3"	2"	
1.25"	6"	20"	3"	3"	
1.5"	8"	27"	4"	4"	
2"	8"	36"	4"	5"	
2.5"	10"	42"	5"	б"	
3"	12"	48"	5"	б"	

3.5"	12"	54"	6"	6"
4"	15"	60"	8"	8"

- H. Conduit bodies are prohibited for use in voice/data conduit runs.
- I. All conduit ends, including stub outs, must be terminated with a bushing.
- J. All conduit must be bonded at each end.

# **END OF SECTION**

#### **SECTION 16138 - BOXES**

#### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

A. Underground handhole enclosures.

#### 1.02 RELATED REQUIREMENTS

- A. Section 16060 Grounding and Bonding.
- B. Section 16131 Conduit:
- C. Section 16010 General Electrical Requirements
- D. Section 16140 Wiring Devices: Wall plates in finished areas.

#### 1.03 REFERENCE STANDARDS

- A. NECA 1 Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.
- B. NEMA FB 1 Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association; 2007.
- C. NEMA OS 1 Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; National Electrical Manufacturers Association; 2008.
- D. NEMA OS 2 Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports; National Electrical Manufacturers Association; 2008.
- E. NEMA 250 Enclosures for Electrical Equipment (1000 Volts Maximum); National Electrical Manufacturers Association; 2008.
- F. NFPA 70 National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

#### 1.04 SUBMITTALS

- A. See Section 01300 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for underground handhole enclosures.
  - 1. Underground Handhole Enclosures: Include reports for load testing in accordance with SCTE 77 certified by a professional engineer or an independent testing agency upon request.
- C. Project Record Documents: Record actual locations and mounting heights of outlet, pull, and junction boxes on project record documents.

#### 1.05 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

#### PART 2 PRODUCTS

# 2.01 BOXES

- A. Underground Handhole Enclosures:
  - 1. Description: In-ground, open bottom boxes furnished with flush, non-skid covers with legend indicating type of service and stainless steel tamper resistant cover bolts.
  - 2. Size: As indicated on drawings.
  - 3. Depth: As required to extend below frost line to prevent frost upheaval, but not less than 12 inches.
  - 4. Polymer Concrete Underground Handhole Enclosures: Comply with SCTE 77.
    - a. Manufacturers:
      - 1) Highline Products, Inc: www.highlineproducts.com.
      - 2) Hubbell Incorporated; Quazite Products: www.hubbellpowersystems.com.
      - 3) Oldcastle Precast, Inc: www.oldcastleprecast.com.

#### 2.02 MANUFACTURERS

A. Substitutions: See Section 01600 - Product Requirements.

#### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that field measurements are as shown on drawings.
- B. Verify that conditions are satisfactory for installation prior to starting work.

#### 3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
- C. Underground Handhole Enclosures:
  - 1. Install enclosure on gravel base, minimum 6 inches deep.
  - 2. Flush-mount enclosures located in concrete or paved areas.
  - 3. Mount enclosures located in landscaped areas with top at 1 inch above finished grade.
  - 4. Install additional bracing inside enclosures in accordance with manufacturer's instructions to minimize box sidewall deflections during backfilling. Backfill with cover bolted in place.
- D. Provide grounding and bonding in accordance with Section 16060.

# **END OF SECTION**

#### **SECTION 16155 - EQUIPMENT WIRING**

#### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

A. Electrical connections to equipment.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 16131 Conduit.
- B. Section 16123 Building Wire and Cable.
- C. Section 16138 Boxes.

#### 1.03 REFERENCE STANDARDS

- A. NEMA WD 1 General Color Requirements for Wiring Devices; National Electrical Manufacturers Association; 1999 (R 2005).
- B. NEMA WD 6 Wiring Devices Dimensional Requirements; National Electrical Manufacturers Association; 2002 (R2008).
- C. NFPA 70 National Electrical Code; National Fire Protection Association; 2008.

# 1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
  - 2. Determine connection locations and requirements.
- B. Sequencing:
  - 1. Install rough-in of electrical connections before installation of equipment is required.
  - 2. Make electrical connections before required start-up of equipment.

#### 1.05 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

#### 1.06 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

#### PART 2 PRODUCTS

#### 2.01 MATERIALS

- A. Cords and Caps: NEMA WD 6; match receptacle configuration at outlet provided for equipment.
  - 1. Colors: Conform to NEMA WD 1.
  - 2. Cord Construction: NFPA 70, Type SO, multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
  - 3. Size: Suitable for connected load of equipment, length of cord, and rating of branch

#### EQUIPMENT WIRING

circuit overcurrent protection.

- B. Wire and Cable: As specified in Section 16123.
- C. Boxes: As specified in Section 16138.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

A. Verify that equipment is ready for electrical connection, wiring, and energization.

#### 3.02 ELECTRICAL CONNECTIONS

- A. Make electrical connections in accordance with equipment manufacturer's instructions.
- B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.
- C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.
- D. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- E. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

# **END OF SECTION**

#### **SECTION 16520 - EXTERIOR LUMINAIRES**

# PART 1 GENERAL

#### 1.01 SECTION INCLUDES

A. Poles and accessories.

#### 1.02 RELATED REQUIREMENTS

- A. Section 16060 Grounding and Bonding.
- B. Section 16138 Boxes.

#### 1.03 REFERENCE STANDARDS

- A. AASHTO LTS Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals; American Association of State Highway and Transportation Officials; 5th Edition, 2009.
- B. IEEE C2 National Electrical Safety Code; 2007.
- C. IESNA RP-8 American National Standard Practice for Roadway Lighting; Illuminating Engineering Society of North America; 2000(R2005) (ANSI/IES RP8).
- D. NECA 1 Standard for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; 2006.
- E. NECA/IESNA 501 Recommended Practice for Installing Exterior Lighting Systems; 2006.
- F. NFPA 70 National Electrical Code; National Fire Protection Association; 2008.

#### 1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Coordinate placement of poles and associated foundations with utilities, curbs, sidewalks, trees, walls, fences, striping, etc. installed under other sections or by others. Coordinate elevation to obtain specified foundation height.
  - 2. Notify GMK Associates of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

#### 1.05 SUBMITTALS

- A. See Section 01300 Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
  - 1. Provide structural calculations for each pole proposed for substitution.
- C. Certificates for Poles and Accessories: Manufacturer's documentation that products are suitable for the luminaires to be installed and comply with designated structural design criteria.
- D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.
- E. Project Record Documents: Record actual connections and locations of pole foundations,

luminaires, and any pull or junction boxes.

#### 1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

# 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, handle, and store products according to NECA/IESNA 501 and manufacturer's written instructions.
- B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.
- C. Handle metal poles carefully to prevent damage to pole or pole finish.
- D. See Section 01600 Product Requirements and Section 16010-General Electrical Requirements, for additional provisions.

#### PART 2 PRODUCTS

### 2.01 POLES

- A. All Poles:
  - 1. Provide poles and associated support components suitable for the luminaire(s) and associated supports and accessories to be installed.
  - 2. Structural Design Criteria:
    - a. Comply with AASHTO LTS.
    - b. Wind Load: Include effective projected area (EPA) of luminaire(s) and associated supports and accessories to be installed.
  - 3. Material: Steel, unless otherwise indicated.
  - 4. Finish: Match luminaire finish, unless otherwise indicated.
  - 5. Mounting: Install on concrete foundation, height as indicated on the drawings, unless otherwise indicated.
- B. Metal Poles: Provide ground lug, accessible from handhole.

# PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that field measurements are as shown on the drawings.
- B. Verify that suitable support frames are installed where required.
- C. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
- D. Verify that conditions are satisfactory for installation prior to starting work.

#### 3.02 INSTALLATION

- A. Coordinate locations of outlet boxes provided under Section 16138 as required for installation of luminaires provided under this section.
- B. Install products according to manufacturer's instructions.

- C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship) and NECA/IESNA 501 (exterior lighting).
- D. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
- E. Pole-Mounted Luminaires:

1.

- Maintain the following minimum clearances:
- a. Comply with IEEE C2.
- b. Comply with utility company requirements.
- 2. Foundation-Mounted Poles:
  - a. Provide cast-in-place concrete foundations for poles as indicated, in accordance with Section 03300.
    - 1) Install anchor bolts plumb per template furnished by pole manufacturer.
    - 2) Position conduits to enter pole shaft.
  - b. Install foundations plumb.
  - c. Install poles plumb, using leveling nuts or shims as required to adjust to plumb.
  - d. Tighten anchor bolt nuts to manufacturer's recommended torque.
  - e. Install anchor base covers or anchor bolt covers as indicated.
- 3. Grounding:
  - a. Bond luminaires, metal accessories, metal poles, and foundation reinforcement to branch circuit equipment grounding conductor.
  - b. Provide supplementary ground rod electrode as specified in Section 16060 at each pole bonded to grounding system as indicated.
- 4. Install separate service conductors, 12 AWG copper, from each luminaire down to handhole for connection to branch circuit conductors.
- 5. Install non-breakaway in-line fuse holders and fuses in pole handhole for each ungrounded conductor.
- F. Bond products and metal accessories to branch circuit equipment grounding conductor.
- G. Provide concrete bases for lighting poles at locations indicated, in accordance with Section 03300. Design foundations to support dead and live loads of pole and fixture assemblies considering the EPA of the pole, fixtures and fixture mounting. Design for a wind loading of 100 miles per hours.

#### 3.03 FIELD QUALITY CONTROL

- A. See Section 01400 Quality Requirements, for additional requirements.
- B. Inspect each product for damage and defects.
- C. Operate each luminaire after installation and connection to verify proper operation.

#### 3.04 CLEANING

A. Clean surfaces according to NECA/IESNA 501 and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

# 3.05 CLOSEOUT ACTIVITIES

A. See Section 01780 - Closeout Submittals, for closeout submittals.

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## 3.06 PROTECTION

A. Protect installed luminaires from subsequent construction operations.

# **END OF SECTION**

# DIVISION 30

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#### **SECTION 311000 - SITE CLEARING**

#### 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. Protecting existing vegetation to remain.
  - 2. Removing existing vegetation.
  - 3. Clearing and grubbing.
  - 4. Stripping and stockpiling topsoil.
  - 5. Removing above- and below-grade site improvements.
  - 6. Disconnecting, capping or sealing, and removing site utilities or abandoning site utilities in place.
  - 7. Temporary erosion- and sedimentation-control measures.
- B. Related Sections:
  - 1. Section 024116 "Structure Demolition" for demolition of buildings, structures, and site improvements.

#### 1.3 DEFINITIONS

- A. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil containing fibrous organic matter and/or roots.
- D. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.

- E. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and indicated on Drawings defined by a circle concentric with each tree with a radius 1.5 times the diameter of the drip line unless otherwise indicated.
- F. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

# 1.4 MATERIAL OWNERSHIP

A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

### 1.5 INFORMATIONAL SUBMITTALS

- A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.
  - 1. Use sufficiently detailed photographs or videotape.
  - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.
- B. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

#### 1.6 QUALITY ASSURANCE

A. Preinstallation Conference: Conduct conference at Project site.

#### 1.7 **PROJECT CONDITIONS**

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
  - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Improvements on Adjoining Property: Authority for performing site clearing indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.

- 1. Do not proceed with work on adjoining property until directed by Architect.
- C. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises if indicated on the drawings.
- D. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- E. Do not commence site clearing operations until temporary erosion- and sedimentationcontrol and plant-protection measures are in place.
- F. The following practices are prohibited within protection zones:
  - 1. Storage of construction materials, debris, or excavated material.
  - 2. Parking vehicles or equipment.
  - 3. Foot traffic.
  - 4. Erection of sheds or structures.
  - 5. Impoundment of water.
  - 6. Excavation or other digging unless otherwise indicated.
  - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- G. Do not direct vehicle or equipment exhaust towards protection zones.
- H. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.
- I. Soil Stripping, Handling, and Stockpiling: Perform only when the topsoil is dry or slightly moist.

# PART 2 - PRODUCTS

# 2.1 MATERIALS

- A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earth Moving."
  - 1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

#### 3.1 **PREPARATION**

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Flag each tree trunk at 54 inches above the ground.
- C. Protect existing site improvements to remain from damage during construction.
  - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

### 3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.
- B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
- D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

#### 3.3 TREE AND PLANT PROTECTION

A. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.

#### 3.4 EXISTING UTILITIES

- A. Owner will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by Contractor.
  - 1. Verify that utilities have been disconnected and capped before proceeding with site clearing.

SITE CLEARING

- B. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.
  - 1. Arrange with utility companies to shut off indicated utilities.
  - 2. Owner will arrange to shut off indicated utilities when requested by Contractor.
- C. Locate, identify, and disconnect utilities indicated to be abandoned in place.
- D. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
  - 1. Notify Architect not less than two days in advance of proposed utility interruptions.
  - 2. Do not proceed with utility interruptions without Architect's written permission.
- E. Excavate for and remove underground utilities indicated to be removed.
- F. Removal of underground utilities is included in earthwork sections and with applicable fire suppression, plumbing, HVAC, electrical, communications, electronic safety and security and utilities sections and Section 024116 "Structure Demolition" and Section 024119 "Selective Structure Demolition."

# 3.5 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
  - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
  - 2. Grind down stumps and remove roots, obstructions, and debris to a depth of 18 inches below exposed subgrade.
  - 3. Use only hand methods for grubbing within protection zones.
  - 4. Chip removed tree branches and dispose of off-site.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
  - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

#### 3.6 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

- B. Strip topsoil to the depth indicated in the project geotechnical report or a minimum of 6" in a manner to prevent intermingling with underlying subsoil or other waste materials.
  - 1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects more than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.
- C. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.
  - 1. Limit height of topsoil stockpiles to 72 inches.
  - 2. Do not stockpile topsoil within protection zones.
  - 3. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.
  - 4. Stockpile surplus topsoil to allow for respreading deeper topsoil.

# 3.7 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
  - 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
  - 2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

# 3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
- B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.

# END OF SECTION 311000

SITE CLEARING

### **SECTION 312000 - EARTH MOVING**

#### 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. Preparing subgrades for walks, pavements, turf and grasses.
  - 2. Subbase course for concrete walks and pavements.
  - 3. Subbase course and base course for asphalt paving.
  - 4. Drainage course for concrete slabs on grade.
  - 5. Subsurface drainage backfill for walls and trenches.
- B. Related Sections:
  - 1. Section 311000 "Site Clearing" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
  - 2. Section 315000 "Excavation Support and Protection" for shoring, bracing, and sheet piling of excavations.

#### 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: Aggregate layer placed between the subbase course and hot-mix asphalt paving.
- C. Bedding Course: Aggregate layer 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.

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- E. Drainage Course: Aggregate layer 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: Aggregate layer placed between the subgrade and base course for hotmix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- K. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

#### PROJECT CONDITIONS 1.4

- Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent A. occupied or used facilities during earth moving operations.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
  - Provide alternate routes around closed or obstructed traffic ways if required by 2. Owner or authorities having jurisdiction.
- Improvements on Adjoining Property: Authority for performing earth moving indicated B. on property adjoining Owner's property will be obtained by Owner before award of Contract.
  - 1. Do not proceed with work on adjoining property until directed by Architect.
- C. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth moving operations.
- D. Do not commence earth moving operations until temporary erosion- and sedimentationcontrol measures, specified in Section 311000 "Site Clearing," are in place.
- E. The following practices are prohibited within protection zones:

- 1. Storage of construction materials, debris, or excavated material.
- 2. Parking vehicles or equipment.
- 3. Foot traffic.
- 4. Erection of sheds or structures.
- 5. Impoundment of water.
- 6. Excavation or other digging unless otherwise indicated.
- 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- F. Do not direct vehicle or equipment exhaust towards protection zones.
- G. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

# PART 2 - PRODUCTS

# 2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: Soil Classification Groups CL, GC, GW, GP, GM, SW, SP, and SM according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: Soil Classification Groups ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.
  - 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. 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.
- I. Sand: ASTM C 33; fine aggregate.
- J. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

# 2.2 ACCESSORIES

- A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored as follows:
  - 1. Red: Electric.
  - 2. Yellow: Gas, oil, steam, and dangerous materials.
  - 3. Orange: Telephone and other communications.
  - 4. Blue: Water systems.
  - 5. Green: Sewer systems.
- B. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
  - 1. Red: Electric.
  - 2. Yellow: Gas, oil, steam, and dangerous materials.
  - 3. Orange: Telephone and other communications.
  - 4. Blue: Water systems.
  - 5. Green: Sewer systems.

# 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 earth moving operations.

- B. Protect and maintain erosion and sedimentation controls during earth moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

# 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 trenches as temporary drainage ditches.

# 3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

# 3.4 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
  - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
  - 2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:
    - a. 24 inches outside of concrete forms other than at footings.
    - b. 12 inches outside of concrete forms at footings.
    - c. 6 inches outside of minimum required dimensions of concrete cast against grade.
    - d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
    - e. 6 inches beneath bottom of concrete slabs-on-grade.
    - f. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.

# 3.5 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.
  - 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.
  - 2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

# 3.6 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

# 3.7 EXCAVATION FOR UTILITY TRENCHES

- A. 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.
- B. 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.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
  - 1. For pipes and conduit less than 6 inches in nominal diameter, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
  - 2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe or conduit circumference. Fill depressions with tamped sand backfill.
  - 3. For flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support conduit on an undisturbed subgrade.

4. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

# 3.8 SUBGRADE INSPECTION

- A. Notify Geotechnical Engineer when excavations have reached required subgrade.
- B. If Geotechnical Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Proof-roll subgrade below the building slabs and pavements with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
  - 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction.
  - 2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Geotechnical Engineer, and replace with compacted backfill or fill as directed.
- D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Geotechnical Engineer, without additional compensation.

# 3.9 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, with 28-day compressive strength of 2500 psi, may be used when approved by Architect.
  - 1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

# 3.10 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.

# 3.11 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.

# 3.12 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. 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.
- C. Trenches under Footings: 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. Backfill voids with satisfactory soil while removing shoring and bracing.
- D. Place and compact initial backfill of satisfactory soil, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.
  - 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- E. Place and compact final backfill of satisfactory soil to final subgrade elevation.
- F. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

# 3.13 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 as follows:
  - 1. Under grass and planted areas, use satisfactory soil material.
  - 2. Under walks and pavements, use satisfactory soil material.
  - 3. Under steps and ramps, use engineered fill.
  - 4. Under building slabs, use engineered fill.
  - 5. Under footings and foundations, use engineered fill.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

# 3.14 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 4 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 4 percent and is too wet to compact to specified dry unit weight.

# 3.15 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 1557:
  - 1. Under streets and pavements- 95%.
  - 2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 92 percent.
  - 3. Shoulders recompact top 8 inches below subgrade and compact each layer of backfill or fill soil material at 92 percent.
  - 4. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 90 percent.

5. For utility trenches, compact each layer of initial and final backfill soil material at 95 percent.

# 3.16 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 Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
  - 1. Turf or Unpaved Areas: Plus or minus 1 inch.
  - 2. Walks: Plus or minus  $\frac{1}{2}$  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.

# 3.17 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

- A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:
  - 1. Place base course material over subbase course under hot-mix asphalt pavement.
  - 2. Shape subbase course and base course to required crown elevations and cross-slope grades.
  - 3. Place subbase course and base course 8 inches or less in compacted thickness in a single layer.
  - 4. Place subbase course and base course that exceeds 8 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 8 inches thick or less than 3 inches thick.
  - 5. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.
- C. Pavement Shoulders: Place shoulders along edges of subbase course 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 92 percent of maximum dry unit weight according to ASTM D 1557. (95 percent of maximum dry density for final 8 inches beneath pavement sections)

# 3.18 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

- 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 with a minimum of two passes of a plate-type or smooth drum vibratory compactor.

### 3.19 **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 Engineer; 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.

# 3.20 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

- B. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Engineer.
  - 1. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000

### SECTION 312315 - EXCAVATION, BACKFILL, AND COMPACTION FOR UTILITIES

#### PART 1 - GENERAL

# 1.1 SECTION INCLUDES

- A. Excavation of trenches for installation of utilities.
- B. Backfilling trenches with bedding material as specified and filling trenches with suitable material to proposed subgrade.
- C. Compacting backfill materials in acceptable manner.
- D. Borings and casings under roads.

#### 1.2 RELATED SECTIONS

- A. Section 02 41 16 Structure Demolition
- B. Section 31 20 00 Earth Moving
- C. Section 33 41 00 Storm Utility Drainage Piping
- D. Construction Drawings

#### 1.3 SUBMITTALS

A. Shop drawings or details pertaining to site utilities are not required unless required by regulatory authorities or unless uses of materials, methods, equipment, or procedures that are contrary to Construction Drawings or Specifications are proposed. Do not perform work until Owner has accepted required shop drawings.

### 1.4 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of subsurface utilities, structures, and obstructions installed or encountered.

# 2.1 MATERIALS

- A. Bedding Material: Aggregate Type as indicated on the plans and in Section 31 20 00.
- B. Haunching Material: Aggregate Type as indicated on the plans and in Section 31 20 00.
- C. Backfill material from the site as specified in Section 31 20 00 and approved by Owner.
- D. Backfill material from off-site as specified in Section 31 20 00 and approved by Owner.
- E. Steel Casing Pipe: Comply with AWWA C200 minimum grade B, size, and wall thickness as indicated on Construction Drawings.
- F. Backfill material shall not contain rock or stone with a maximum size greater than 2 inches.

# 2.2 LOCATOR TAPE

A. Locator tape shall be heavy duty 6" wide underground warning tape. Tape shall be made from polyethylene material, 3.5 mils thick, with a minimum tensile strength of 1,750 psi. Place the tape at one-half the minimum depth of cover for the utility line or a maximum of 3', which ever is the lesser, but never above the top of subgrade. Color of tape shall be determined by APWA Color Standards: Natural Gas - Yellow, Electric - Red, Telephone -Orange.

# 2.3 EQUIPMENT

A. Transport off-site materials to project using well-maintained and operating vehicles. Once on site, transporting vehicles shall stay on designated haul roads and shall at no time endanger improvements by rutting, overloading, or pumping

# PART 3 - EXECUTION

# 3.1 PREPARATION

- A. Set lines, elevations, and grades for proposed systems.
- B. Protect benchmarks, property corners, and other survey monuments from damage or displacement. If marker needs to be removed it shall be referenced by licensed land surveyor and replaced, as necessary, by same.
- C. Maintain in operating condition existing utilities, previously installed utilities, and drainage systems encountered in utility installation. Repair surface or subsurface improvements shown on Construction Drawings.
- D. Verify location, size, elevation, and other pertinent data required making connections to existing utilities and drainage systems as indicated on Construction Drawings.
- E. Over excavate and properly prepare areas of subgrade that are not capable of supporting proposed systems. Stabilize these areas by using acceptable bedding material placed and compacted as shown on the plans.
- F. Provide dewatering systems as required for utility excavations. Dewatering systems shall comply with requirements of Section 31 23 19.

# 3.2 EXCAVATION

- A. Contact local utility companies before excavation begins. Dig trench at proper width and depth for laying pipe, conduit, or cable. Cut trench banks vertical, if possible, and remove stones from bottom of trench as necessary to avoid point -bearing. Over excavate wet or unstable soil, if encountered, from trench bottom as necessary to provide suitable base for continuous and uniform bedding.
- B. Trench excavation sidewalls shall be sloped, shored, sheeted, braced, or otherwise supported by means of sufficient strength to protect workmen in accordance with applicable rules and regulations established for construction by the Department of Labor, Occupational Safety and Health Administration (OSHA), and by local ordinances. Lateral travel distance to exit ladder or steps shall not be greater than 25-feet in trenches 4-feet or deeper.
- C. Perform excavation as indicated on Construction Drawings for specified depths. During excavation, stockpile materials suitable for backfilling in orderly manner far enough from bank of trench to avoid overloading, slides, or cave -ins.
- D. Remove excavated materials not required or not suitable for backfill or embankments and waste off-site or at on-site locations approved by the Owner and in accordance with governing regulations.
- E. Prevent surface water from flowing into trenches or other excavations by temporary grading or other methods, as required. Remove accumulated water in trenches and other excavations as specified in Section 31 23 19.
- F. Open cut excavation with trenching machine or backhoe. Where machines other than ladder or wheel-type trenching machines are used, do not use clods for backfill. Dispose of unsuitable material and provide other suitable material at no additional cost to Owner.

- G. Accurately grade trench bottom to provide uniform bearing and support for each section of pipe on bedding material at every point along entire length, except where necessary to excavate for bell holes, proper sealing of pipe joints, or other required connections. Dig bell holes and depressions for joints after trench bottom has been graded. Dig no deeper, longer, or wider than needed to make joint connection properly.
- H. Trench width below top of pipe shall not be less than 12-inches or more than 18-inches wider than outside surface of pipe or conduit that is to be installed to designated elevations and grades. Other trench width for pipe, conduit, or cable shall be least practical width that will allow for proper compaction of trench backfill.
- I. Trench depth requirements measured from finished grade or paved surface shall meet the following requirements or applicable codes and ordinances, whichever is more stringent:
  - 1. Water Mains: 36-inches to top of pipe barrel or 6-inches below frost line, established by local building official, whichever is deeper.
  - 2. Sanitary Sewer: Elevations and grades as indicated on Construction Drawings.
  - 3. Storm Sewer: Elevations and grades as indicated on Construction Drawings.
  - 4. TV Conduits: 18-inches minimum to top of conduit or as required by local utility company, whichever is deeper.
  - 5. Telephone Conduits: 18-inches minimum to top of conduit, or as required by local utility company, whichever is deeper.
  - 6. Gas Mains and Service: 30-inches minimum to top of pipe, or as required by local utility company, whichever is deeper.

#### 3.3 PIPE BEDDING

A. Accurately cut trenches for pipe or conduit that is to be installed to designated elevations, and provide bedding and backfilling as shown on Construction Drawings and as specified in Section 31 20 00.

# 3.4 BACKFILLING

- A. Criteria: Do not backfill trenches until required tests are performed and utility systems comply with and are accepted by applicable governing authorities. Backfill trenches as specified in Sections 31 20 00. If improperly backfilled, reopen to depth required to obtain proper compaction. Backfill and compact, as specified herein, to properly correct the condition in an acceptable manner.
- B. Backfilling: After pipe or conduit has been installed, bedded, and tested as required, backfill trench or structure excavation with specified material placed as given in the Construction Documents.
- C. Backfill trenches to contours and elevations shown on Construction Drawings with unfrozen materials.
- D. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

3.5 COMPACTION

- A. Exercise proper caution when compacting immediately over top of pipes or conduits. Water jetting or flooding is not permitted as method of compaction.
- B. Maintain optimum moisture content of fill materials as specified in Section 31 20 00 to attain required compaction density.
- 3.6 BORINGS AND CASINGS UNDER ROADS, HIGHWAYS, AND RAILROAD CROSSINGS
  - A. When indicated by Construction Drawings, street, road, highway, or railroad crossings for utility mains installed by jacking and boring method shall be in accordance with area specifications and governing authorities.
  - B. Excavation of approach pits and trenches within right -of-way of street, road, highway, or railroad shall be of sufficient distance from paving or railroad tracks to permit traffic to pass without interference. Tamp backfill for approach pits and trenches within right-of-way in layers not greater than 6-inches thick for entire length and depth of trench or pit. Compact backfill to 95 percent of maximum density, in accordance with ASTM D1557 obtained at optimum moisture as determined by AASHTO T 180. Mechanical tampers may be used after cover of 6-in. has been obtained over top of barrel of pipe.
  - C. Accomplish boring operation using commercial type boring rig. Bore hole to proper alignment and grade. Bore hole shall be within 2-inches of same diameter as largest outside joint diameter of pipe installed. Install pipe in hole immediately after bore has been made and in no instance shall hole be left unattended while open.
  - D. In the event subsurface operations result in failure or damage to pavement or railroad tracks within 1 year of construction, make necessary repairs to pavement or railroad tracks at no additional cost to Owner. If paving cracks on either side of pipe line or is otherwise disturbed or broken due to construction operations, repair or replace disturbed or broken area at no additional cost to Owner.
  - E. Clean, prime, and line interior and exterior of casing pipe with two coats of asphalt in accordance with area specifications and governing authorities.
  - F. Butt weld steel casing. Welds shall be full penetration single butt-welds in accordance with AWWA C206 and AWS D7-0-62.
  - G. Install casing and utility pipe with end seals, vent pipe, and other special equipment in accordance with area specifications and governing authorities..

# SECTION 315000 - EXCAVATION SUPPORT AND PROTECTION

#### 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 temporary excavation support and protection systems.
- B. Related Sections:
  - 1. Section 312319 "Dewatering" for dewatering system for excavations.

# 1.3 PERFORMANCE REQUIREMENTS

- A. Design, furnish, install, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting soil and hydrostatic pressure and superimposed and construction loads.
  - 1. Prevent surface water from entering excavations by grading, dikes, or other means.
  - 2. Install excavation support and protection systems without damaging existing buildings, structures, and site improvements adjacent to excavation.

#### 1.4 QUALITY ASSURANCE

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review methods and procedures related to excavation support and protection system including, but not limited to, the following:
    - a. Existing utilities and subsurface conditions.
    - b. Proposed excavations.
    - c. Proposed equipment.
    - d. Monitoring of excavation support and protection system.
    - e. Working area location and stability.
    - f. Coordination with waterproofing.
    - g. Abandonment or removal of excavation support and protection system.

# 1.5 PROJECT CONDITIONS

- A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:
  - 1. Notify Owner no fewer than two days in advance of proposed interruption of utility.
  - 2. Do not proceed with interruption of utility without Owner's written permission.

# PART 2 - PRODUCTS

# 2.1 MATERIALS

- A. General: Provide materials that are either new or in serviceable condition.
- B. Structural Steel: ASTM A 36/A 36M, ASTM A 690/A 690M, or ASTM A 992/A 992M.
- C. Steel Sheet Piling: ASTM A 328/A 328M, ASTM A 572/A 572M, or ASTM A 690/A 690M; with continuous interlocks.
  - 1. Corners: Site-fabricated mechanical interlock.
- D. Wood Lagging: Lumber, mixed hardwood, nominal rough thickness of size and strength required for application.

# 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 that could develop during excavation support and protection system operations.
  - 1. Shore, support, and protect utilities encountered.
- B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

- C. Locate excavation support and protection systems clear of permanent construction so that forming and finishing of concrete surfaces are not impeded.
- D. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure that excavation support and protection systems remain stable.
- E. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

# 3.2 SOLDIER PILES AND LAGGING

- A. Install steel soldier piles before starting excavation. Extend soldier piles below excavation grade level to depths adequate to prevent lateral movement. Space soldier piles at regular intervals not to exceed allowable flexural strength of wood lagging. Accurately align exposed faces of flanges to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.
- B. Install wood lagging within flanges of soldier piles as excavation proceeds. Trim excavation as required to install lagging. Fill voids behind lagging with soil, and compact.

# 3.3 REMOVAL AND REPAIRS

- A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities, and utilities.
  - 1. Remove excavation support and protection systems to a minimum depth of 48 inches below overlaying construction and abandon remainder.
  - 2. Fill voids immediately with approved backfill compacted to density specified in Section 312000 "Earth Moving."
  - 3. Repair or replace, as approved by Architect, adjacent work damaged or displaced by removing excavation support and protection systems.

END OF SECTION 315000

#### **SECTION 321313 - CONCRETE PAVING**

#### 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. Contractor shall make reference to the latest version of SCDOT specifications and if these specifications differ, the SCDOT specifications shall prevail as applicable.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Driveways.
  - 2. Parking lots.
  - 3. Curbs and gutters.
  - 4. Walks.

#### B. Related Sections:

1. Section 321373 "Concrete Paving Joint Sealants" for joint sealants in expansion and contraction joints within concrete paving and in joints between concrete paving and asphalt paving or adjacent construction.

#### 1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

### 1.4 QUALITY ASSURANCE

- A. Detectable Warning Installer Qualifications: An employer of workers trained and approved by manufacturer of stamped concrete paving systems.
- B. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

- 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").
- C. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
  - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
- D. Concrete Testing Service: Engage a qualified testing agency to perform material evaluation tests and to design concrete mixtures.
- E. ACI Publications: Comply with ACI 301 unless otherwise indicated.
- F. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review methods and procedures related to concrete paving, including but not limited to, the following:
    - a. Concrete mixture design.
    - b. Quality control of concrete materials and concrete paving construction practices.
  - 2. Require representatives of each entity directly concerned with concrete paving to attend, including the following:
    - a. Contractor's superintendent.
    - b. Independent testing agency responsible for concrete design mixtures.
    - c. Concrete paving subcontractor.

# 1.5 PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.
- B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F for oil-based materials 55 deg F for water-based materials, and not exceeding 95 deg F.

#### 2.1 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
  - 1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less. Do not use notched and bent forms.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

#### 2.2 STEEL REINFORCEMENT

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars. Cut bars true to length with ends square and free of burrs.

#### 2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:
  - 1. Portland Cement: ASTM C 150, gray portland cement Type I.
- B. Normal-Weight Aggregates: ASTM C 33,, uniformly graded. Provide aggregates from a single source.
  - 1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
  - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: Potable and complying with ASTM C 94/C 94M.
- D. Air-Entraining Admixture: ASTM C 260.

#### 2.4 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry or cotton mats.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlappolyethylene sheet.

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C. Water: Potable.

### 2.5 RELATED MATERIALS

- A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork in preformed strips.
- B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

#### 2.6 PAVEMENT MARKINGS

- A. Pavement-Marking Paint: Alkyd-resin type, lead and chromate free, ready mixed, complying with AASHTO M 248, Type N; colors complying with FS TT-P-1952.
  - 1. Color: White Yellow Blue.

#### 2.7 WHEEL STOPS

- A. Wheel Stops: Precast, air-entrained concrete, 2500-psi minimum compressive strength, 4-1/2 inches high by 9 inches wide by 72 inches long. Provide chamfered corners and drainage slots on underside and holes for anchoring to substrate.
  - 1. Dowels: Galvanized steel, 3/4 inch in diameter, 10-inch minimum length.

#### 2.8 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.
  - 1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
  - 2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that meet or exceed requirements.
- B. Proportion mixtures to provide normal-weight concrete with the following properties:
  - 1. Compressive Strength (28 Days): 4000 psi.
  - 2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.
  - 3. Slump Limit: 2" to 4" for hand-placed concrete, 1-1/4" to 3" for machine-placed concrete.

- C. Add air-entraining admixture at manufacturer's prescribed rate to result in normalweight concrete at point of placement having an air content as follows:
  - 1. Air Content: 6 percent plus or minus 1.5 percent for 3/4-inch nominal maximum aggregate size.

# 2.9 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.
  - 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

#### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.
  - 1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.
  - 2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
  - 3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Section 312000 "Earth Moving."
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

# 3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

# 3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

#### 3.4 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
  - 1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.
  - 1. Butt Joints: Use bonding agent at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
  - 2. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
  - 1. Locate expansion joints at intervals of 50 feet unless otherwise indicated.
  - 2. Extend joint fillers full width and depth of joint.
  - 3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
  - 4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
  - 5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
  - 6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth

of the concrete thickness, as follows, to match jointing of existing adjacent concrete paving:

- 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch radius. Repeat grooving of contraction joints after applying surface finishes.
  - a. Tolerance: Ensure that grooved joints are within 3 inches either way from centers of dowels.
- 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
  - a. Tolerance: Ensure that sawed joints are within 3 inches either way from centers of dowels.
- 3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

# 3.5 CONCRETE PLACEMENT

- A. Before placing concrete, inspect and complete formwork installation and items to be embedded or cast-in.
- B. Remove snow, ice, or frost from subbase surface before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.
- F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

- G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
  - 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating dowels and joint devices.
- H. Screed paving surface with a straightedge and strike off.
- I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- J. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.
- K. Slip-Form Paving: Use design mixture for automatic machine placement. Produce paving to required thickness, lines, grades, finish, and jointing.
  - 1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of slip-form paving machine during operations.
- L. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
  - 1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
  - 2. Do not use frozen materials or materials containing ice or snow.
  - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.
- M. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:
  - 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  - 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.

3. Fog-spray forms and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

# 3.6 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
  - 1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across floatfinished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

#### 3.7 DETECTABLE WARNINGS

- A. Stamped Detectable Warnings: Install stamped detectable warnings as part of a continuous concrete paving placement and according to stamp-mat manufacturer's written instructions.
  - 1. Before using stamp mats, verify that the vent holes are unobstructed.
  - 2. Apply liquid release agent to the concrete surface and the stamp mat.
  - 3. Stamping: While initially finished concrete is plastic, accurately align and place stamp mats in sequence. Uniformly load, gently vibrate, and press mats into concrete to produce imprint pattern on concrete surface. Load and tamp mats directly perpendicular to the stamp-mat surface to prevent distortion in shape of domes. Press and tamp until mortar begins to come through all of the vent holes. Gently remove stamp mats.
  - 4. Trimming: After 24 hours, cut off the tips of mortar formed by the vent holes.
  - 5. Remove residual release agent according to manufacturer's written instructions, but no fewer than three days after stamping concrete. High-pressure-wash surface and joint patterns, taking care not to damage stamped concrete. Control, collect, and legally dispose of runoff.

# 3.8 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.

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- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture curing or moisture-retaining-cover curing as follows:
  - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
  - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moistureretaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period using cover material and waterproof tape.

# 3.9 PAVING TOLERANCES

- A. Comply with tolerances in ACI 117 and as follows:
  - 1. Elevation: 3/4 inch.
  - 2. Thickness: Plus 3/8 inch, minus 1/4 inch.
  - 3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 1/2 inch.
  - 4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches of tie bar.
  - 5. Lateral Alignment and Spacing of Dowels: 1 inch.
  - 6. Vertical Alignment of Dowels: 1/4 inch.
  - 7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches of dowel.
  - 8. Joint Spacing: 3 inches.
  - 9. Contraction Joint Depth: Plus 1/4 inch, no minus.
  - 10. Joint Width: Plus 1/8 inch, no minus.

# 3.10 PAVEMENT MARKING

CONCRETE PAVING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.
- B. Allow concrete paving to cure for a minimum of 28 days and be dry before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply paint with mechanical equipment to produce markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.
  - 1. Apply graphic symbols and lettering with paint-resistant, die-cut stencils, firmly secured to concrete surface. Mask an extended area beyond edges of each stencil to prevent paint application beyond stencil. Apply paint so that it cannot run beneath stencil.
  - 2. Broadcast glass beads uniformly into wet markings at a rate of 6 lb/gal..

# 3.11 WHEEL STOPS

- A. Install wheel stops in bed of adhesive applied as recommended by manufacturer.
- B. Securely attach wheel stops to paving with not less than two steel dowels located at one-quarter to one-third points. Install dowels in drilled holes in the paving and bond dowels to wheel stop. Recess head of dowel beneath top of wheel stop.

# 3.12 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Testing Services: The independent resting laboratory will randomly core pavement at a minimum rate of 1 core per 20,000 s.f. of pavement, with a minimum of 3 cores from heavy-duty areas and 3 cores from light-duty areas. Core will be tested for thickness and quality of aggregate distribution. Core holes shall be patched immediately with Portland cement concrete and shall be finished to match surrounding finish.

# 3.13 REPAIRS AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.

- B. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- C. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313

# SECTION 321373 - CONCRETE PAVING JOINT SEALANTS

#### 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. Contractor shall make reference to the latest version of SCDOT specifications and if these specifications differ, the SCDOT specifications shall prevail as applicable.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Cold-applied joint sealants.
  - 2. Hot-applied joint sealants.

#### B. Related Sections:

- 1. Section 321216 "Asphalt Paving" for constructing joints between concrete and asphalt pavement.
- 2. Section 321313 "Concrete Paving" for constructing joints in concrete pavement.

#### 1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Source Limitations: Obtain each type of joint sealant from single source from single manufacturer.
- C. Product Testing: Test joint sealants using a qualified testing agency.
  - 1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
- D. Preinstallation Conference: Conduct conference at Project site.

### 1.4 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

- 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
- 2. When joint substrates are wet.
- 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
- 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

# PART 2 - PRODUCTS

# 2.1 MATERIALS

A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer based on testing and field experience.

# 2.2 COLD-APPLIED JOINT SEALANTS

- A. Single-Component, Nonsag, Silicone Joint Sealant for Concrete: ASTM D 5893, Type NS.
- B. Single-Component, Self-Leveling, Silicone Joint Sealant for Concrete: ASTM D 5893, Type SL.
- C. Multicomponent, Pourable, Traffic-Grade, Urethane Joint Sealant for Concrete: ASTM C 920, Type M, Grade P, Class 25, for Use T.

# 2.3 HOT-APPLIED JOINT SEALANTS

- A. Hot-Applied, Single-Component Joint Sealant for Concrete: ASTM D 3406.
- B. Hot-Applied, Single-Component Joint Sealant for Concrete and Asphalt: ASTM D 6690, Types I, II, and III.

# 2.4 JOINT-SEALANT BACKER MATERIALS

A. General: Provide joint-sealant backer materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing.

- B. Round Backer Rods for Cold- and Hot-Applied Joint Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.
- C. Round Backer Rods for Cold-Applied Joint Sealants: ASTM D 5249, Type 3, of diameter and density required to control joint-sealant depth and prevent bottom-side adhesion of sealant.
- D. Backer Strips for Cold- and Hot-Applied Joint Sealants: ASTM D 5249; Type 2; of thickness and width required to control joint-sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

#### 2.5 PRIMERS

A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

# PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

### 3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.
- B. Joint-Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install joint-sealant backings of kind indicated to support joint sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  - 1. Do not leave gaps between ends of joint-sealant backings.
  - 2. Do not stretch, twist, puncture, or tear joint-sealant backings.
  - 3. Remove absorbent joint-sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install joint sealants using proven techniques that comply with the following and at the same time backings are installed:
  - 1. Place joint sealants so they directly contact and fully wet joint substrates.
  - 2. Completely fill recesses in each joint configuration.
  - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Joint Sealants: Immediately after joint-sealant application and before skinning or curing begins, tool sealants according to the following requirements to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint:
  - 1. Remove excess joint sealant from surfaces adjacent to joints.
  - 2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.
- F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated.

# 3.4 CLEANING

A. Clean off excess joint sealant or sealant smears adjacent to joints as the Work progresses, by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 **PROTECTION** 

A. Protect joint sealants, during and after curing period, from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations in repaired areas are indistinguishable from the original work.

END OF SECTION 321373

#### **SECTION 334100 - STORM UTILITY DRAINAGE PIPING**

#### 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. Refer to Section 334700 HDPE Storm Drainage Piping also.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Pipe and fittings.
  - 2. Nonpressure transition couplings.
  - 3. Cleanouts.
  - 4. Drains.
  - 5. Manholes.
  - 6. Catch basins.
  - 7. Stormwater inlets.
  - 8. Stormwater detention structures.
  - 9. Pipe outlets.

# 1.3 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 and stormwater inlets according to manufacturer's written rigging instructions.

#### 1.4 **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 Owner no fewer than two days in advance of proposed interruption of service.
- 2. Do not proceed with interruption of service without Owner's written permission.

# PART 2 - PRODUCTS

# 2.1 PVC PIPE AND FITTINGS

- A. PVC Gravity Sewer Piping:
  - 1. Pipe and Fittings: ASTM F 679, T-1 wall thickness, PVC gravity sewer pipe with bell-and-spigot ends and with integral ASTM F 477, elastomeric seals for gasketed joints.

# 2.2 CONCRETE PIPE AND FITTINGS

- A. Reinforced-Concrete Sewer Pipe and Fittings: ASTM C 76.
  - 1. Bell-and-spigot or tongue-and-groove ends and gasketed joints with ASTM C 443, rubber gaskets
  - 2. Class III, Wall B.

# 2.3 CLEANOUTS

- A. Cast-Iron Cleanouts:
  - 1. Description: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug.
  - 2. Top-Loading Classification(s): Heavy Duty.
  - 3. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.
- B. Plastic Cleanouts:
  - 1. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

# 2.4 MANHOLES

A. Standard Precast Concrete Manholes:

# STORM UTILITY DRAINAGE PIPING

- 1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
- 2. Diameter: 48 inches minimum unless otherwise indicated.
- 3. Ballast: Increase thickness of precast concrete sections or add concrete to base section as required to prevent flotation.
- 4. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
- 5. Riser Sections: 4-inch minimum thickness, and lengths to provide depth indicated.
- 6. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated, and top of cone of size that matches grade rings.
- 7. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
- 8. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
- 9. Steps: Individual FRP steps; FRP ladder; or ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 48".
- 10. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, to match diameter of manhole frame and cover, and height as required to adjust manhole frame and cover to indicated elevation and slope.
- B. Designed Precast Concrete Manholes:
  - 1. Description: ASTM C 913; designed according to ASTM C 890 for A-16 (AASHTO HS20-44), heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for sealant joints.
  - 2. Ballast: Increase thickness of one or more precast concrete sections or add concrete to manhole as required to prevent flotation.
  - 3. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
  - 4. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
  - 5. Steps: Individual FRP steps; FRP ladder; or ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 48".
  - 6. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, to match diameter of manhole frame and cover, and of height required to adjust manhole frame and cover to indicated elevation and slope.
- C. Manhole Frames and Covers:

- 1. Description: Ferrous; 24-inch ID by 7- to 9-inch riser with 4-inch- minimum width flange and 26-inch- diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "STORM SEWER" or other Fort Jackson Standard stamp. Contractor to verify.
- 2. Material: ASTM A 536, Grade 60-40-18 ductile iron unless otherwise indicated.

#### 2.5 CONCRETE

- A. General: Cast-in-place concrete according to ACI 318, ACI 350/350R, and the following:
  - 1. Cement: ASTM C 150, Type II.
  - 2. Fine Aggregate: ASTM C 33, sand.
  - 3. Coarse Aggregate: ASTM C 33, crushed gravel.
  - 4. Water: Potable.
- B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio.
  - 1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
  - 2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.
- C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.
  - 1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
    - a. Invert Slope: 2 percent through manhole.
  - 2. Benches: Concrete, sloped to drain into channel.
    - a. Slope: 8 percent.
- D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water/cementitious materials ratio.
  - 1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
  - 2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

#### 2.6 CATCH BASINS

- A. Standard Precast Concrete Catch Basins:
  - 1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
  - 2. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
  - 3. Riser Sections: 4-inch minimum thickness, 48-inch diameter, and lengths 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.
  - 5. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
  - 6. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and shape matching catch basin frame and grate. Include sealant recommended by ring manufacturer.
  - 7. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch- diameter frame and grate.
  - 8. Steps: Individual FRP steps; FRP ladder; or ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of catch basin to finished grade is less than 48"
  - 9. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.
- B. Designed Precast Concrete Catch Basins: ASTM C 913, precast, reinforced concrete; designed according to ASTM C 890 for A-16 (ASSHTO HS20-44), heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for joint sealants.
  - 1. Joint Sealants: ASTM C 990, bitumen or butyl rubber.
  - 2. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and shape matching catch basin frame and grate. Include sealant recommended by ring manufacturer.
  - 3. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch- diameter frame and grate.
  - 4. Steps: Individual FRP steps; FRP ladder; or ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals.

Omit steps if total depth from floor of catch basin to finished grade is less than 48".

- 5. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.
- C. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for A-16, structural loading. Include flat grate with small square or short-slotted drainage openings.
  - 1. Size: 24 by 24 inches minimum unless otherwise indicated on drawings.
  - 2. Grate Free Area: Approximately 50 percent unless otherwise indicated.
- D. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for A-16, structural loading. Include 24-inch ID by 7- to 9-inch riser with 4-inch minimum width flange, and 26-inch- diameter flat grate with small square or short-slotted drainage openings.
  - 1. Grate Free Area: Approximately 50 percent unless otherwise indicated.

#### 2.7 STORMWATER INLETS

A. Frames and Grates: Heavy duty.

# 2.8 STORMWATER DETENTION STRUCTURES

- A. Cast-in-Place Concrete, Stormwater Detention Structures: Constructed of reinforcedconcrete bottom, walls, and top; designed according to ASTM C 890 for A-16 (AASHTO HS20-44), heavy-traffic, structural loading; of depth, shape, dimensions, and appurtenances indicated.
  - 1. Ballast: Increase thickness of concrete as required to prevent flotation.
  - 2. Steps: Individual FRP steps; FRP ladder; or ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of structure to finished grade is less than 48".
  - 3. Manhole Frames and Covers: ASTM A 536, Grade 60-40-18, ductile-iron castings designed for heavy-duty service. Include 24-inch ID by 7- to 9-inch riser with 4-inch minimum width flange, and 26-inch- diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "STORM SEWER" or other Fort Jackson Standard stamp. Contractor to verify.

#### 2.9 PIPE OUTLETS

- A. Riprap Basins: Broken, irregularly sized and shaped, graded stone according to NSSGA's "Quarried Stone for Erosion and Sediment Control."
- B. Filter Stone: According to NSSGA's "Quarried Stone for Erosion and Sediment Control," No. FS-2, No. 4 screen opening, average-size graded stone.

# PART 3 - EXECUTION

# 3.1 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Section 312000 "Earth Moving."

# 3.2 PIPING INSTALLATION

- A. 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 into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. 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.
- C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- D. Install gravity-flow, nonpressure drainage piping according to the following:
  - 1. Install piping pitched down in direction of flow.
  - 2. Install piping Insert value and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place concrete supports or anchors.
  - 3. Install piping with 18" minimum cover.
  - 4. Install PVC profile gravity sewer piping according to ASTM D 2321 and ASTM F 1668.
  - 5. Install reinforced-concrete sewer piping according to ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual."

#### 3.3 PIPE JOINT CONSTRUCTION

- A. Join gravity-flow, nonpressure drainage piping according to the following:
  - 1. Join PVC profile gravity sewer piping according to ASTM D 2321 for elastomeric-seal joints or ASTM F 794 for gasketed joints.
  - 2. Join reinforced-concrete sewer piping according to ACPA's "Concrete Pipe Installation Manual" for rubber-gasketed joints.
  - 3. Join dissimilar pipe materials with nonpressure-type flexible couplings.

#### 3.4 CLEANOUT INSTALLATION

- A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use castiron 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 Heavy-Duty, top-loading classification cleanouts in vehicle-traffic 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 concrete pavement and roads with tops flush with pavement surface.

#### 3.5 DRAIN INSTALLATION

- A. Install type of drains in locations indicated.
  1. Use Heavy-Duty, top-loading classification drains in vehicle-traffic service areas.
- B. Fasten grates to drains if indicated.
- C. Set drain frames and covers with tops flush with pavement surface.

#### 3.6 MANHOLE INSTALLATION

- A. General: Install manholes, complete with appurtenances and accessories indicated.
- B. Install precast concrete manhole sections with sealants according to ASTM C 891.
- C. Where specific manhole construction is not indicated, follow manhole manufacturer's written instructions.

D. 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. Construct catch basins to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

#### 3.8 STORMWATER INLET AND OUTLET INSTALLATION

- A. Construct riprap of broken stone, as indicated.
- B. Install outlets that spill onto grade, with flared end sections that match pipe, where indicated.
- C. Construct energy dissipaters at outlets, as indicated.

#### 3.9 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. Submit separate reports for each system inspection.
  - 2. Defects requiring correction include the following:
    - 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. Damage: Crushed, broken, cracked, or otherwise damaged piping.
  - 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
  - 4. Reinspect and repeat procedure until results are satisfactory.

# 3.10 CLEANING

A. Clean interior of piping of dirt and superfluous materials. Flush with water.

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END OF SECTION 334100

#### **SECTION 334700 – HDPE STORM DRAINAGE PIPING**

PART 1 — GENERAL

1.1 SUMMARY

This specification applies to corrugated High-Density Polyethylene (HDPE) pipe with full circular cross-section and an integrally formed smooth interior. Nominal sizes are 4" -60" diameter.

#### **1.2 REFERENCE STANDARDS**

- A. American Association of State Highway and Transportation Officials (AASHTO)
  - a. AASHTO HB -Section 30 Thermoplastic Pipe
  - b. AASHTO M252 Corrugated Polyethylene Drainage Pipe
  - c. AASHTO M294 Corrugated Polyethylene Drainage Pipe 300to 1500-mm Diameter
- B. American Society for Testing and Materials (ASTM)
  - a. ASTM D2321 Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
  - b. ASTM D3212 Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
  - c. ASTM F477 Elastomeric Seals (Gaskets) for Joining Plastic Pipe

d. ASTM F2306 – 12 to 60 in. [300 to 1500 mm] Annular Corrugated Profile Wall Polyethylene (PE) Pipe and Fittings for Gravity-Flow Storm Sewer and Subsurface Drainage Applications

#### **1.3 DEFINITIONS**

HDPE - High Density Polyethylene Pipe NTPEP - National Transportation Product Evaluation Program

# 1.4 PERFORMANCE STANDARDS

Pipe and fittings shall meet the requirements of AASHTO M252 for diameters 4" through 10" (100 to 250mm), and AASHTO M294 or ASTM F2306 for diameters 12" through 60" (300 to 1500mm). Pipe shall be Type S (Smooth interior) unless otherwise specified. Pipe and resin producers shall be certified according to the NTPEP Third Party Certification Program. All corrugated polyethylene pipe shall contain the appropriate program mark, either an official label or permanent affixation prior to shipment.

# 1.5 DELIVERY, STORAGE AND HANDLING

All pipe and fittings shall be delivered to the site and unloaded with handling that conforms to the manufacturer's instructions for reasonable care. Pipe shall not be rolled or dragged over gravel or rock during handling. The Contractor shall take necessary precautions to ensure the method used in lifting or placing the pipe does not induce stress fatigue in the pipe.

# PART 2 — PRODUCTS

# 2.1 CORRUGATED HIGH DENSITY POLYETHYLENE PIPE

1. Pipe and fittings shall meet the requirements of AASHTO M252 for diameters 4" through 10" (100 to 250mm), and AASHTO M294 or ASTM F2306 for diameters 12" through 60" (300 to 1500mm). Pipe shall be Type S (Smooth interior) unless otherwise specified. Pipe and resin producers shall be certified according to the NTPEP Third Party Certification Program. All corrugated polyethylene pipe shall contain the appropriate program mark, either an official label or permanent affixation prior to shipment.

### 2.1.1 Joint Performance

Pipe joints shall be water-tight joints must meet a 10.8 psi (74 kPa) laboratory test per ASTM D3212 and utilize a bell and spigot design with a gasket meeting ASTM F 477. A reinforced bell device shall be used on all water-tight pipe and fittings and this device shall be integrally bonded to the bell.

2.1.2 Fittings

Fittings used with the pipe shall not reduce or impair the overall integrity or function of the pipeline. Fittings may be molded or fabricated and shall be furnished by the pipe manufacturer.

2.1.3 Installation

Pipe installation shall be in accordance with Section 3 of this specification and the product manufacturer's published installation guides.

# PART 3 — EXECUTION

# 3.1 EARTHWORK

A. Excavation, trenching, and backfilling shall be as specified in this Section and with reference to Section 312000 EARTH MOVING.

# 3.2 IDENTIFICATION

For all stormwater and subsurface drainage piping, green warning tape should be placed six (6) inches directly over the top of pipe and at outside edges of underground structures.

#### **3.3** PIPING INSPECTION

3.3.1 General

Piping, fittings, and drainage structures shall be inspected prior to installation and any defective or damaged product shall be replaced.

# 3.3.2 Corrugated HDPE Pipe and Fittings

- A. Any pipe, fittings, or drainage structures with cuts, punctures, or other damage on the interior or exterior shall be rejected and replaced.
- B. Any pipe, fittings or drainage structures with damaged ends or joints, which would prevent proper sealing of the joints, shall be rejected and replaced.

# 3.4 PIPING, FITTING, AND DRAINAGE STRUCTURE INSTALLATION

3.4.1 General

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm and drainage piping system. Location and arrangement of piping layout take design considerations into account. Install piping system as indicated herein and as directed by the product manufacturer, to extent practical. Where specific installation procedure is not indicated, follow product manufacturer's written instructions.
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- B. All products shall be inspected for defects and cracks before being lowered into the trench, piece by piece. Any defective, damaged or unsound pipe, fitting or drainage structure or any product that has had its grade disturbed after laying, shall be taken up and replaced. Pipe ends shall be protected to prevent earth or other material from entering the pipe during construction. The interior of the pipe shall be free from dirt, excess water and other foreign materials as the pipe laying progresses and left clean at the completion of the installation.
- C. Install piping system 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. Follow product manufacturer's instructions for the use of lubricants, cements, and other special installation requirements.
- D. Use Manholes or Catch Basins for changes in direction, unless fittings are indicated. Use fittings for branch connections, unless direct tap into existing sewer is indicated.
- E. Use 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.
- 3.4.2 Trench Excavation
  - 3.4.2.1 Excavation
    - A. Excavate trenches to ensure that sides will be stable under all working conditions. Slope trench walls or provide supports in conformance with all local and national standards for safety. Open only as much trench as can be safely maintained by available equipment. Backfill all trenches as soon as practicable, but not later than the end of each working day.
    - B. Where trench walls are stable or supported, provide a width sufficient, but no greater than necessary, to ensure working room too properly and safely place and compact haunching and other embedment materials. The space between the pipe and trench wall must be wider than the compaction equipment used in the pipe zone. Minimum width shall be not less than the greater of either the pipe outside diameter plus 16 in. or the pipe outside diameter times 1.25, plus 12 in. In addition to safety considerations, trench width in unsupported, unstable soils will depend on the size and stiffness of the pipe, stiffness of the embedment and in-situ soil, and depth of cover.

Table 6-1

Minimum Trench Widths	Minimum	Trench	Widths
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Pipe Diameter,	Minimum Trench in.
in. (mm)	(m)
4 (100)	21 (0.5)

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6 (150)	23 (0.6)
8 (200)	26 (0.7)
10 (250)	28 (0.7)
12 (300)	30 (0.8)
15 (375)	34 (0.9)
18 (450)	39 (1.0)
24 (600)	48 (1.2)
30 (750)	56 (1.4)
36 (900)	64 (1.6)
42 (1050)	72 (1.8)
48 (1200)	80 (2.0)
54 (1350)	88 (2.2)
60 (1500)	96 (2.4)

C. When supports such as trench sheeting, trench jacks, trench shields or boxes are used, ensure that support of the pipe and its embedment is maintained throughout installation. Ensure that sheeting is sufficiently tight to prevent washing out of the trench wall from behind the sheeting. Provide tight support of trench walls below viaducts, existing utilities, or other obstructions that restrict driving of sheeting.

# 3.4.2.2 Dewatering

- A. Do not lay or embed pipe fittings or drainage structures in standing or running water. At all times prevent runoff and surface water from entering the trench.
- B. When water is present in the work area, dewater to maintain stability of in-situ and imported materials. Maintain water level below pipe bedding and foundation to provide a stable trench bottom. Use, as appropriate, sump pumps, well points, deep wells, geofabrics, perforated underdrains, or stone blankets of sufficient thickness to remove and control water in the trench. When excavating while depressing ground water, ensure the ground water is below the bottom of cut at all times to prevent washout from behind sheeting or sloughing of exposed trench walls. Maintain control of water in the trench before, during, and after pipe system installation and until embedment is installed and sufficient backfill has been placed to prevent flotation of the pipe, fitting, or drainage structures. To preclude loss of soil support, employ dewatering methods that minimize removal of fines and the creation of voids in in-situ materials.
- 3.4.2.3 Removal of Rock

Rock in either ledge or boulder formation shall be replaced with suitable materials to provide a compacted earth cushion having a thickness between exposed rock and the pipe of at least 12 inches (0.3m). Where Bell-and-Spigot pipe is used, the

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cushion shall be maintained under the bell as well as under the straight portion of the pipe. Rock excavation shall be as specified and defined under section 02300 Earthwork.

3.4.2.4 Removal of Unstable Material

Where wet or otherwise unstable soil incapable of properly supporting the pipe system, as determined by the Engineer, is encountered in the bottom of a trench, such material shall be removed to at least 24 inches below bottom of pipe and replaced to the proper grade with select granular material, compacted as directed by the engineer.

### 3.4.3 Bedding

A stable and uniform bedding shall be provided for the pipe and any protruding features of its joint and/or fittings. The middle of the bedding, equal to one-third of the pipe outside diameter, shall be loosely placed while the remainder shall be compacted to a minimum of 90% of maximum density per AASHTO T99, or as shown in the plans. Pipe bedding shall be a minimum of 4" - 6" in thickness. The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe.

#### 3.4.4 Placing Pipe

Each pipe shall be thoroughly examined before being laid; defective or damaged pipe shall not be used. Pipelines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Pipe shall not be laid in water, and the pipe shall not be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches shall be provided as directed by the engineer; see dewatering section.

### 3.4.5 Jointing

- A. Joints shall be constructed as described herein and in accordance with manufacturer's installation instructions.
- B. All Bell-and-Spigot pipe joints shall be thoroughly cleaned. Joint lubricant, supplied by the manufacturer, shall be applied evenly to entire interior of bell and gasket on spigot prior to assembly.
- 3.4.6 Backfilling

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3.4.6.1 General

Backfill material, placement, and compaction shall be constructed in accordance with the specifications herein and the product manufacturer's published installation guides.

#### 3.4.6.2 Backfilling Pipe in Trenches

After the pipe and pipe system have been properly bedded, selected material from excavation or borrow and conforming to ASTM D2321 Class I, II, or III material, at a moisture content that will facilitate compaction, shall be placed along both sides of pipe in layer depths to ensure minimum compaction density is obtained evenly throughout the backfill material. The backfill shall be brought up evenly on both sides of pipe and pipe system for the full length of pipe. Fill shall be thoroughly stepped in place, or knifed in place prior to compaction. The fill shall be compacted under the haunches of the pipe, or . Each layer shall be thoroughly compacted with mechanical tampers or rammers. This method of filling and compacting shall continue until the fill has reached an elevation of at least 6 inches above the top of the pipe. The remainder of the trench shall be backfilled and compacted by spreading and rolling or compacted by mechanical rammers or tampers in loose layers not exceeding 8 inches. Tests for density shall be made as necessary to ensure conformance to the compaction requirements specified below.

3.4.6.3 Movement of Construction Machinery

When compacting by rolling or operating heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Movement of construction machinery over a culvert or storm drain at any stage of construction shall be at the Contractor's risk. Any damaged pipe shall be repaired or replaced.

END OF SECTION 3347